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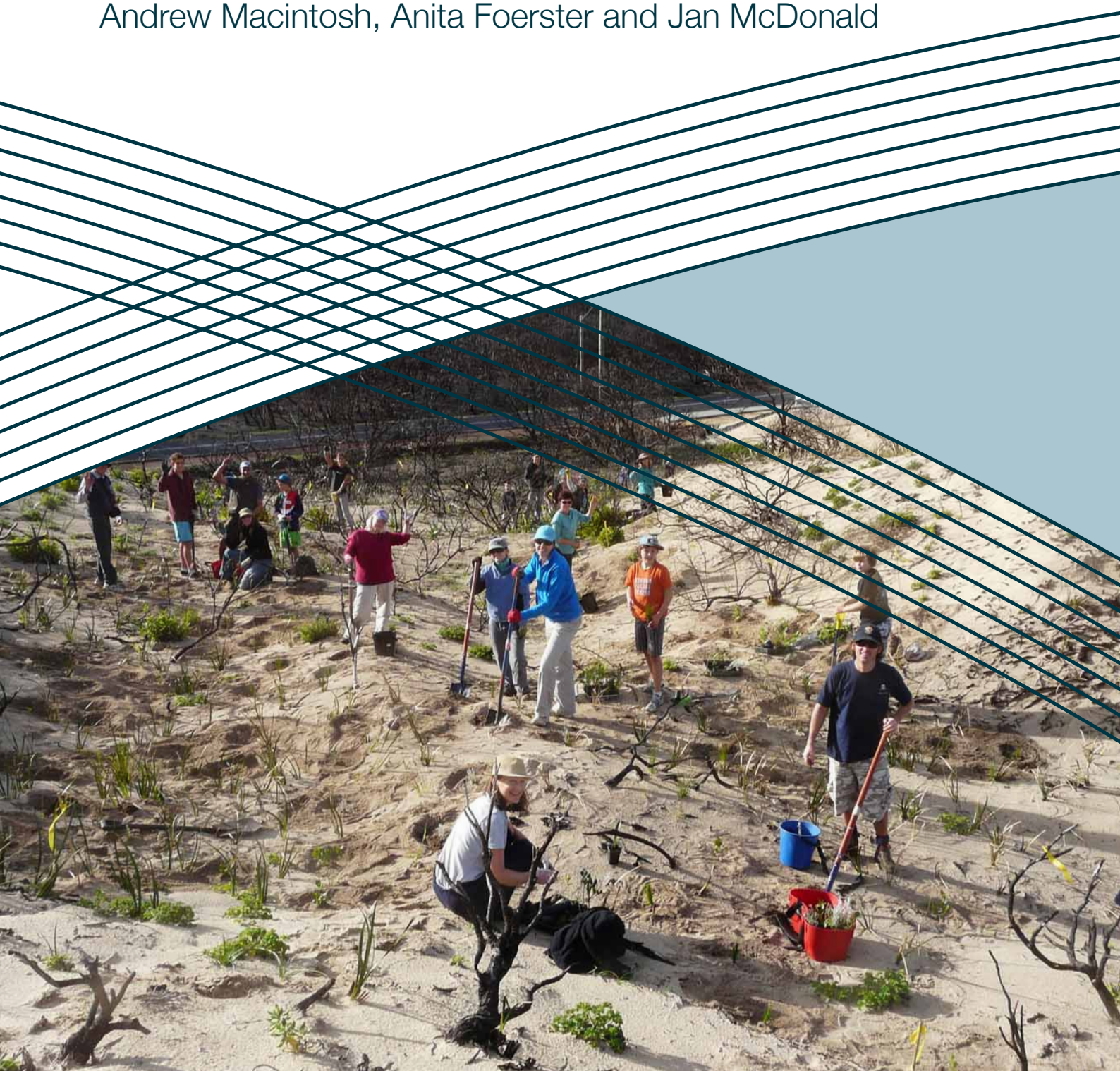
Limp, leap or learn?
Developing legal frameworks for climate change adaptation planning in Australia

Final Report

Andrew Macintosh, Anita Foerster and Jan McDonald



SPATIAL PLANNING INSTRUMENTS FOR CLIMATE CHANGE ADAPTATION

Limp, Leap or Learn?
Developing legal frameworks for climate change adaptation planning in Australia

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The role of NCCARF is to lead the research community in a national interdisciplinary effort to generate the information needed by decision makers in government, business and in vulnerable sectors and communities to manage the risk of climate change impacts.

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Cover image: Gnarabup community planting after bushfires © Blair Darvill, South West Catchment Council

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Acronym list

ACT	Australian Capital Territory
ACTPLA	ACT Planning and Land Authority
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ANU	Australian National University
APZ	Asset Protection Zone
AR4	Intergovernmental Panel on Climate Change Fourth Assessment Report
ARI	Average Recurrence Interval
BAL	Bushfire Attack Level
BMO	Bushfire Management Overlay
BMSCA	Bushfire Management Special Control Area
BOM	Australian Government Bureau of Meteorology
BPA	Bushfire Prone Area
CAWCR	The Centre for Australian Weather and Climate Research
CCRLUS	Cradle Coast Regional Land Use Strategy (Tas)
CFA	Country Fire Authority (Vic)
CHAS	Coastal Hazard Adaptation Strategy
CHVA	Coastal Hazard Vulnerability Assessment under the Victorian State Planning Policy Framework
COAG	Council of Australian Governments
CP Act	Coastal Protection Act 1979 (NSW)
CPA	Coast Protection Act 1972 (SA)
CPMA	Coastal Protection and Management Act 1995 (Qld)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cth	Commonwealth of Australia
CZMP	NSW Coastal Zone Management Plans
CZMS	Coastal Zone Management Subgroup under the Intergovernmental Panel on Climate Change
DAP	Development Assessment Panel (WA)
DC	Development Control Policy (WA)
DCP	NSW Development Control Plans
DPAC	Department of Premier and Cabinet
DPCD	Victorian Department of Planning and Community Development
DPIPWE	Tasmanian Department of Primary Industries, Planning, Water and the Environment
DPTI	SA Department of Planning, Transport and Infrastructure
Draft SPRP	Draft Coastal Protection State Planning Regulatory Provision (Qld)

EPA	Environment Protection Authority, as it is established in each Australian state and territory.
EPA Act	Environmental Planning and Assessment Act 1979 (NSW)
EPI	NSW Environmental Planning Instruments
ESA	SA Emergency Services Authority
HSD	Horizontal Setback Datum
IPCC	Intergovernmental Panel on Climate Change
JDAP	Joint Development Assessment Panel (WA)
LDAP	Local Development Assessment Panel (WA)
LEP	NSW Local Environmental Plans
LG Act	Local Government Act 1993 (NSW)
LGA	Local Government Act 1993 (Tas)
LPPF	Local Planning Policy Framework (Vic)
LUPAA	Land Use Planning and Approvals Act 1993 (Tas)
MSS	Municipal Strategic Statement (Vic)
NRLUS	Regional Land Use Strategy of Northern Tasmania
NSW	New South Wales
NT	Northern Territory of Australia
NTPL	Northern Territory Planning Scheme
PD Act	Planning and Development Act (WA)
PD1	Planning Directive No. 1: The Format and Structure of Planning Schemes (Tas)
PD5	Planning Directive No. 5: Bushfire-Prone Areas Code (Tas)
QCP	Queensland Coastal Plan
Qld	Queensland
RCP	Representative Concentration Pathways
RF Act	Rural Fires Act 1997 (NSW)
RFS Commissioner	Commissioner of the Rural Fire Service in NSW
RLUS	Regional Land Use Strategies (Tas)
RMPS	Resource Management and Planning System (Tas)
SA	South Australia
SCA	Special Control Area (WA)
SEPP	State Environment Planning Policies (NSW)
SLR	Sea Level Rise
SMS	Safe Minimum Standards
SPA	Sustainable Planning Act 2009 (Qld)
SPP	State Planning Policy

