Climate Adaptation in Coastal Caravan Parks
Economic Value and Equity Literature Review
Report 1

First Report of the ‘Value and Equity Framework for Climate Adaptation: Coastal Caravan and Camping Parks Case Study’ Project
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About this Literature Review

This literature review is the first report generated through the Value and Equity Framework for Climate Adaptation: Coastal Caravan and Camping Parks Case Study project.

The review is targeted and brief following the guidance of the Western Coastal Board. The purpose of this literature review is twofold:

- First, to provide a brief overview of key pieces of information relevant to the project (‘the CCP project’)
- Second, to provide a ‘synthesis’ of these separate pieces of literature as required.

Like most literature reviews, this review captures currently available information, publications and reports relevant to this project. However, it provides a starting point and will require updating as new publications are developed in the area and old publications come to light.

The review is undertaken with seven sections:

1. Introduction to the project;
2. Valuation and its legitimacy;
3. Triple bottom line (TBL) assessment and decision making (i.e. incorporation of social equity and non-market economic information into decision making);
4. Caravan and camping park (CCP) management and adaptation to climate change impacts;
5. Decision pathways and decision support systems;
6. Conclusion; and
7. References.

These sections are detailed in turn.
1. Introduction

Caravan and camping parks (CCPs) on coastal Crown land occupy an important place in the social, economic and environmental landscape, providing multiple benefits to the public in various forms. They provide affordable holiday destinations and access to the coast’s myriad recreation and tourism opportunities. The physical character of many coastal towns and their foreshores is often heavily influenced by their caravan parks, while the summer influx of friends, family and visitors to enjoy the ambience of a beachside holiday has a profound effect on community. Coastal CCPs also play a crucial role in providing the majority of revenue for the day-to-day management of Crown land reserves along the Victorian coastline, and provide a range of flow-on benefits to local communities and their economies.

However, the location of coastal CCPs often renders them physically exposed to the risks associated with climate change, which in turn threatens the benefits and values they provide. Despite widespread recognition of the importance of CCPs, little evidence is available of the social and economic values of CCPs and the foreshore to the wide range of people who use them. Little is also known of community preferences for equitably sharing the burdens of different climate change adaptation options and their implications. Given the focus on risk management in climate adaptation, it is essential that value and equity are properly considered, as these are the primary determinants of consequence.

The Western Coastal Board, as one of Victoria’s Regional Coastal Boards charged with facilitating implementation of the Victorian Coastal Strategy (VCS), has long been interested in promoting full consideration of triple bottom line issues in coastal decision making. The Hierarchy of Principles in the VCS 2008 requires that integrated coastal zone management (ICZM) takes into account the environmental, social and economic implications of decisions, and that seeks to ensure an integrated analysis of economic, social and environmental and cultural heritage implications of decisions.

In response to these issues and the opportunity afforded by the Australian Government’s Coastal Adaptation Decision Pathway program (CADPP), the Western Coastal Board and Deakin University developed the Value and Equity Framework for Climate Adaptation: ‘Coastal Caravan and Camping Parks Case Study’ project (CCPs project). Contributions were received from a range of regional partner organisations.

The CCPs project aimed to generate new information on economic value and social equity and provide guidance on how that can be used to improve decision making for climate adaptation.

The project has been developed in three distinct phases:

- A literature review to assess current knowledge concerning non-market economic value and social equity in caravan parks and adaptation. This informed the development of the methodology for field research and the operation of the Decision Support Framework.
- Targeted field research to estimate market and non-market economic values and generate social equity preferences of campers and residents in adjacent towns.
- A Decision Support Framework to illustrate how to generate, interpret and apply social and economic information in key adaptation decision-making processes.
Overview

Non-market valuation is a well-established field of economics. Very broadly it encompasses the valuation of benefits and costs which are not typically traded in markets. While a night at a CCP has a price, this price is not necessarily set by a fluid and commercially operated market. While society may value goods and services in different ways (e.g. economically, socially, environmentally), in this review, valuation means economic and monetary valuation.

Monetary valuation is legitimate and justified because money is a simple, easy and efficient measure of the value of goods and services exchanged between people and is often used as a proxy, even where adjusted, for wellbeing e.g. income per capita adjusted for non-monetary wellbeing. Money has its problems but compared with alternatives is preferred because of its simplicity and applicability in a multitude of complex situations (see for example Smith 1776 and his definition of value in exchange). Because non-market valuation should form part of a triple bottom line assessment, it does not obviate other value systems (e.g. social and environmental values), particularly in this project because social equity considerations inform part of the development of a decision support framework.

While there is a paucity of literature in the specific area of coastal CCPs, there is an extremely strong history of valuing parks and outdoor recreation across the world using non-market valuation methods such as travel cost, contingent valuation and choice modelling. Much work has been done on the valuation of coasts and beaches in the United States and Europe. In Australia, this work is more limited but there are publications that exist using these methods. The literature on the non-market valuation of relevance to the project may be broken into six main groupings:

- Values of the coast, including Victoria’s coast;
- Values of beaches and foreshores in Australia;
- Values of recreational use of Australian National Parks;
- Overseas related camping studies;
- Australian environmental economic valuation guides; and
- More general publications.

These are reviewed in turn.

2.1 Values of the coast including Victoria’s coast

The Victorian Coastal Council commissioned a study by URS (2007) into the value of Victoria’s Coast. The study encompassed market and non-market economic values associated with the coast, including a review of the ecosystem goods and services approach to valuation. Of particular relevance to this project was the travel cost study undertaken. In the travel cost study URS estimated the mean value of a visit to the coast, per person per day, of approximately $45 (in 2007 dollars). This value will be highly relevant to the CCP project for comparison with values attained from the case studies.

Although not yet publically available, the Department of Sustainability and Environment (DSE 2011a) Public Land Services is preparing a Cost-Benefit analysis of Port Phillip Bay Beach Renourishment. The Department will obtain its benefit measures from beach loss and impacts on property values. Consideration of possible impacts of climate change was considered outside the scope of the project (DSE 2011a). Previously related studies included a report prepared by PWC (2003) which transferred values obtained from KPMG (1997) who in turn based their non-market values from Adelaide’s beaches (i.e. Kinhill Stearns and Reidel and Byrne 1983).

In addition, DSE through the Victorian Future Coast Program, are developing a guide on undertaking economic analysis of adaptation options for Victorian agencies (Ross Martin and Kate Wood 2011, pers. comms, DSE, Melbourne); this is not yet publicly available. This report would be particularly relevant to the project given it provides guidance on how agencies should use economic valuation and economic analysis in assessing adaptation options.

In contrast to the DSE studies provided above, Blackwell (2007a) takes an ecosystem goods and services approach to value Australia’s coastal biomes for the Coastal CRC. Blackwell’s work provides estimates derived from global assessments and a synthesis of individual studies of the values of Australia’s natural coastal biomes like estuaries, beaches, mud and sand flats, and mangroves. This work provides an alternative framework for assessing the economic value of the environmental resources for the CCP project. The work also highlights that there are a large number of gaps in available estimates of the values of coastal biomes in Australia.