SPP 1/03	Queensland State Planning Policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide
SPPA	State Policies and Projects Act 1993 (Tas)
SPPCP	State Planning Policy for Coastal Protection (Qld)
SPPF	State Planning Policy Framework (Vic)
SPS	State Planning Strategy (WA)
SRES	Intergovernmental Panel on Climate Change's Special Report on Emissions Scenarios
SRLUS	Southern Tasmania Regional Land Use Strategy 2010–2035
Tas	Tasmania
TCAP	Tasmanian Coastal Adaptation Pathways
TDR	Transferable Development Rights
TFS	Tasmanian Fire Service
TPC	Tasmanian Planning Commission
UNEP	United Nations Environment Programme
US EPA	United States Environmental Protection Agency
UTas	University of Tasmania
VCAT	Victorian Civil and Administrative Tribunal
VCC 2008	Victorian Coastal Strategy 2008
Vic	Victoria
VPP	Victoria Planning Provisions
WA	Western Australia
WAPC	Western Australian Planning Commission
WHO	World Health Organization

ABSTRACT

Settlements in coastal and bushfire prone areas across Australia face major challenges in adapting to potential climate change impacts. This report identifies the range of legal tools and instruments that can be used to influence the spatial distribution and nature of land use and development and hence the exposure and vulnerability of settlements to climate hazards. The analysis is not limited to traditional 'land use planning' instruments such as zones, overlays and approval conditions. Instead, it considers the broad suite of 'spatial planning instruments' applicable to both new and existing development, including information tools, incentives, taxes and charges. These instruments are classified according to the role they play within a legal framework for adaptation planning. Examples drawn from current Australian practice are used to illustrate how each instrument can be employed to address climate change-related coastal and bushfire hazards. The report draws on interviews with local and state planning, emergency management and coastal officers in selected coastal and bushfire prone areas across Australia, to highlight the potential benefits and challenges associated with different instrument (and combinations of instruments), and a range of considerations relevant to instrument design and implementation. This discussion highlights that each category of instruments has an important role to play within a legal framework for adaptation planning and makes a number of recommendations regarding the way in which they can be employed to support effective and efficient adaptation to climate change.

EXECUTIVE SUMMARY

This report presents the findings of research into the tools, instruments, and implementation features of legal frameworks for climate change adaptation planning in relation to coastal climate change and bushfire hazards across Australia. It focuses on the range of legal tools and instruments that can be used to influence the spatial distribution and nature of land use and development and hence the exposure and vulnerability of settlements and infrastructure to climate hazards. The analysis is not limited to traditional 'land use planning' instruments, encompassing both strategic and statutory planning. Rather, it considers a broader collection of methods and processes that can be used to influence the location and nature of land use and development in the context of both new and existing development.

The report presents a taxonomy of spatial planning instruments and an analysis of considerations relevant to instrument choice, design and implementation. This analysis draws on an extensive empirical investigation of the use of spatial planning instruments for adaptation in bushfire prone and coastal local government areas around Australia. It is supported by numerous examples of instruments currently in use; and the commentary of planners and adaptation professionals in relation to the potential effectiveness of various instruments and combinations of instruments *in practice*.

Taxonomy of spatial planning instruments

Seven categories of instrument are identified according to their spatial planning function:

1. ***Framing instruments***, such as the objectives, principles and strategy clauses in state, regional and local planning policies, articulate over-arching policy goals and objectives and outline how different regulatory and non-regulatory instruments can be used to achieve these objectives.
2. ***Information instruments*** are used to communicate information, including climate hazard risks, to current and future property owners and more broadly. Instruments such as planning certificates do not regulate land use or development; their functions are purely communicative. Other information instruments, such as zones, overlays and agreements on title, have a dual purpose; they can be used to transmit information and to regulate land use and development.
3. ***Regulatory instruments*** are legally enforceable restrictions placed on land use activities that dictate where, what and how use and development occurs. They are employed to prevent or reduce the severity of climate hazards, eliminate or reduce the harmful effects of climate hazards, or reduce exposure to climate hazards. In this analysis, regulatory instruments have been categorised as either fixed or flexible. ***Fixed regulatory instruments*** (such as zones and overlays; hazard mapping and management plans; non-spatial regulatory restrictions; permit requirements and approval conditions; codes and guidelines and compulsory insurance; and reserves) are based on the assumption that once lawfully commenced, an existing land use will be beyond the reach of the planning system and can continue indefinitely unless intensified, expanded or abandoned. ***Flexible regulatory instruments*** (such as those that confer qualified development or use rights or involve a modification of existing lawful uses) specifically provide governments with powers to control land use and development, even after it has lawfully commenced, and therefore can be used to facilitate changes in land use and development in response to changing hazard threats. This allows a more responsive approach in light of the uncertainties surrounding the distribution, timing and magnitude of climate change impacts.

4. ***Compulsory acquisition instruments***, including property purchase and the designation of acquisition land, can be used for a broad range of public purposes, including the resumption of hazard-prone land. Compulsory acquisition can be combined with certain voluntary instruments, such as lease-back or covenant schemes, to lower costs to government and allow continued use of land until hazards materialise.
5. ***Voluntary instruments***, involve the use of positive incentives to control or influence where, what and how land use and development occurs in order to reduce sensitivity or exposure to climate hazards, but do not compel compliance or participation. Examples include financial inducements to undertake hazard mitigation activities, voluntary buy-back schemes, land swaps and transferable development rights.
6. ***Taxes and charges***: Taxes, such as elevated council rates imposed on particular land uses in high risk areas, can be used as a spatial planning instrument to provide incentives to alter land use and development in response to climate hazards. Taxes can also be used to raise funds to assist in preparing for, or responding to, climate hazards. Charges can be used to recoup costs from landholders that benefit from protective measures provided by government agencies, and to recoup the cost of damage remediation measures provided to particular landholders or communities.
7. ***Liability shield instruments*** provide a partial or full exemption from legal liability to specified entities if they take a particular action, or fail to act in a particular way, in relation to climate hazards. The purpose of these instruments is to stop people from unjustly pursuing governments or other third parties for legal compensation when hazard risks materialise. As such, these instruments can prevent the risk (or perception of risk) of legal liability operating as a barrier to adaptation decision-making. The two main approaches are statutory immunities from liability and developer indemnity agreements.

Instrument Selection and Implementation

The choice and implementation of spatial planning instruments will depend on a range of legal, social, economic, political and institutional factors. The advantages and disadvantages of employing particular instruments in particular ways to achieve climate change adaptation objectives are explored; and key implementation considerations are identified.