Lastly, Kirkpatrick (2011, 2012) uses the work of Blackwell (2007a) and other documents to outline the economic
values of Australia’s natural and built coastal assets as part of an NCAReFF project. This is an excellent literature review of coastal economic values and is thus particularly relevant for the CCPs project.

Value of beaches and foreshores in Australia

Most of the work in Australia on the value of beaches and foreshores uses market values with some work using non-market travel cost methods but as Blackwell (2007b) points out there is little or no work done on the non-use values associated with beaches. The choice modelling work of the CCP project has the potential to be an Australian pioneer for establishing non-use values for beaches.

A number of examples of the work currently being conducted on beach and foreshore values around Australian highlight this knowledge gap and provide important backgrounds to establishing values for coastal CCPs. This is particularly relevant to the CCPs project given adjacent beaches are often integral components of CCPs’ recreational offerings. These examples include:

Queensland beaches:
- Blackwell (2007b) established economic values for recreation at Mooloolaba beach on Sunshine Coast, Queensland using the individual travel cost method. The beach has a number of abutting coastal CCPs.
- Blackwell, Raybould and Lazarow (2012) review Sunshine Coast and Gold Coast council budgets for beach maintenance, estimate monetary estimates of the recreation values associated with these beaches and compare the advantages of each council in addressing possible climate impacts. This type of analysis is relevant to the CCP project because it shows how social economic values can be used to identify adaptation paths for coastal councils, drawing on their comparative advantages and historical development and planning practices.
- Raybould and Mules (1999) used market values to value beach protection on the Gold Coast by using tourism receipts as a benefit contrasted with beach works as a cost. This work shows that market values can be successfully incorporated into economic analysis to provide a financial case for beach and foreshore (which includes adjacent CCPs) protection.

NSW beaches:
- AECOM (2010) found that for the next 10 years, the costs of nourishing Sydney’s beaches would be $300m with subsequent nourishments costing $120m every ten years. Renourishment net benefits (using market values only – property, recreation revenues, rates revenues) were found to exceed costs at chosen case study sites in the order of tens of millions of dollars.
- Related to the work of AECOM (2010) is a study by Withycombe et al. (n.d.) who scope the viability of extracting offshore sands for Sydney beach nourishment. A number of case studies are conducted quantifying the benefits of avoided loss from property values, beach visitor expenditure, rates revenue and non-market (consumer surplus) values for beach users. Overall net benefits for such a program are documented and planned to be put before the NSW Treasury to seek funding to progress the program.
- Anning, Dominy-Howes and Withycombe (2009) used travel cost and contingent valuation to estimate people’s non-market values for beach erosion, the foundation work to that of Withycombe et al. (n.d.). Given the CCP project includes an assessment of non-market value these studies are also relevant.
- Carlsen (1997) estimated market and non-market values for recreation and tourism on northern NSW coastal public land to help prepare a regional audit of public lands for the Natural Resources Audit Council of the NSW Government. This provides an example of the value and importance of public land to the people of NSW and how economic information on coastal public land is critical to its good management.

Other states:
- Concurrent studies to those of Queensland and NSW for Perth’s (e.g. DIP, 2007) and Adelaide’s beaches (e.g. Burgan 2003) are evolving to help guide coastal management in these jurisdictions. These provide an example of the extent of economic non-market valuation, including the use of travel cost, in helping decision making over Australia’s coastal resources.

2.2 Value of recreational use of national parks in Australia

While non-market values of national park recreation may appear to be different to that of CCPs, the two are historically connected. The travel cost method was first proposed by Hotelling (1949) as way to value recreation in the United States’ estate of national parks. Clawson (1959) and Clawson and Knetsch (1966) went on to develop the mechanics of the method. In Australia, there are a number of examples of the use of the method to valuing National Parks. For example, Beale (1995) used the travel cost method to estimate the recreational value of Carnarvon George National Park at $40m in 1992/3. Chotikapanich and Griffiths (1998) went on to find that Beale’s (1995) benefit estimates were possibly six times the size of those originally reported by Beale (1995), further bolstering the non-market values held for the park.

In Australia, there has been considerable growth of the

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use of choice modelling to provide economic values for national parks, e.g. Bennett (various dates, e.g. 1984). Bennett was a founding developer of the application of choice modelling in Australia as a response to the criticisms directed at contingent valuation. This history is important to understanding the rigour of choice modelling and its advantages and disadvantages for the CCP project.

2.3 Overseas related camping studies

To my knowledge, there have been no examples of non-market valuation studies of caravan and camping in Australia. Even the literature on non-market values for camping and caravanning in Europe and North America is sparse. This review has located one important study in the United States (Brox and Kumar 1996) but this does not provide non-market values. The details of this and the other studies are as follows:

- Brox and Kumar (1996) found that camping and caravanning were, from an economic perspective, ‘inferior goods’; as people’s incomes rose, their demand for the good falls or as incomes fall, people’s demand for these goods rise. This finding suggests that in recessionary times, CCPs may offer less well-off people the opportunity to take a holiday break. This economic finding has important and social equity considerations for the CCP project.

- Becken and Simmons (2007) used the concept of yield to compare the relative sustainability of campers, measured by the carbon produced, compared with other tourists. While not directly relevant to the CCP project, this provides an example of sustainability or triple bottom line assessment helping in the management of campers.

- Hailu, Boxall and McFarlane (2005) found that attachment to a place as a result of previous visits can influence the benefits (consumer surplus) estimated through recreation demand (travel cost) models. This finding suggests that ‘attachment to place’ may be an important consideration in analysing the results of the non-market valuation estimates for the CCP project.

2.4 Australian environmental economic valuation guides

There are a number of environmental economic valuation guides available in Australia which outline the non-market valuation methodology and the incorporation of non-market values into decision making. Determining whether each of these guides has had an influence on coastal management practice is difficult to determine because of the general nature of these guides but historically it is fair to say that other mechanisms such as planning and engineering expediency have been used to prioritise and allocate resources to coastal management. Also, if a regulatory impact statement is required in the changing of coastal laws, then State or Commonwealth government cost benefit guides will at least have been referred to. Adherence to the use of non-market values however, is not always applied in practice because of oversight, ignorance, disapproval or time constraints. Some of these guides are outlined below.

The Commonwealth Government has a number of guides to non-market and environmental valuation including:

- the Commonwealth Departments of the Environment, Sport and Territories; Finance; and Resource Assessment Commission (1995) Techniques to Value Environmental Resources: An Introductory Handbook; and


The first guide outlines the techniques used to value environmental resources. The second guide considers the valuation of non-market benefits from biodiversity conservation. Both are applicable to the project generally but no specific coastal or CCP examples are provided.

A guide prepared by Travers, Elrick, and Dalton (2011) reviews the existing approaches for the economic assessment of climate change adaptation for the Department of Climate Change and Energy Efficiency funded Coastal Adaptation Pathways (CAP) project. The project is for the Peron Naturalist Partnership coastal zone in Western Australia. This guide recommends choice modelling for assessing localised adaptation and benefit transfer for regional assessment. Because each CCP has specific local issues, the choice modelling approach may be best for assessing the values associated with adaptation options. The eleven other CAP projects include:

- Rising to the challenge – developing flexible coastal adaptation pathways for local communities (TAS): Local Government Association of Tasmania

- Choosing a preferred pathway for Port Phillip Bay (VIC): Municipal Association of Victoria

- Climate Change Adaptation Tool for the Water Industry (NSW/National): Water Services Association of Australia

- Pilot Council and Insurance Partnership on Climate Adaptation Methods (QLD): Sunshine Coast Council

- Assessment and Decision Frameworks for Existing Seawalls (NSW/QLD): Sydney Coastal Councils Group


- Demonstrating Climate Change Adaptation of Interconnected Water Infrastructure Project (NSW): Sydney Water
Multi-Criteria Approaches to Adaptive Coastal Development (prioritising coastal adaptation options) (NSW): Sydney Coastal Councils Group and Local Government and Shires Associations of New South Wales
Decision Support for Adaptation Action (NSW): Hunter Councils / Hunter and Central Coast Regional Environmental Management Strategy
Climate change decision support framework and software for coastal Councils (SA): Local Government Association of South Australia
Deciding for the coast – implementing effective adaptation actions (VIC): South East Councils Climate Change Alliance.

(Minister for Climate Change and Energy Efficiency, 2011)
The Victorian Future Coasts: Economic Valuation Guide, as discussed above, while not yet publicly available, is likely to be available to Victorian agencies. Because of its nature it is highly applicable to the CCP project;
The Queensland Government’s environmental economic valuation guide (EPA Qld 2003) is not directly relevant to the project but outlines the non-market valuation methods proposed to be used in the CCP project;
The NSW Government’s Environmental Valuation Reference Inventory website (accessed 11 May 2011: http://www.environment.nsw.gov.au/publications/evri.htm) provides a database of non-market valuation studies, a number of which have been related to coasts and beaches of relevance to the CCP project. The coastal categories of values draw on studies from overseas and Australia. These studies were reviewed by Blackwell (2003, 2007a, 2007b) and others e.g. Kirkpatrick (2011, 2012) which are outlined above.

2.5 More general publications

There are a number of more general publications which relate to non-market valuation and economic analysis that have influenced public policy decisions in the coastal zone which are of obvious relevance to the CCP project. These include the following.

The Queensland Inquiry into the non-extractive users of Fraser Island (Hundloe McDonald and Blamey 1990) used travel cost and contingent valuation to estimate the economic values of camping and outdoor recreation including 4WD use of the island. These non-market values were associated with the proposed conservation of the Island as a National Park and compared favourably to the market values from continued logging and sand mining of the island. This economic comparison of benefits resulted in the island being conserved as part of the Great Sandy Region National Park, an important feature for the CCP project in comparing the market and non-market values associated with the CCPs, their various adaptation options, and the consequences for social equity.

There are a couple of studies in Australia that estimate values for ocean views using hedonic pricing (Fraser and Spencer 1998; Pearson, Tisdell and Lisle (2002) and seascapes using contingent valuation (McCarty 2006). These studies show that people hold significant non-market values for sea and coastal views. These non-market values are now available in guiding coastal management and planning policies that involve decisions about these views. Many of the coastal and sea vistas associated with CCPs are likely to be of value to both campers and residents. These studies are therefore relevant to the CCP project.

ABARE was engaged by the Great Barrier Reef Marine Park Authority to prepare a report (Green and Lal 1991) on charging users of the Park and resulted in environmental management levies being applied to help manage the park. This work was commissioned by the Authority in response to rising management costs and information requirements for the park as well as increased use, conflicts over use, and potential damage to the reef ecosystems. The Great Barrier Reef Ministerial Council, which oversaw the operation and funding of the Authority, indicated in 1991 that tax payers should not be the only ones contributing to the management costs of the park, and users should supplement government appropriations (Green and Lal 1991). Prior to this, Driml (1987) and Hundloe (1990) had prepared some market and non-market values for the reef which were influential for the park’s management. This evolution of work is directly relevant to the CCP project in identifying economic instruments that can help manage CCPs adaptation in the face of climate change.

Further afield in the United States, non-market valuation, including the use of travel cost, contingent valuation and choice modelling have been highly influential in the management of coastal and marine resources. See for example the National Oceanic and Atmospheric Administration’s National Economics Program (http://stateofthecoast.noaa.gov/coastal_economy/nonmarket.html; accessed 16 Aug 2012). Similar examples are also available from the European Union (e.g. Hanley, Bell, Alvarez-Farizo 2003).

Returning to Australia, more broadly there is a vast literature on outdoor recreation, tourism and social values. For example Lazarow, Miller and Blackwell (2007) assess the socio-economic values associated with surfing and the important role that this outdoor recreation activities play in Australian society. Camping and caravanning has a similar economic nature; most of the benefit may lie outside the market, thus warranting the use of non-market values in ascertaining their economic value and the consequences from climate impacts or adaptation responses on these values and social equity.
3. Triple bottom line assessment and decision making

Overview

This section reviews triple bottom line assessment and its role in decision making where relevant to the CCP project. The review is grouped around four main themes:

• Social equity, triple bottom line assessment and sustainability
• Incorporation of non-market values into decision making
• Government Policy; and
• Risk and triple bottom line assessments with land managers

These are reviewed in turn.

3.1 Social equity, triple bottom line assessment and sustainability

Incorporating social equity into decision making is fundamentally the role of government and is considered at all levels of government in Australia and overseas. Social equity is at the heart of the concept of Ecologically Sustainable Development (ESD), which began with Rawls’ (1971) theory of justice, not too distant from the Reciprocity Ethic, ‘Do to others as you would have them do to you’ (The Bible, Luke 6:31). ESD is reached through intergenerational and intragenerational equity (Brundtland 1987). Triple bottom line or integrated assessment approaches include social equity considerations through social assessment but also through environmental and economic ethical assessments and values (Elkington 1997).

For example, Scarborough and Bennett (2008) use a choice modelling exercise to establish distributional weights for costs benefit analysis using community preferences for intergenerational utility. Scarborough (2011, p. 145) went further and addressed the question of the relationship between intergenerational equity and the social discount rate to promote

...the application of intergenerational distributional weights as a means of incorporating intergenerational equity preferences in policy analysis. Intergenerational equity-adjusted social discount rates are derived as a means of decomposing the intergenerational equity aspect of the social discount rate. The work has significant policy implications for projects with long time frames given the sensitivity of Cost Benefit Analysis outcomes to decisions regarding the social discount rate.