Framing instruments are important umbrella instruments within legal frameworks for adaptation planning. It is critical that framing instruments clearly articulate objectives and provide implementation guidance to support decision-makers in the use of different regulatory and non-regulatory instruments to achieve objectives, particularly given the context of pervasive uncertainties and policy trade-offs associated with climate change adaptation. The mechanism of the State Planning Policy under planning legislation is used to frame adaptation policy in many jurisdictions and is particularly well suited to this end. Improvements in the specificity and enforceability of framing instruments would better support decision-makers at all levels, but particularly coastal councils, to achieve a consistent and more effective planning response to potential climate change impacts

There is strong policy support at a federal and state level for the use of ***information instruments*** to encourage and support private adaptation measures. Information instruments also play an important role in managing risks of future liability for planning authorities. The utility of such measures depends upon the availability and consistency of robust, reliable information; the clear articulation of limitations in available information; and the provision of information at a time and in a manner that can inform relevant decisions. Information measures are often vigorously resisted due to concerns

about impacts on property prices. However, it is important to emphasise that these instruments are intended to influence behaviour, and changes in property values are one manifestation of this. There is however very little actual evidence of long term adverse effects flowing solely from the provision of information.

A notable aspect of current Australian practice is that most regulatory instruments used in an adaptation context are ***fixed regulatory instruments***, which focus on new development. Although there are many variations on this, the dominant regulatory model involves embedding spatial hazard data into planning instruments, via zones or overlays; placing restrictions on the types of uses and development that are allowed in hazard-prone areas; and requiring responsible authorities to have regard to general or specific hazard safety considerations when considering development applications and impose certain conditions on development in these areas. There is a particular reliance on development assessment processes, particularly conditions on development approvals, to manage climate hazard risks. There is comparatively limited use of outright prohibitions and land use restrictions to avoid locating new development in hazard-prone areas. The use of spatial instruments, such as zones and overlays, as the basis for development controls ensures that there is a clear, unambiguous trigger for development assessment processes; and targets effort at the most hazard-prone areas. The use of spatial instruments does, however, require the availability of quality down-scaled data – which is expensive and time-consuming. A key policy issue which remains highly contested across the jurisdictions in relation to the use of regulatory instruments is the level of risk aversion or tolerance to be reflected in development controls.

To date, ***flexible regulatory instruments*** have not been widely employed in practice. There has been explicit provision for the use of time-limited and contingent approvals in the context of new development at the level of state planning policy and in some local planning schemes; however no examples of such approvals have been identified. The key advantage of using contingent and time-limited approvals is that they allow current use and enjoyment of land until such time as the hazard materialises. They are most appropriate in areas where the hazards are likely to develop incrementally over an extended period of time and the changes are likely to be largely irreversible. As such, they are more applicable to coastal areas which are prone to erosion and permanent inundation, than a bushfire planning context. There is however considerable concern among decision makers that it will be difficult for future governments to exercise options to require houses and other buildings to be removed without facing claims for compensation or demands for coastal protection measures. There is also concern among utility providers that contingent development approval will make planning and provision of reticulated services (particularly sewerage) very difficult.

Similarly, despite the clear legal power to introduce regulations which seek to modify existing use rights without providing compensation, in the context of existing development, no examples of such regulation have been identified. Instead, governments have preferred information and voluntary instruments to encourage landholders in existing dwellings to carry out hazard mitigation activities such as retro-fitting and building modifications. This may reflect strong societal norms concerning existing uses and property, which are likely to make any regulatory response controversial. However, where landholders are unresponsive to information and voluntary measures, there may be a greater future role for regulatory measures in certain contexts, such as requiring house retro-fit and the establishment of defendable space in areas at high risk of bushfire.

Compulsory acquisition is a controversial and potentially costly option, and there are a range of legitimate questions about the role that these instruments may play in climate change adaptation, including when is an investment of public funds justified and who should pay. Generally speaking, these instruments will be most applicable

where there a clearly identifiable public policy benefit associated with the resumption of hazard-prone land, such as establishing a coastal conservation reserve to facilitate the landward migration of important coastal ecosystems and continued public access to the foreshore. ***Voluntary instruments*** may be more politically palatable, but also involve significant public investment, and will therefore be evaluated on the basis of their likely effectiveness in achieving adaptation objectives and the public benefit to be gained through the program. There are strong arguments for considering greater use of financial incentives to encourage private parties to implement hazard mitigation measures; and if climate change impacts materialise as predicted, the full range of voluntary instruments may need to play a greater role in supporting adaptation in high risk existing settlements.

Despite their advantages, there are currently no known examples in Australia of ***taxes*** being used specifically to provide incentives to landholders to alter land use patterns in order to respond *ex ante* to bushfire and coastal hazards, although these measures are being considered in some contexts. Such measures will face challenges: there is no agreed method of devising the appropriate tax rate; proposals will face political opposition from affected landholders, property developers and other related groups; and governments may be tempted to distort the design of the tax to achieve other objectives, particularly revenue raising. Taxes have however been used to raise funds to prepare for and respond to natural hazards, particularly in the wake of extreme events. There are also some examples of ***charges***, used by local government to recoup costs associated with hazard mitigation measures, particularly in relation to coastal protection works; however these mechanisms have not been consistently applied within and between local government areas. Such measures specifically target the direct beneficiaries of hazard mitigation measures, and can also send a price signal to the community that can trigger desired land use and behavioural changes. Yet, it may be politically difficult to introduce charges in relation to existing structures and services and policy makers should ensure that the costs of administering and complying with the scheme are kept to a minimum and are proportionate to the revenues raised. Further development of policy direction on principles for cost-sharing between public and private parties would support greater use of these instruments.

Finally, there is a strong case for uniform ***liability shield instruments*** in all states and territories, either in the form of a statutory immunity or the legal right of councils to require indemnities from developers. Local governments continue to identify the risk of potential legal liability and costs associated with defending a legal challenge as significant barriers to adaptation decision-making. A broadly applicable statutory immunity is likely to be more efficient than individual indemnity contracts and will also cover risks associated with hazard prevention and response measures.

Roles and responsibilities

The spread of roles and responsibilities, particularly between levels of government, is an important consideration relevant to instrument selection and implementation.

This report identifies strong arguments for state government leadership in a number of areas including:

- provision of quality spatial data which can be embedded in planning schemes to trigger development controls in hazard-prone areas, to be provided in conjunction with the Federal Government;
- development of framing instruments which provide clear policy positions on how to incorporate climate change data into planning and development decision-making and how to stagger planning responses accordingly;

- development of sufficiently detailed codes and guidelines that can be incorporated into local planning schemes so as to support decision-makers in making decisions that will help to achieve the objectives of framing instruments and which are likely to be upheld by planning tribunals; and
- provision of statutory liability shields for local and state government decision-making.

Local governments play a critical role in planning and development decision-making in relation to climate change adaptation; and in many jurisdictions it is local government that has taken the lead in developing adaptation planning responses. It is critical that the spread of roles and responsibilities between local and other levels of government is clarified; and that local government have access to resources (including financial resources, and professional and technical expertise) commensurate with their expected role and responsibilities in this area. The key roles of local government in this area, which should be further clarified, strengthened and supported with appropriate resources are:

- development of strategic planning instruments at a local scale, within the scope of the policy direction and legislative framework provided by state government, including the variation of development controls according to local conditions;
- development assessment, in conjunction with an enhanced role for specialised statutory authorities as referral authorities in development decision-making; and
- compliance and enforcement of development approval conditions, which are critical to manage hazard exposure.

The formal legal role of the federal government in land use planning is limited. Yet, the federal government has a number of avenues through which it can influence policy development at a state and local level, including the development of national policy through the Council of Australian Governments and tying federal funding to its implementation by state governments. Common national policy positions on a number of key adaptation issues would be beneficial, including:

- overarching parameters for the generation of consistent spatial hazard data and its incorporation in planning and development decision making, for example via sea level rise planning benchmarks;
- general policy direction on the planning responses that are considered appropriate in different circumstances (considering spatial and temporal distribution of risk and the nature of development in question); and
- policy direction on the principles upon which cost-sharing and revenue-raising arrangements should be developed.

Process Considerations

The processes employed in the development and assessment of adaptation options for a particular region or locality will have a significant influence on which spatial planning instruments are selected and how they are used. Adaptation planning processes that move beyond the traditional domain of land use planning (with its focus on regulating new development) are clearly required to allow consideration and coordination of the full range of spatial planning instruments available for achieving adaptation objectives. Integrated, overarching processes are essential to establish an adaptation pathway for a particular locality (such as accommodate, protect, retreat), which will then inform the selection and implementation of various instruments over time. Such processes should be parallel and complementary to existing statutory land use planning; and are likely to require considerable institutional support from state governments, including:

- a state-wide policy framework for adaptation planning, which provides basic underlying policy principles on instrument selection, cost-sharing and roles and responsibilities;
- a statutory basis for adaptation planning to authorise and approve the development of local plans; to formalise roles and responsibilities; and to identify the relevant administering body to lead implementation; and
- significant resource commitments to support an effective process.

In light of the highly contested nature of the adaptation challenge, it is important to consider the extent, nature and timing of stakeholder engagement and community consultation. More participatory processes can help to establish a social licence to support implementation of adaptation responses by government; and may also help to better address distributional concerns and externalities associated with adaptation planning.

1. INTRODUCTION

1.1 Project objectives

This report presents the findings of a research project to identify the criteria and characteristics of legal frameworks for adaptation planning in Australian settlements. The project was funded by the Department of Climate Change and Energy Efficiency Adaptation Research Grants Program, and addresses priority 1.2 in the *National Adaptation Research Plan for Settlements and Infrastructure*, namely 'Legal frameworks, encompassing both the formal and informal rules and the institutions that administer those rules governing planning decision-making'. The Project Team consisted of Professor Jan McDonald (University of Tasmania), Associate Professor Andrew Macintosh (ANU), Dr Anita Foerster (UTas), Dr Phillipa England (Griffith), and Professor Tim Bonyhady (ANU).

In order to analyse the strengths and weaknesses of current arrangements, the project compared and contrasted the legal frameworks for planning for coastal impacts of climate change, and those for the increased risks of bushfire – two sets of natural hazard that are likely to be exacerbated in different ways by the impacts of climate change. Formal planning laws, coastal and emergency management laws, the applicable property law, and liability and insurance regimes, were all considered through a combination of formal legal analysis, archival research, and extensive stakeholder interviews across the country. Comparing current approaches assisted in identifying and understanding the range of legal instruments available for adaptation, and provided an evidentiary foundation for articulating the barriers to, and opportunities for, broader use of legal frameworks.

1.2 Report scope and structure

Spatial planning refers to a broad collection of methods and processes that aim to influence the spatial distribution of economic, social and environmental activities.[1] At times, the phrase 'spatial planning' is used interchangeably with 'land use planning' (or urban planning) but the two can be differentiated. Land-use planning is a statute-based planning and regulatory process that aims to promote the orderly use and development of land.[2] It has two sub-disciplines: strategic and statutory planning. Strategic planning involves the formulation and evaluation of policies for achieving land use and development objectives. Statutory planning is concerned with the implementation of regulations governing the use and development of land. As these definitions suggest, strategic and statutory planning are inter-related: strategic planning sets the policies and frameworks that are implemented by statutory planners.

Traditionally, the practice of planning in Australia has been confined within state and territory land-use planning systems. However, adaptation to climate change raises spatial issues that are unlikely to be resolved solely within these statutory regimes. Accordingly, the phrase 'spatial planning' is used in this report in its European sense to refer to the suite of government policies and instruments that can be used to shape the spatial distribution of human activities.[3] Formal land-use planning lies at the core of spatial planning but it incorporates other policy instruments that can be used to change the location and nature of current settlements and shape the distribution of future land uses.

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[1] European Commission, *The EU Compendium of Spatial Planning Systems and Policies* (1997); Davoudi S, Crawford J and Mehmood A (eds), *Planning for Climate Change: Strategies for Mitigation and Adaptation for Spatial Planners* (Earthscan, 2009); Wilson E and Piper J, *Spatial planning and climate change* (Routledge, 2010).

[2] Eccles D and Bryant T, *Statutory Planning in Victoria* (Federation Press, 2011).

[3] United Kingdom Office of the Deputy Prime Minister, *Planning Policy Statement 1: Delivering Sustainable Development* (2005); Wilson E and Piper J, *Spatial planning and climate change* (Routledge, 2010).

Owing to its role in guiding economic, social and environmental activities, spatial planning is viewed by many as an indispensable tool for facilitating efficient and equitable adaptation to climate change.[4] This is a product of the fact that the location and configuration of settlements and infrastructure can influence the vulnerability and resilience of communities to climatic events. By shaping the nature and location of land use and development, spatial adaptation planning can help reduce the adverse impacts of climate change. Planning processes can also be used as a medium for the dissemination of information about potential climate change impacts, thereby promoting private adaptation initiatives.

Like all policy instruments, the success of spatial adaptation planning measures depends on their design and implementation. Poor spatial planning can lead to maladaptations (where actions taken to prepare for or respond to global warming increase the social costs of climate change) and inequity (where the costs of adaptation and climate change are borne disproportionately by particular groups in society).[5] The risk of suboptimal outcomes is heightened in this context by the complexities of adaptation decision making, especially the high levels of uncertainty surrounding the impacts of climate change and degree of contestation over values, objectives, property rights and governance structures. Neither uncertainty nor conflict is unique to spatial adaptation planning. What makes adaptation a particularly difficult policy issue is the 'specific manifestations and pervasive nature' of the associated uncertainties, governance challenges and contestation.[6]

The object of this report is to assist spatial planners to overcome these challenges by identifying the planning instruments that can be used to address climate change-related coastal and bushfire hazards and analysing when and how they should be employed. The report draws on our comprehensive review of the legal frameworks for adaptation planning in each Australian jurisdiction (see Appendix A), and the experience of their implementation in a range of case study locations.

The report contains seven sections.

Section 2 frames the analysis of adaptation planning with a discussion of key terminology and concepts and an outline of the nature of the potential climate change impacts for coastal and bushfire prone areas around Australia.