Barnett et al. (2011) in their Australian Research Council Linkage (with state and local government agencies) funded project Equitable Local Outcomes in Adaptation to Sea Level Rise focussed on East Gippsland, Victoria. Barnett (2011, p. 15-16) indicates the wishes of people in regards to the incorporation of social equity in adaptation for East Gippsland:

• Equitable adaptation must take time, just as sea level rise will occur over a long period of time.
• Equal treatment of all parties subject to the State planning system is required and that planning guidelines and decisions need to be universally applicable, clear and unambiguous.
• Communicating climate change risks carries with it risks of unfair outcomes.
• Local ownership of the adaptation process is the ‘right’ way to proceed.

A social research project entitled Exploring local narratives of environmental change and adaptation recently completed for Port Fairy was a partnership project between DSE and the Victorian Centre for Climate Change Adaptation Research (VCCAR). The research sought to examine how qualitative social research and narrative analysis can be used in adaptation planning, particularly in understanding vulnerability and adaptive capacity.

Blackley and Scarborough (2010, p. 5) argue that ‘decision-making processes are unable to adequately take into account or analyse the implications of decisions unless there is a consistent and equitable platform to compare development impacts and policy alternatives’. As part of a triple bottom line assessment, economic information will help in providing consistency and an analysis of equitable outcomes (who wins and loses and how much they lose and win).

3.2 Incorporation of non-market values

The previous sections of this literature review provide a multitude of examples of the preparation of non-market values for incorporation in triple bottom line assessment or to assess the social equity outcomes for a particular policy decision. In addition to these examples, Blackwell (2008a, b & c) highlights the lack of integration in assessing various coastal issues in Victoria including waste water ocean outfalls, dredging in Port Phillip Bay and the building of an ocean access boat ramp and rock wall at Bastion Point.
Blackwell (2008a, b & c) referred to the need for non-market economic valuation of social and environmental impacts to improve public policy decision making on issues which affect the coast and the equity of people who value the coast.

Where non-market values are not available for land managers, they will be unable to undertake triple bottom line assessments. However, with the advent of this project, CCP managers should be better prepared to include economic values and social equity in their triple bottom line assessments. One of the problems with integrating values from different disciplines is that the benefits of one assessment may be watered down, misunderstood or inappropriately valued. For these reasons, some argue (e.g. Blackwell 2008b & c) that social and environmental values should be included in an integrated assessment, so that they can be compared using a common numeraire, that is, money. When values are integrated using multi-criteria analysis or a risk assessment the preferences obtained are dependent on the criteria used.

Examples of the success of triple bottom line assessment, through the incorporation of non-market values, in helping deliver successful coastal management have been partly outlined, in the first section of this literature review. In addition to these Western Australia has uniquely undertaken some strategic sustainability reform. This reform has occurred through the use of integrated assessment as documented by Kay, Elliot, Panizza and Donaldson (1997) and evidenced by the subsequent development of the states’ Sustainability Strategy (Government of Western Australia 2003).

3.3 Government policy

Fundamentally for this project, the Victorian Coastal Strategy (Victorian Coastal Council 2008) gives direction, under the Coastal Management Act 1995 (Vic), for planning and managing the impacts of activities on coastal Crown land which includes the CCPs case study areas considered in this project.

Blackley and Scarborough (2010, p.4) indicated that there are a range of policies governing coastal management and a requirement for triple bottom line assessment to be incorporated in decision making in Victoria through:

- State and regional development policies such as:
  - Growing Victoria Together (Department of Premier and Cabinet 2005);
  - The Great Ocean Road Regional Strategy (GORRS) (DSE 2004); and
  - The Barwon South West Regional Strategic Plan (Regional Development Australia and Regional Development Victoria 2010).
- Victorian Coastal Strategy 2008 (Victorian Coastal Council 2008) Hierarchy of Principles implemented through the State Planning Policy Framework at Clause 12.02-1, enforced by the Coastal Management Act 1995 (Vic), namely:
  - Principle 2. Undertake integrated planning and provide clear direction for the future: Ensure ICZM takes into account the environmental, social and economic implications of decisions.
  - Principle 3. Ensure the sustainable use of natural coastal resources: Ensure an integrated analysis of economic, social and environmental and cultural heritage implications of decisions.

Further, using economic information in undertaking the assessment of benefits and costs of adaptation to climate change is implicit within the Productivity Commission’s (2012) draft report recommendations. For example the Productivity Commission (2012, p. 2) recommends ‘[f] or reforms with low up-front costs and potentially large but distant benefits some preparatory action could be worthwhile. The case is stronger for reforms that would deliver benefits under a range of climate change scenarios’ such as ensuring planning regulations are flexible and ‘respond to uncertain climate change impacts’ (Productivity Commission 2012, p. 2).

More broadly across natural resource management in Victoria, and as part of the Victorian Investment Framework, the Natural Resource Investment Program (NRIP) identifies ecosystems as assets and in which coastal and marine ecosystems are included by the West Gippsland Catchment Management Authority (WGCMA, 2011). This is a reflection of an assets based or ecosystem good and service approach to valuing and managing natural resources inter alia the approach at the Commonwealth level for coastal management and economic values: Kirkpatrick (2011); Blackwell (2007a). However, while the framework gives a good philosophical overview and outline of methods and approaches, there are no practical implementation examples. For example, how would a coastal CCP faced with an eroding coastline and limited funds undertake an integrated assessment which guides its adaptation strategy?

3.4 Risk and triple bottom line assessments with land managers

From the Coastal Adaptation Project Expression of Interest for this project, (Western Coastal Board p. 2) it is clear that coastal land managers need more information about coastal climate change to meet their obligations and in particular:

The national first pass assessment highlighted risks to properties at Port Fairy and identified a key knowledge gap of ‘Little known about social vulnerability, cost-benefit of adaptation options and their social acceptability.’(p145)…
The decision-making framework will be designed to be flexible and have application to many coastal land management issues. It will improve current decision making processes that require triple-bottom line assessments but do not have the information or frameworks to properly consider triple bottom line issues.

In addition to the First Pass Assessment (Department of Climate Change 2009) there are second (Future Coasts 2009) and third pass assessments (forthcoming) which, because they occur at a higher resolution, once they are produced, can be used by Land Managers for aiding in risk and triple bottom line assessments. These would ideally fit within a decision support tool, system or website for land or local managers.

Other relevant risk assessments to this project include:
- In Victoria: Gippsland Coastal Board (2008) Climate Change, Sea Level Rise and Coastal Subsidence Along the Gippsland Coast; and

These three examples provide information on the likelihood and risks associated with inundation from the sea, both at a regional and local scale. The first provides an explicit example where coastal managers are using risk assessment as part of triple bottom line decision making in preparing for climate change. These three examples are relevant because general and specific likelihood and consequence of sea inundation can be used to interpret the likely losses to coastal land and assets and how these may impact social equity. These risk assessments are therefore critical to assessing the costs and benefits of options for adaptation in response to possible climate change scenarios.

One problem in coastal adaptation at the local level is that land or coastal managers may be significantly under-resourced (Gurran, Norman, Gilbert, and Hamin 2011). Critical to successful adaptation planning is having the required information (readily available in a single repository - a ‘one stop shop’) and staff to help with these assessments - to have the cost benefit information to undertake any trade-off analysis in the social, economic and environmental impacts and how adaptation options may bring the best outcomes for the represented community and users. The Western Coastal Board (2011, p. 2) continues:

Managing risk requires an understanding of consequences. There is a paucity of economic information to support understanding of consequence. Estimation of market and non-market values and development of the framework will improve this understanding, provide a framework to consider these issues and enhance cost-effectiveness of adaptation.

The project will enhance adaptive capacity of all stakeholders through improving understanding of consequences of adaptation options and delivering a framework to enable valuation information and community preferences to be factored directly into decision-making.

This last point and the earlier comment about a one stop shop or at least a decision support tool that brings the valuation information and community preferences directly into decision making is a key gap in resources (and information). As an example, the previous OzEstuaries website had a number of decision support tools and was setup by the no longer existent Cooperative Research Centre for Coastal Zone, Estuary and Waterway Management. Part of the OzEstuaries website has morphed into the OzCoasts website (http://www.ozcoasts.gov.au/) run by Geosciences Australia and is linked to the First National Pass Assessment (DCC 2009). These facilities are discussed in more detail in Section 4.
4. Caravan and camping park management and adaptation to climate impacts

Overview

This section reviews the literature relevant to CCP management and adaptation to climate impacts. The focus of the review is in the following main areas and these are discussed in turn:

- CCP climate adaptation and other responses to natural resource management issues
- General adaptation to climate change
- Coastal climate adaptation in regional Victoria
- Planned retreat as an adaptation option, Kingscliff
- Managing and planning for change
- Victorian adaptation
- Success in using frameworks

4.1 CCP climate adaptation and other responses to natural resource management issues

There is limited literature on CCP adaptation to climate change impacts. For CCP responses to other natural resource management issues like flooding, the literature includes:

- Yeo and Bewsher (2007, p. 1) undertook an analysis of flood risk management for caravan parks in Victoria. They found that
  
  ...for proposed new parks or park extensions, flood risks can be managed through the planning system. For existing parks, options include better identifying flood risks, ensuring the provision of flash flood warning systems where appropriate, and raising access roads. Much can be done to improve the quality of emergency management planning in caravan parks, and a draft document containing guidelines and a template has been prepared to assist caravan park owners to prepare meaningful flood emergency management plans and to provide councils with a standard against which they can assess the plans submitted for approval. Measures to encourage caravan park owners to engage in flood risk planning include a proactive approach by councils and CMA's, education via industry newsletters, and amendments to the relevant Regulation.

- Yeo (2003) found that caravan and camping parks in New South Wales were highly exposed to the risk of flood and managers were not well equipped to respond. Yeo recommends rigorous implementation of tighter regulations to reduce flood risk which better protect the health and safety of residents and for managers to be better equipped to self-manage risk.

- Hebusch (2009) undertook research on Caravan Park Flood Evacuation Time Line Modelling and found that CCP users are one of the most vulnerable groups prone to adverse impacts of flood. Despite regulations that vans must be moveable, aging stock and the transiency of owners means that vans can not necessarily be evacuated and can block the evacuation of more easily moved assets. Therefore, Huebusch (2009) identified the need for a user friendly evacuation procedure.

- Cioccio and Michael (2007) review the impacts of the 2003 fires in North East Victoria. Their review, which included terrestrial CCPs, found that insurance was inadequate as a risk management strategy. However the study found that collective approaches to marketing to rebuild the confidence of future visitors worked well. Insurance and reputation are important issues for considering adaptation options for CCPs on coastal Crown land.

4.2 General adaptation to climate change

In contrast to the literature on CCP adaptation to climate change impacts, there is a vast body of literature on general adaptation to climate change and this will not be referred to here other than those studies which have direct relevance.

For example, some recent work has been prepared on how ski parks may best adapt to the impacts of a changing climate (Morrison & Pickering 2012). Morrison and Pickering (2012) review the pros and cons of adaptation options for Australian ski parks, given a constrained resource (water and snow) and competing uses and non-uses of water for making snow (e.g. ecosystems, agriculture and fire protection). Given these competing interests, the authors recommended a collaborative adaptation and change policy for the Australian Alps. Such a policy may also be best where there is limited local public space on the coastal fringe and CCPs are one competing use.
4.3 Coastal climate adaptation in regional Victoria

Figure 1 comes from Barnett et al. (2011) in their Australian Research Council Linkage (with state and local government agencies) funded project *Equitable Local Outcomes in Adaptation to Sea Level Rise* focussed on East Gippsland Victoria. The extract provides an indication of innovative adaptation options for coastal CCPs in the areas of planning, land title, engineering and miscellaneous. The viability of these options could be assessed using market and non-market value information as well as social equity implications to devise a pathway for CCP adaptation.

4.4 Planned retreat as an adaptation option

One particular adaptation option is planned retreat. Svikis and Lofthouse (2011) believe this has not been given a sufficient hearing by the NSW government in planning for impacts along the coast. Victorian surf lifesaving clubs have successfully retreated in the past given eroding coasts (Elrick Dalton and Kay 2011) but with considerable funding from the Victorian Government.

At Kingscliff in NSW, the surf lifesaving club and caravan park have had hard coastal structures built as a short term response to severe erosion in these locations. A key finding from the Kingscliff experience was that “Pressure to make short-term reactive decisions in ‘knowledge poor’ environments is a significant cognitive and behavioural barrier to adaptation.” (DCC&E 2011, p. 12)

4.5 Managing and planning for change

CCP land managers in Victoria can also use the Department of Planning and Community Development (2008) General Practice Note: *Managing coastal hazards and the coastal impacts of climate change*. This note provides guidance on managing coastal hazards, the decision making process for assessing coastal hazard risk; and planning for development in coastal areas.

Coastal Management Plans (CMPs) could be used as a tool for providing for adaptation options for CCPs. For example, the Otway Coastal Management Plan (Crocker 2012) – identifies the relocation of the golf course and pony club as options for creating more public open space. The pony club has been recommended (no. 42) as a place for enhancing natural and landscape values and to be considered as a site for short-term holiday camping. The ability to highlight and pursue options for increasing public space may also be a way of seeking additional space where CCP land is lost through climate impacts.