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[4] Burby R and Nelson A, 'Local government and public adaptation to sea-level rise' (1991) 117(4) *Journal of Urban Planning and Development* 140; Bray M, Hooke J and Carter D, 'Planning for Sea-Level Rise on the South Coast of England: Advising the Decision-Makers' (1997) 22(1) *Transactions of the Institute of British Geographers, New Series* 13; Wilson E, 'Adapting to Climate Change at the Local Level: The Spatial Planning Response' (2006) 11 *Local Environment* 609; de Vries J, 'Climate change and spatial planning below sea-level: Water, water and more water' (2006) 7 *Planning Theory and Practice* 229; Tol R, Klein R and Nicholls R, 'Towards Successful Adaptation to Sea-Level Rise along Europe's Coasts' (2008) 242 *Journal of Coastal Research* 432; Hansen H, 'Modelling the future coastal zone urban development as implied by the IPCC SRES and assessing the impact from sea level rise' (2010) 98 *Landscape and Urban Planning* 141; Royal Commission on Environmental Pollution, *Adapting Institutions to Climate Change* (United Kingdom (UK) Government, 2010); McDonald J, 'The role of law in adapting to climate change' (2011) 2 *Wiley Interdisciplinary Reviews: Climate Change* 283; Measham T et al, 'Adapting to climate change through local municipal planning: barriers and challenges' (2011) 16(8) *Mitigation and Adaptation Strategies for Global Change* 889; Abel N et al, 'Sea level rise, coastal development and planned retreat: analytical framework, governance principles and an Australian case study' (2011) 14 *Environmental Science & Policy* 279; Productivity Commission, *Barriers to effective Climate Change Adaptation – Draft Report* (Commonwealth of Australia, 2012).

[5] Moser D, Stakhiv E and Vallianos L, 'Risk-Cost Aspects of Sea Level Rise and Climate Change in the Evaluation of Coastal Protection Projects' in Titus J (ed), *Climate Change and the Coast. Volume 1: Adaptive Responses and their Economic, Environmental, and Institutional Implications. Report to the Intergovernmental Panel on Climate Change from the Miami Conference on Adaptive Responses to Sea Level Rise and Other Impacts of Global Climate Change* (United States Environmental Protection Agency (US EPA), 1990); Mendelsohn R, 'Efficient Adaptation to Climate Change' (2000) 45 *Climatic Change* 583; Barnett J and O'Neill S, 'Maladaptation' (2010) 20 *Global Environmental Change* 211.

[6] Royal Commission on Environmental Pollution, *Adapting Institutions to Climate Change* (UK Government, 2010).

In section 3, the complexities associated with adaptation planning are explored, including approaches to managing uncertainties, externalities and distributional issues, community expectations about private property rights, and the roles and responsibilities of governments and the private sector. This discussion underscores the highly contested nature of the adaptation challenge and, as such, the selection and implementation of planning strategies to achieve adaptation objectives.

Against this background, section 4 outlines the spatial planning instruments that can be used to achieve adaptation objectives for both new and existing development. The range of instruments presented is comprehensive and includes examples drawn from current practice across Australia. Available instruments include information measures which are used to promote private adaptation by raising awareness and understanding of climate hazards; more direct command and control style regulation of spatial use and development of land so as to reduce vulnerability to climate hazards; and voluntary instruments, such as incentives, land swaps and buybacks that seek to influence where, what and how land use and development occurs.

Following this, section 5 considers which planning instruments are most suitable for different circumstances: where and when they can best be employed to promote effective, efficient and equitable adaptation outcomes. This discussion draws particularly on the empirical investigation of current legal frameworks for adaptation planning in Australia and their implementation. Which instruments are selected and how they are used will depend on the processes that are followed in the problem and policy framing stages and the capacity for planning agencies to implement instruments and monitor and evaluate the outcomes. In light of this, section 6 considers governance and procedural considerations relevant to instrument choice and implementation.

Section 7 provides a conclusion and recommendations for the further development of legal frameworks for adaptation planning in Australia.

1.3 Research Activities and Methods

The project has taken a socio-legal (or law-in-context) approach to the analysis of developing legal frameworks for climate change adaptation planning. The basis for this approach is an acknowledgment that all law operates within a social, political, cultural and economic context.[7] As such, while the project has focused on the legal dimensions of climate change adaptation planning, it has also explored the factors which have influenced the introduction and design of legal arrangements, the organisational culture behind implementation practices, and interpretation of laws by courts and decision-makers.[8] This broader contextual understanding is an important basis for developing recommendations for achieving best practice in legal and institutional frameworks.

The project was undertaken in the following stages:

1.3.1 Stage 1: Literature Review and Legal Research

A broad review of the relevant literature was conducted to establish the analytical context for this project. This review focused particularly on social and institutional barriers to adaptation, law and governance models for adaptation, and the particular role of spatial planning in climate change adaptation. This review confirmed a need for further analysis of the way in which law can influence adaptation planning and decision-making. More specifically, there was an apparent need for targeted empirically-based research exploring how planning laws are interpreted, applied, or

[7] Thomas P, 'Socio-Legal Studies: The Case of Disappearing Fleas and Bustards' in Thomas P (ed), *Socio-Legal Studies* (Aldershot, 1997) 1.
[8] Adger W, 'Learning to adapt: Organisational adaptation to climate change impacts' (2006) 78(1) *Climatic Change* 135.

indeed circumvented, in practice, and what this may mean for the potential role of legal frameworks for adaptation planning in the future.

Following this, the project team conducted a comprehensive review of existing legal and policy frameworks for planning and risk management in relation to coastal hazards and bushfire in all Australian jurisdictions. This involved collating and reviewing planning, coastal and emergency management legislation and associated regulations, codes and guidelines; policy documents; statutory and non-statutory plans; and associated academic literature. This material formed the basis for the mapping of current regulatory approaches to adaptation planning for coastal and bushfire prone areas, which is presented in Appendix A.

1.3.2 Stage 2: Qualitative research on adaptation law and governance

A program of empirical work was developed to complement the literature and legal research with a deeper, contextual understanding of the nature and application of relevant legal and policy structures in practice. Central to this was a series of semi-structured interviews with local government planners and decision-makers (including elected officials), state government agencies (including planning; emergency services and environmental protection agencies), and professional bodies and advocacy groups (such as local government associations and public environmental law organisations). Across the jurisdictions, 15 local government areas in coastal or bushfire prone locations were selected to focus the empirical work at a scale relevant to current planning and decision-making frameworks. More than 50 interviews were conducted with professional and elected officers across 13 state agencies, 15 local governments and 6 professional bodies.

Drawing on the Stage 1 research, a standardised interview schedule was prepared to obtain information and opinion from participants on how existing legal and policy processes were developed and administered in practice and how they could be improved. The questions focused on the following areas:

- the information available to decision makers on potential climate change impacts;
- how potential climate change impacts were taken account in strategic and statutory planning processes and other relevant decision-making processes, and specifically the range of legal instruments employed in this context;
- the spread of roles and responsibilities between levels of government, and between public and private parties in adaptation planning and risk management;
- how climate change considerations have been treated by courts and tribunals in planning disputes; and
- perceptions and approaches to potential exposure to legal liability in relation to adaptation decision-making.

This schedule was adapted to different case study contexts and different participants. However, the use of similar questions and themes across the jurisdictions allowed responses to be compared and contrasted. Most of the interviews were conducted face-to-face during visits to the study locations, with the remainder being undertaken by telephone.

1.3.3 Stage 3: Socio-legal analysis

- The information derived from stages 1 and 2 was analysed to explore the following:

- comparisons across jurisdictions and across local government areas within jurisdictions;
- contrasts between approaches to the different hazards;
- identification of strengths and/or weaknesses in current approaches; and
- the responsiveness of legal and policy approaches to changing conditions and uncertainties.

The resulting project report has focused specifically on identifying and critiquing the range of legal instruments available to influence the spatial distribution of land use and development, and hence the exposure and vulnerability of settlements and infrastructure to climate hazards. The report presents a taxonomy of spatial planning instruments and an analysis of considerations relevant to instrument choice, design and implementation. This forms the basis for recommendations for the further development of legal and policy frameworks for adaptation planning.

1.3.4 Stage 4: Refining the research outputs.

An invitation-only symposium involving 25 representatives from local, State and Commonwealth planning agencies or representative bodies, was held in Melbourne in October 2012. Most of the participants had already contributed to the project by participating in interviews or providing the team with relevant documentary or archival material during stage 2.

The symposium was designed to inform key end-user groups on research outputs and engage those end-users as agents for the wider dissemination of results; and to obtain constructive feedback from leading practitioners on the outputs and potential impediments to the uptake and implementation of the recommendations, in order to refine outputs to maximise their value and applicability for end-users.

A draft of the project report was distributed to attendees prior to the symposium to ensure they had the opportunity to consider the research findings and the relevance of the analysis to their activities or area of expertise. The symposium was structured to maximise opportunities for discussion and input from participants. Following two initial presentations on existing legal arrangements for adaptation planning in a coastal and bushfire context, participants were invited to compare and contrast the different approaches in place in the different jurisdictions. This served an important educative function allowing participants from different jurisdictions to share experiences. Following this, the project team presented a more detailed analysis of each type of spatial planning instrument, its advantages and disadvantages and potential challenges in implementation. Participants were given an opportunity to respond to the presentations and to probe the project team's analysis. A series of survey questions, presented through the interactive software *Turning Point*, were also used to gain additional targeted, quantitative feedback. The results of this survey are included where relevant in the discussion of instrument design and implementation in Part 5 of the report. More broadly, participant feedback from the symposium was evaluated and used to refine the analysis in the project report.

1.3.5 Stage 5: Dissemination of outputs

The final report will be distributed to all practitioners who participated in interviews and/or the project symposium, as well as other selected policy makers. This report has been prepared and presented with practitioner end-users in mind, to ensure that the important findings and recommendations are communicated in a way that promotes easy and rapid consideration and uptake to the wider planning community around the country. Particular emphasis has been placed on the use of examples of different

instruments in use in different contexts; and comparison across jurisdictions and between hazards.

In addition to the project report, a range of scholarly articles are in preparation for submission to national and international climate change, law, planning and environmental policy journals. Briefings will also be held at the invitation of key stakeholders.

2. FRAMING THE ADAPTATION CHALLENGE

2.1 Adaptation terminology

2.1.1 What is adaptation?

Adaptation is defined by the Intergovernmental Panel on Climate Change (IPCC) as, 'the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities'.[9] The concepts of moderating harm and exploiting beneficial opportunities draw upon the basic premise that adaptation should enhance community well-being in the face of climate change impacts.[10] The opposite of adaptation is maladaptation, where actions taken to prepare for or respond to global warming decrease social welfare (or increase the social costs of greenhouse gas emissions).[11]

2.1.2 Categories of types of adaptation

The IPCC has categorised adaptation according to who undertakes it (public versus private), when it is undertaken (anticipatory versus reactive) and whether it is prompted by deliberate policy decisions (planned versus autonomous).[12] Public adaptation refers to adaptation undertaken by government; private adaptation is that undertaken by non-government actors, although in practice this distinction may not be so clear-cut and both public and private actors may have a role in achieving particular adaptation goals. Anticipatory adaptation refers to adaptation undertaken or planned for before impacts are experienced; reactive refers to adaptation taken after impacts are experienced. Planned adaptation refers to adaptation taken as a result of a deliberate policy decision based on an awareness that conditions might change or have changed; autonomous adaptation is an internal system response that is not prompted by a policy measure (i.e. actions by individuals without policy inducement).[13]

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[9] Watson R and the Core Writing Team (eds), *Climate Change 2001: Synthesis Report. Contribution of Working Groups I, II, III to the Third Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2001) 365; Klein R et al, 'Inter-relationships between adaptation and mitigation' in Parry M et al (eds), *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2007) 750.

[10] Productivity Commission, *Barriers to effective Climate Change Adaptation – Draft Report* (Commonwealth of Australia, 2012).

[11] Barnett J and O'Neill S, 'Maladaptation' (2010) 20 *Global Environmental Change* 211; Productivity Commission, *Barriers to effective Climate Change Adaptation – Draft Report* (Commonwealth of Australia, 2012); maladaptation can be defined more narrowly as 'actions which tend to increase vulnerability to climate change' (Feenstra J et al (eds), *Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies* (United Nations Environment Programme (UNEP) and Institute for Environmental Studies, 1998) 5-4).

[12] Feenstra J et al (eds), *Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies* (UNEP and Institute for Environmental Studies, 1998); Smit B et al, 'The Science of Adaptation: A Framework for Assessment' (1999) 4 *Mitigation and Adaptation Strategies for Global Change* 199; McCarthy et al (eds), *Climate Change 2001: Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2001).

[13] Feenstra J et al (eds), *Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies* (UNEP and Institute for Environmental Studies, 1998); Smit B et al, 'The Science of Adaptation: A Framework for Assessment' (1999) 4 *Mitigation and Adaptation Strategies for Global Change* 199; McCarthy et al (eds), *Climate Change 2001: Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2001); Walker W, Marchau V and Swanson D, 'Addressing deep uncertainty using adaptive policies' (2010) 77 *Technological Forecasting & Social Change* 917.

2.1.3 Vulnerability and adaptive capacity

Vulnerability to climate change refers to 'the propensity of human and ecological systems to suffer harm and their ability to respond to stresses imposed as a result of climate change effects'.[14] An alternative IPCC definition is 'the degree to which geophysical, biological and socio-economic systems are susceptible to, and unable to cope with, adverse impacts of climate change'.[15] As these definitions suggest, vulnerability is a function of exposure to risks, ability to cope with stresses, and the capacity of a system to recover.[16]

The IPCC defines adaptive capacity as 'the ability or potential of a system to respond successfully to climate variability and change, and includes adjustments in both behaviour and in resources and technologies'.[17] The main determinants of the adaptive capacity of a community are the availability and distribution of economic resources, availability and distribution of technology (including information), infrastructure and human capital, including expertise, cultural and social values.[18]

2.1.4 Limits, barriers and drivers

Limits to adaptation are defined as insurmountable constraints on the ability of land-use planning systems to change to address or respond to social and climatic stimuli. Barriers are surmountable obstacles to the modification of land-use planning systems to address issues related to climate change. Drivers are matters or processes that promote the modification of planning systems in response to social and climatic stimuli.[19]

2.2 Nature of the threats

Planning frameworks around the nation must already deal with the risks associated with bushfire and coastal hazards such as flooding, erosion and storm surge. Some address these current threats better than others. Climate change will exacerbate these risks and in order to understand how these frameworks must respond in the future, this sub-section provides a brief overview of these projected impacts.

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[14] Adger W et al, '2007: Assessment of adaptation practices, options, constraints and capacity' in Parry M et al (eds), *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2007) 720.