4.6 Victorian adaptation

Parks Victoria (2010) have prepared a risk assessment1 of the impacts from climate change which helped identify key risks to parks including:

- increased bushfire impacts;
- increased flood and storm impacts;
- hotter drier recreation conditions;
- increased and generalised ecosystem stress;
- four particular ecosystems at higher risk; and
- increased financial and economic costs and impacts on organisational effectiveness.

Parks Victoria (http://parkweb.vic.gov.au/park-management/environment/climate-change/response) will respond through two streams:

1. actively dealing with extreme weather events that are unfolding here and now – fire, flood, storms and drought;
2. working with DSE and others on long-term research and adaptation to permanent climate change impacts such as warming, permanent shifts in rainfall and sea level rise.

The next step is to develop adaptation responses that will:

- focus on priority climate change issues;
- use an adaptive management approach;
- achieve balance between climate and non-climate risks; and
- focus on cost effective actions.

Parks Victoria will consult with the community and its stakeholders during the adaptation planning process. As draft plans and reports are developed, they will be available.

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1Parks Victoria identify in the risk assessment a number of possible impacts for the marine bioregions which overlap with the case study sites in the CCP research.
Planning based approaches

Victorian Coastal Strategy (‘Plan for sea level rise of not less than 0.8 m by 2100’), and related guidelines, and their effects on planning schemes, and associated VCAT decisions

More prescriptive coastal action plans

State Government provides new land for settlements, and claims land of abandoned areas – ‘a swap’ (i.e. plan new settlements and reclaim old ones)

Long lead-out periods to give people the opportunity to make choices themselves – e.g. give people twenty years to develop a strategy, maybe a relocation strategy, that fits with their life stage and financial circumstances, their preferences and values.

Retreat / move towns and settlements

Open up nearby and safer development areas, restrict new developments and upgrades in hazardous locations. Thus development will progressively shift; hazardous locations can still be used for recreational purposes, but capital value shifts from old to new over time

Add climate change overlays into the planning scheme

Climate change risk management plans required for new buildings in WSC, which may transfer risk to developers (but may not remove the risk of compensation to Local Government)

Government buys properties then offers vendors the option of renting back from Government, but with the caveat that Government will periodically review leases

Land title based approaches

Transferable development rights. If people move early they should get 80-100% of value of present property, and/or access to a new block at a subsidised price, and which is available with services. Compensation should decline with increasing time and amount of sea level rise.

Restructuring properties (where possible join blocks together to include more elevated land in a title)

Time-limited permits in areas that are of particular risk (say for 25 to 30 years of use). Restrict life of ownership of new properties, then re-zone land once period of ownership ends (e.g. 25 years as residential, then rezone as commercial, or park).

Caveat on titles that land is or could be subject to inundation, so owner is aware of the risk, develops land at own risk, and is not eligible for compensation (i.e. transfer risk to owners).

Land use titles that are revoked when a physical threshold is reached - a trigger event, e.g. flooding frequency, or erosion level

Engineering based approaches

Sea walls and associated engineering solutions (coastal defences)

Relocate sewerage pumping stations

Block stormwater drains to stop water welling up

Build a lock (barrier) across the entrance to prevent flooding from the sea

New sewerage infrastructure replacing septic tanks, and then in low-lying areas pumping waste water some distance away for treatment

Elevate walls and jetties when rebuilding when at the end of current lifespan (of 20-40 years)

Recycle urban water and use it to maintain freshwater supplies to rivers and wetlands to keep saline incursions at bay

Design replacements or upgrades of assets to allow for functionality given future rises in sea level

Transportable buildings

Miscellaneous

Improve predictions to reduce uncertainty about risks

Retrieve items of cultural heritage (especially Indigenous heritage) value at risk of inundation, and retrieve information from heritage sites before the sites are lost to the sea

Plant species that will be tolerant of changing conditions in the future (like higher salt levels in groundwater)

Shift timing of community events to periods where hazards are fewer (e.g. shift timing of Golden Beach fishing competition from summer to Easter, when fire risk is far lower)

Allow small firms to profit from providing the coastal vulnerability assessments required for planning permits
4.7 Success in using frameworks

The Regional Sustainability Indicators Framework, a triple bottom line assessment framework to assess sustainability in South West Victoria, has been established through the South West Sustainability Partnership1. Wallis, Kelly and Graymore (2010) found that the framework was not being used by local governments and land managers. Therefore Graymore (2011) undertook some additional research for the Partnership through participatory approaches to attempt to expand the Framework’s use in the local context. Similar dedicated participatory approaches may be required for this project to get CCP managers to develop and use their own adaptation pathway.

The Western Australian Local Government Association (WALGA) has developed a climate change management toolkit (www.walgaclimatechange.com.au/adaptation-plan-checklist.htm) and has listed a number of key domestic and international links for councils on adapting to climate change.

Amongst a range of possible responses, WALGA makes special mention of caravan parks for the relocation option:

- avoidance of activity or development, e.g. foreshore setbacks;
- temporary relocation or discontinuation of activity, e.g. recreation;
- permanent relocation of activity, e.g. foreshore caravan parks;
- changes to form and/or nature of development, e.g. building design;
- changes to use of land, e.g. agriculture, fisheries, urban expansion;
- physical protection, e.g. coastal engineering, building standards;
- upgrading of public infrastructure, e.g. dams, pipelines, roads;
- adjustment to activity and lifestyle, e.g. re-scheduling of outdoor sports;
- emergency response, e.g. storms, bushfires, heatwaves;
- awareness and expectation, e.g. information/understanding/education.

The East Riding of Yorkshire, U.K. and its neighbours are particularly at risk of an eroding coastline even without the impacts of climate change. In conjunction with the caravanning industry and the Environment Agency, the council has put in place a ‘rollback’ strategy because of the unsuitable costs and adverse environmental consequences from hard engineering solutions. The council makes special mention to the rollback of caravan parks as a coastal adaptation requirement. (www2.eastriding.gov.uk/environment/sustainable-environment/looking-after-our-coastline/coastal-change-getting-support/?locale=en):

‘Rollback’ provides a planning response to reducing the effects of coastal erosion on communities that can be applied to other coastal areas. However, the concept presented a particular challenge to local forward planning policy, in terms of seeking locations for ‘new’ (or replacement) buildings in open countryside.

The Western Australian Government (n.d.) has written about the success of the East Riding rollback strategy for the caravanning industry in its Coastal Vulnerability Assessment Projects List:

Partners such as the Local Planning Authority have looked at the implications of re-locating the parks, and developed guidelines, standards and policies within which any moves can be made. The rollback strategy for the caravan industry has, to date, been highly successful. Whilst moving inland, the viability of the caravan industry is being maintained, sustaining communities dependent on caravan tourism. The quality of tourism facilities and the local environment has improved.