[15] Schneider S et al, 'Assessing key vulnerabilities and the risk from climate change' in Parry M et al (eds), *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2007) 783.

[16] Schneider S and Sarukhan J (eds), 'Overview of Impacts, Adaptation, and Vulnerability to Climate Change' in McCarthy et al (eds), *Climate Change 2001: Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2001); Smit B et al, 'Adaptation to Climate Change in the Context of Sustainable Development and Equity' in McCarthy et al (eds), *Climate Change 2001: Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2001).

[17] Adger W et al, '2007: Assessment of adaptation practices, options, constraints and capacity' in Parry M et al (eds), *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2007) 720, 727.

[18] Smit B et al, 'Adaptation to Climate Change in the Context of Sustainable Development and Equity' in McCarthy et al (eds), *Climate Change 2001: Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2001).

[19] Adger W et al, '2007: Assessment of adaptation practices, options, constraints and capacity' in Parry M et al (eds), *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2007) 720; Moser S and Ekstrom J, 'A framework to diagnose barriers to climate change adaptation' (2010) 107(51) *Proceedings of the National Academy of Sciences* 22026.

2.2.1 Coastal climate hazards

The coastal zone is naturally in a constant state of flux. When not interfered with by human structures, the coast will continually erode and accrete, with the state at any point in time reflecting the interaction between wave and tidal energy and coastal geology and geomorphology. Storms and seasonal tidal variations alter the wave and tidal conditions and thereby cause changes in coastal landforms. Likewise, coastal landforms can be affected by variations in sea levels as they change the wave climate. The extent and timing of any changes in coastal landforms are a function of the magnitude of the energy shift and the nature of the local geomorphology; sandy beaches adjust rapidly, rocky cliffs very slowly. The dynamic nature of the coastal zone exposes coastal settlements and other human activities to a number of hazards, particularly erosion, shoreline recession, coastal cliff instability and inundation (coastal hazards). These threats are heightened in storm events, where increased winds, wave energy and riverine flows can combine to intensify impacts.

The impacts of climate change on coastal areas are primarily related to two factors: increasing mean sea levels and potential changes in the frequency and intensity of storm events. While climate change could have other significant coastal impacts – biodiversity loss, changes in ecosystem function, altered prevailing wind speeds and direction etc – it is sea level rise and storm events that are of greatest relevance to the current analysis.[20]

2.2.1.1 Sea level rise

Rising sea levels could have a number of adverse effects on coastal areas, the most significant being inundation, increased erosion, increased flood frequencies, increased water tables and salt water intrusion.[21] The consequences of these effects will vary but could include loss of land, damage or loss of buildings and infrastructure, increased flood risk due to impaired drainage systems, loss of cultural heritage sites, modification and destruction of coastal ecosystems, contamination of water sources and loss or damage to agricultural areas due to salinity or inundation. With 85% of its population living within 50 km of the coast, Australia is particularly vulnerable to effects of sea level rise.[22]

Predictions of future sea level rise are subject to a high degree of uncertainty, which is a function of natural and social factors embodied in the projections. In order to estimate future trends in global average sea level, modellers have to account for multiple uncertainties, including:

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[20] Intergovernmental Panel on Climate Change Coastal Zone Management Subgroup (IPCC CZMS), *Strategies for Adaptation to Sea Level Rise* (IPCC, 1990); McLean R et al, 'Coastal zones and marine ecosystems' in McCarthy M et al (eds), *Climate Change 2001: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2001); Nicholls R et al, 'Coastal systems and low-lying areas' in Parry et al (eds), *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2007).

[21] Titus J (ed), *Changing Climate and the Coast: Report of the Intergovernmental Panel on Climate Change from the Miami Conference on Adaptive Responses to Sea Level Rise and Other Impacts of Global Climate Change* (UNEP, World Health Organization (WHO) and US EPA, 1990); IPCC CZMS, *Strategies for Adaptation to Sea Level Rise* (IPCC, 1990); Feenstra J et al (eds), *Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies* (UNEP and Institute for Environmental Studies, 1998); Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Bureau Of Meteorology (BOM), *Climate Change in Australia 2010: Technical Report* (Commonwealth of Australia, 2010).

[22] Australian Bureau of Statistics, *Year Book Australia, 2004* (Commonwealth of Australia, 2004); Department of Climate Change, *Climate Change Risks to Australia's Coast: A First Pass National Assessment* (Commonwealth of Australia, 2009).

- future trends in greenhouse gas emissions;
- future trends in non-greenhouse gas anthropogenic forcings (e.g. black carbon and aerosols);
- the airborne fraction of carbon dioxide (i.e. the proportion of CO_2 that remains in the atmosphere, which is likely to change through time due to changes in the amount of CO_2 that is absorbed by sinks);
- potential positive climate feedbacks that trigger releases of greenhouse gases (e.g. the release of methane from ocean hydrates, permafrost hydrates and peat deposits);
- climate sensitivity (the amount of warming that arises from a given increase in the atmospheric concentration of CO_2 or greenhouse gases);
- thermal expansion of the oceans, which is determined by the rate of warming, ocean heat uptake, the distribution of heat within oceans and changes in ocean density (i.e. salt levels); and
- glacier and ice-sheet melt.

Global projections of sea level rise can provide useful information on possible general future trends. However, because sea level rises will not be uniform, caution is needed when seeking to draw conclusions about possible local impacts from global projections. Local and regional projections of future sea level change have been undertaken and can be used for assessment purposes but they involve a further layer of uncertainty because they require modellers to account for local and regional factors, including local topography and geomorphology (e.g. uplifting and subsidence), regional climate patterns and shifts (e.g. sea level changes in Australia are particularly influenced by the El Niño-Southern Oscillation and Southern Annular Mode), and localised changes in wave activity and sand movement.[23]

The most widely used projections of sea level rise in Australian planning processes to date are those contained in the IPCC's Fourth Assessment Report (AR4), which are an assessment of the likely change in global average sea levels between 1980-1999 and 2090-2099 under the Special Report on Emissions Scenarios (SRES) emission scenarios.[24] Details of the SRES scenarios and IPCC 4AR sea level rise projections, as adjusted by Hunter (2010),[25] are presented in Table 1.

[23] Meehl G A et al, '2007: Global Climate Projections' in Solomon S et al (eds), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2007); CSIRO and BOM, *Climate Change in Australia 2010: Technical Report* (Commonwealth of Australia, 2010).

[24] Meehl G A et al, '2007: Global Climate Projections' in Solomon S et al (eds), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2007).

[25] Hunter J, 'Estimating Sea-Level Extremes Under Conditions of Uncertain Sea-Level Rise' (2010) 99 *Climatic Change* 331.

Table 1: IPCC SRES projections of atmospheric GHG concentrations (incl. aerosols), radiative forcing, and warming at 2090-2099 relative to 1980-1999, and sea level rise as adjusted by Hunter (2010) at 2100 relative to 1990

SRES scenario	B1	A1T	B2	A1B	A2	A1FI
All gases (incl. aerosols) atmospheric concentration at 2100 (CO_2-e)	608	717	808	861	1256	1535
Anthropogenic radiative forcing at 2100 (W m^{-2})	4.19	5.07	5.71	6.05	8.07	9.14
Temperature change at 2100 (°C)*	1.8 [1.1-2.9]	2.4 [1.4-3.8]	2.4 [1.4-3.8]	2.8 [1.7-4.4]	3.4 [2.0-5.4]	4.0 [2.4-6.4]
Sea level rise at 2100 relative to 1990 (mm) (including scaled-up ice sheet discharge)	185-496	194-611	210-576	208-649	237-692	266-819

* Best estimate (likely range) above pre-industrial.