While there is a Victorian state policy to prevent permanent residents in coastal Crown land CCPs, the National Sea Change Taskforce (Gurran, Hamin and Norman 2008, p. 5) identified caravanning as offering a key form of housing for low income and retiree Australians who are particularly vulnerable to coastal climate change impacts:

Those in temporary housing like caravans and manufactured homes, are at particular risk in the event of a major natural disaster. These housing forms are an important source of housing for low income Australians and retirees, particularly along the coast. Without proper insurance or ownership of land there is a high likelihood that tenants will face long term displacement in the event of a disaster.

The Taskforce (Gurran, Hamin and Norman 2008) recommends that:

- the sitting of caravans be such that it enables safe and easy evacuation for residents in the case of storm or hurricane events (p. 32);
- caravan parks have their design standards reviewed (p. 53). This could also apply to the design standards for tents and caravans.

For states other than Victoria where permanent residents are allowed on coastal Crown land CCPs, some consideration of the cost of doing these Taskforce recommendations for CCP users would be useful to ensure the most economic adaptation option is indentified. Part of the CCP project requires transferability of the findings to other states and consideration of permanent residents is therefore of consideration for CCPs outside Victoria.

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1The partnership includes Deakin University Warrnambool and Glenelg Hopkins Catchment Management Authority.
The Australian Local Government Association has identified that local councils are exposed to considerable risk of liability in the face of climate change (Barker and McKenzie 2011) and has identified a number of barriers to adaptation including a lack of:

- decision making power;
- consistency;
- clear guidance;
- materials and expertise;
- funding.

The Association therefore calls for regulatory reforms with a nationally consistent approach. Given that coastal CCPs on crown land do operate within local government jurisdictions and some CCPs are operated by Councils as a defacto Committee of Management (e.g. Warrnambool), these issues would also pertain to CCPs. This project may help to develop a nationally consistent approach to the management of CCPs climate adaptation.

Lastly, Simmons, Bushell and Scott (2010, p. 185) found that ‘the common barriers to adoption of environmental management systems by industry operators who chose not to participate have been concerns about time, expertise, cost and bureaucracy.’ The camping and caravanning industry was included in the case studies of the project and managing the impacts of climate change would of course be included in the preparation and accreditation of an environmental management system.
5. Decision pathways and decision support systems

Overview

In this section, literature links and web tools on decision pathways and decision support systems (called ‘tools’) are outlined. The literature is grouped into three main areas which are discussed in turn:

• An introduction to decision support tools;
• The need for a ‘one stop shop’ decision support tool for CCPs;
• Regional initiatives;
• National and international government initiatives.

5.1 An introduction to decision support tools

The Public Land Climate Change Adaptation Project (DSE 2011b) of the Victorian Government held a workshop in Geelong in November of 2011 which considered a number of issues for land managers and the types of assessment methods or decision support tools. These tools could be used to prioritise adaptation options and included cost benefit analysis, cost effectiveness, and multi-criteria analysis (MCA).

Cost benefit requires more information, especially on benefits compared to cost effectiveness analysis (CEA) and most CBAs do not go far enough with their benefit assessment to include non-market benefits as well as market benefits; the CCP research attempts to overcome this problem by providing an assessment of non-market values. CEA provides the least cost approach for a given objective rather than the best approach or that which provides the greatest net benefit to society. In contrast, MCA must integrate a number of criteria, and is thus dependent on the weightings attributed to these criteria.

5.2 A ‘one stop shop’ decision support tool for CCPs

As stated in section 2, in triple bottom line assessment, there is a need for a ‘one stop shop’ or a decision support tool that helps land and coastal managers include social, economic and environmental information in their decision making. A decision support tool that could bring the valuation information (obtained by this research project for example) and community preferences directly into decision making is a key gap in resources (and information) identified by the Western Coastal Board (2011).

As an example of a decision support tool for coastal management, the previous OzEstuaries website had a number of decision support tools and was set-up by the no longer existent Cooperative Research Centre for Coastal Zone, Estuary and Waterway Management. This has morphed into the OzCoasts website (http://www. ozcoasts.gov.au/) run by Geosciences Australia and has a number of online tools that can help with decision making such as the mapping and classification of habitat types for Australian estuaries, including their description and areas. This geographical information is useful in transferring non-market values across natural coastal assets (for an example of benefit transfer for coastal biomes see the work of Blackwell 2007c; 2006a; 2006b), an approach that would be useful in transferring CCP values attained from the research of the CCP project.

In addition to this tool, the maps available from the first, second and third pass assessments3, if provided via an integrated and consolidated web portal or decision support tool would also be invaluable to land managers.

5.3 Regional initiatives

There are a number of regional initiatives from the states and local level including initiatives from Victoria, regional NSW, and Western Australia.

Victoria

The Western Coastal Board (2011, p. 4) also refers to a relevant risk assessment framework and complementary project through the Victorian Centre for Climate Change Adaptation Research (VCCCAR):

The framework will be based on a climate impact assessment and support the implementation of the revised ISO 31000 risk assessment framework.4

Consultation with relevant parties will be undertaken to maximise the complementarity between this project and the VCCCAR project: Framing Adaptation in the Victorian Context.

3The first pass assessment was undertaken by DCC (2009) using Oz-Coasts maps. The second pass assessment was undertaken by Future Coasts (2009) using topographic (land) digital elevation model (DEM) data maps.
The VCCCAR framing of ‘multi-level and multi-actor adaptation responses in the Victorian context’ is to be presented as four ‘work packages’ to better inform adaptation policy and practice by local and regional Victorian authorities:

1. An overarching framework for adaptation – a decision-making ‘roadmap’ (Fünfgeld and McEvoy 2011);
2. A preliminary economic analysis of climate change impacts (Keating and Handmer 2011);
3. A framework development in selected case studies (forthcoming and continuous);

A number of forthcoming adaptation research projects outside the Round 1 framing project can be accessed through www.vcccar.org.au/content/views/adaptation_ projects and include:

• Round 2: Design-led decision support for regional climate change
• Round 3:
  - Governance models for adaptation and natural disaster risk management: legal, regulatory, institutional and financial assessment;
  - Decision Taking in Times of Uncertainty. Towards an efficient strategy to manage risk and uncertainty in climate change adaptation.

These VCCCAR projects are highly relevant to the CCP project. While not being necessarily about CPPs or coastal adaptation, their general application to climate change adaptation in Victoria will be useful for comparison to the CCP project and vice versa. Of particular note is their economic work (2 above) and their framework development including their decision making roadmap (1 and 3 above) combined with applications in local areas (4 above). These work packages mirror those of the CCP project and would be important in the development and roll-out of a decision support tool for the CCP project.

The Victorian Coastal Council Science Panel (2011, p. iv) refers to a number of emerging scientific issues for Victoria’s coast which are relevant to how land managers can best adapt to the possible impacts of climate change including:

Issue 1: Understanding the effects of increased climatic variability. Although predictions for future rates of warming and sea level rise to around 2050 are well defined with little prospect of major departures from current trends, impacts cannot be predicted accurately from changes to average climate alone. The Science Panel strongly encourages the development of the scientific understanding and tools needed (including monitoring) and better harnessing of existing data and information to predict local responses of coastal ecosystems and landforms to changes in climatic variability including extreme events, taking into account synergies between climate drivers.

Issue 4: Understanding the condition of Victoria’s coastal environments. Assessing the effectiveness of management actions requires data. Data tell us about the current condition of a particular asset, but the data alone are of little value unless they are linked to a clear decision-making framework.

Not only did the scientific panel identify the need for tools to help with delivering required climate risk information to land managers but that a clear decision making framework also be provided.

The Regional Sustainability Indicators Framework for South West Victoria by Graymore (2011) could be part of a decision support portal or tool to expand the frameworks’ use in the local context and in gauging success in adapting to climate change.

Regional NSW

The Hunter and Central Coast Regional Environmental Management Strategy (HCCREMS 2012) is developing a Decision Support for Adaptation project with the goal of helping councils in NSW ‘plan and implement adaptation approaches in coastal areas vulnerable to the impacts of climate change. Importantly it seeks to promote a more consistent and transparent approach to adaptation planning in the context of land use planning and asset management’. HCCREMS (2011) has produced a very useful literature review and consultation paper on decision support that may be used by the CCP project in designing its framework and decision pathway.

Western Australia

The Western Australian Local Government Association (WALGA) has developed a climate change management toolkit (www.walgaclimatechange.com.au/adaptation-plan-checklist.htm) with guidance and domestic and international web links on responding to climate change impacts.

5.4 National and international government initiatives

In addition to the OzEstuaries mapping support tool, there is the Antarctic and Climate Ecosystems Cooperative Research Centre (ACE CRC) web tool: http://www.sealevelrise.info/cms/Home. This tool assesses the risk of inundation in specific locations around Australia. This project has been funded by the Commonwealth government and was predominantly established so local government could estimate sea-level rise extremes even with an uncertain future. This is an example of a decision support tool that would help CCP managers in assessing the risks of sea level rise for their CCP.
Climate Adaptation in Coastal Caravan Parks: Economic Value and Equity Literature Review

The Productivity Commission (2012, p. 2) inquiry into economic barriers to climate change adaptation identified amongst other things and those relevant to the CCP project:

...uncertainty surrounding changes to the frequency, intensity, location and timing of extreme weather events requires a risk management approach to adaptation.

Policy reforms that would help people, firms and governments deal with current climate variability and extreme weather events should be prioritised. These ‘no-regret’ or ‘low-regret’ reforms would deliver benefits and build adaptive capacity for responding effectively to future impacts. Examples include:

- reducing perverse incentives in tax, transfer and regulatory arrangements that impede the mobility of labour and capital;
- improving information on climate risks by increasing the quality and availability of natural hazard mapping;
- clarifying the roles, responsibilities and legal liability of local governments, and improving their capacity to manage climate risks;
- improving emergency management arrangements;
- avoiding regulatory distortions in insurance markets.

The case for implementing reforms now to address barriers to adaptation to uncertain future climate trends is less clear. For reforms with low up-front costs and potentially large but distant benefits some preparatory action could be worthwhile. The case is stronger for reforms that would deliver benefits under a range of climate change scenarios. For instance:

- producing and disseminating localised (downscaled) climate projections;
- designing flexible planning regulation to respond to uncertain climate change impacts;
- developing approaches to managing risks to existing settlements.

Where measures have high up-front costs, there is likely to be a benefit to the community in deferring action until better information becomes available.

Some individuals and certain communities are likely to face greater challenges in adapting to the impacts of climate change. In the main, the tax and transfer system can help these groups adapt to the impacts of gradual climate change.

Note the economic approach adopted by the PC with a comparison of benefits and costs, identification of when these are received and the identification of the likelihood of these occurring in prioritising polices and adaptation options. Also note the Productivity Commission’s recommendation for addressing equity concerns through the tax and transfer system rather than through adaptation options per se. These should be noted as key background documents to the incorporation of economic analysis into decision making tools for CCP adaptation.


The Coastal Zone Inquiry (Resource Assessment Commission 1993) including work of ABARE (1993) on economic instruments for managing the Coast; there is a diverse array of opportunities for using economic instruments to manage the impacts and responses to possible climate change. The inquiry also calls for a consistent approach to coastal management in Australia which could be transferred to the arena of coastal adaptation undertaken by CCPs.

The United Nations Development Program has developed a toolkit for practitioners in designing climate change adaptation initiative (UNDP 2010) which would be a useful reference in designing a decision support tool for land managers.
6. Conclusion

As can be seen by reviewing the literature provided above, there are gaps in knowledge in a number of areas which has warranted the development of a value and equity framework for coastal CCPs to adapt to possible climate change impacts. Of particular note are the following categorised by the various sections within the review.

**Valuation, its legitimacy, triple bottom line assessment and decision making**

There is a non-existence of non-market values for CCPs on crown land, either in Victoria, across Australia or overseas. This makes the requirement for managers to undertake a triple bottom line and integrated assessment of adaptation options very difficult. In simple terms, having such information would make the task of prioritising responses far easier and more transparent.

**CCP management and adaptation**

There is a plethora of documents on adapting to climate change but these do not necessarily address the special nature of CCPs, given their closeness to the shore, their management arrangements, and the multifaceted goals of their CoMs.

There is anecdotal evidence of considerable experience and capacity within CoMs to adapt to change but some literature on emergency management planning of CCPs in response to flooding and fire has been highly critical and has suggested areas for reform that may be considered in developing adaptation options for the impacts of climate change.

**Decision pathways and decision support systems**

In addition to the non-existence of non-market values for CCPs on crown land, having preferences from users and the community on social equity around the impacts of possible climate change and the impacts from adaptation options would be very useful. Of particular use would be if these preferences were ‘fed’ with triple bottom line information, including non-market valuation. Such an approach would be consistent with adaptation decision frameworks being developed elsewhere (e.g. VCCCAR) and would offer an innovative opportunity for CCPs.

There are a number of existing decision support tools for adaptation to climate change across Australia but also overseas – but primarily focussed on local government adaptation rather than for the adaptation of CCPs per se. The experience in the success and failures of these can be used in designing an appropriate tool for this project.

Much of the information required for developing a suitable framework or decision pathway is likely to be in different locations and at different levels. Having a web based tool that brings this information together and links with other portals may make the framework more attractive to users.

In finishing, new literature on climate change adaptation is currently being prepared at all levels of government in Australia and overseas, and in academia. This literature review will therefore date quickly and the project will require updating as new information comes to light and old information is uncovered. Regardless, the CCP project will aid enormously in filling a number of knowledge gaps for the management of CCPs in the face of possible climate change.
7. References


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