Source: Meehl G A et al, '2007: Global Climate Projections' in Solomon S et al (eds), Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press, 2007); Hunter J, 'Estimating Sea-Level Extremes Under Conditions of Uncertain Sea-Level Rise' (2010) 99 Climatic Change 331; European Environment Agency (EEA), Atmospheric Greenhouse Gas Concentrations (CSI-013) (EEA, 2010).

There are several important points that decision makers should be aware of when seeking to rely on the IPCC 4AR global sea level rise projections for policy purposes.

First, the IPCC projections are global averages and do not account for regional and local factors. Secondly, the projections are based on the SRES scenarios. These scenarios cover a range of possible development paths but all assume that no direct policies are introduced to mitigate greenhouse gas emissions. This is significant because the international community has agreed to pursue an aggressive mitigation strategy to keep warming below 2°C above pre-industrial levels. In order to keep warming below 2°C, the atmospheric concentration of greenhouse gases (including aerosols) would have to be kept below 450 ppm CO_2-e and anthropogenic radiative forcing would have to be ~2.5 W/m^2 by the end of the 21st century. As Table 1 shows, under all of the SRES scenarios, the greenhouse gas and radiative forcing levels are well above those required for a 2°C outcome.

Thirdly, the IPCC 4AR divides the sea level rise projections into three major sources: thermal expansion of the oceans, glacier and ice cap melt (i.e. all land ice excluding the ice sheets of Greenland and Antarctica), and Antarctic and Greenland Ice Sheets. For any given projection of the future atmospheric concentration of greenhouse gases, the level of uncertainty associated with the sea level contributions increases progressively, being lowest with thermal expansion and highest with the Antarctic and Greenland Ice Sheets. The IPCC's handling of the uncertainties associated with ice sheet contributions has attracted criticism, with claims (and counter claims) that it has significantly underestimated the potential sea level rise from these sources.[26] In the

[26] Hansen J, 'Scientific reticence and sea level rise' (2007) 2 *Environmental Research Letters* 024002; Rahmstorf S, 'A Semi-Empirical Approach to Projecting Future Sea-Level Rise' (2007) 315 *Science* 368; Holgate S et al, 'Comment on 'A Semi-Empirical Approach to Projecting Future Sea-Level Rise'' (2007) 317(5846) *Science* 1866b; Schmith T, Johansen S and Thejll P, 'Comment on 'A semi-empirical approach

4AR, these contributions were split into two groups. The main reported projections included the effects of dynamical changes that could be simulated with continental ice sheet models and a scenario-independent ice sheet contribution estimate of 0.32 mm yr^{-1}, which was based on the assumption that flows from the Antarctic and Greenland Ice Sheets remain at the rates observed over the period 1993-2003.[27] Reported separately was a scaled-up ice sheet discharge estimate that was based on the simple assumption that the estimated rate over the period 1993-2003 increases linearly with global average temperature change through to 2090-2099, leading to an additional contribution of between -0.01 m and 0.17 m by the end of the century.

Since the publication of the IPCC's 4AR, several studies have been undertaken using a semi-empirical method to estimate sea-level rise, all of which suggest that the 4AR may have underestimated potential increases.[28] This is illustrated in Figure 1, which compares the IPCC 4AR projections (as adjusted by Hunter (2010)) to those from Jevrejeva et al (2012).[29] The Jevrejeva et al (2012) study projects sea level rise under the Representative Concentration Pathways (RCPs) scenarios: RCP3PD, RCP4.5, RCP6 and RCP8.5.[30] The anthropogenic radiative forcing outcomes under the RCP4.5, RCP6 and RCP8.5 scenarios cover a range similar to that from the SRES scenarios.[31] The RCP3PD scenario provides a representation of the emissions and radiative forcing outcomes that would be necessary to meet the current international target of keeping warming to 2°C above pre-industrial levels.[32]

As the results from Jevrejeva et al (2012) suggest, semi-empirical models give a higher rate and wider range of sea level rise than the more conventional (physical modelling) approach adopted for the purposes of the IPCC 4AR's main projections.[33] The available semi-empirical literature provides a range of between 50-180 cm above 1990 levels at 2100 under the SRES (or equivalent) emission scenarios,[34] compared to the

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to projecting future sea-level rise'' (2007) 317(5846) *Science* 1866c; Pfeffer W, Harper J and O'Neel S, 'Kinematic constraints on glacier contributions to 21-st century sea-level rise' (2008) 321(5894) *Science* 1340; Rahmstorf S, 'A new view on sea level rise' (2010) 4 *Nature Climate Change* 44; Church J et al, 'Understanding and projecting sea level change' (2011) 24(2) *Oceanography* 130; Rahmstorf S, Foster G and Cazenave A, 'Comparing climate projections to observations up to 2011' (2012) 7(4) *Environmental Research Letters* 044035.

[27] The scenario-independent Antarctic and Greenland Ice Sheet term (0.32 mm yr^{-1}) was the central estimate of the sea level contribution over the period 1993-2003 from the Antarctic Ice Sheet, plus half of that from Greenland. This was supposed to represent the best estimate of the 2000s ice sheet mass imbalance attributable to ice flow acceleration. Readers should also be aware that the IPCC 4AR projections do not account for uncertainties associated with carbon cycle feedbacks (i.e. the potential for temperature changes to trigger changes in the rate at which carbon is absorbed by terrestrial and ocean sinks), nor do they account for changes in terrestrial water storage (i.e. groundwater depletion).

[28] Rahmstorf S, 'A Semi-Empirical Approach to Projecting Future Sea-Level Rise' (2007) 315 *Science* 368; Rahmstorf S, 'A new view on sea level rise' (2010) 4 *Nature Climate Change* 44; Vermeer M and Rahmstorf S, 'Global sea level linked to global temperature' (2009) 106(51) *Proceedings of the National Academy of Sciences* 21527; Grinsted A, Moore J and Jevrejeva S, 'Reconstructing sea level from paleo and projected temperatures 200 to 2100 AD' (2010) 34(4) *Climate Dynamics* 461; Jevrejeva S, Moore J and Grinsted A, 'Sea level projections to AD2500 with a new generation of climate change scenarios' (2012) 80-81 *Global and Planetary Change* 14.

[29] Jevrejeva S, Moore J and Grinsted A, 'Sea level projections to AD2500 with a new generation of climate change scenarios' (2012) 80-81 *Global and Planetary Change* 14.

[30] Meinshausen M et al, 'The RCP greenhouse gas concentrations and their extensions from 1765 to 2300' (2011) 109 *Climatic Change* 213; van Vuuren et al, 'The representative concentration pathways: an overview' (2011) 109 *Climatic Change* 5.

[31] Total anthropogenic radiative forcing at 2100 relative to pre-industrial under the RCP4.5, RCP6 and RCP8.5 scenarios is 4.1 W/m^2, 5.3 W/m^2 and 8.1 W/m^2 respectively.

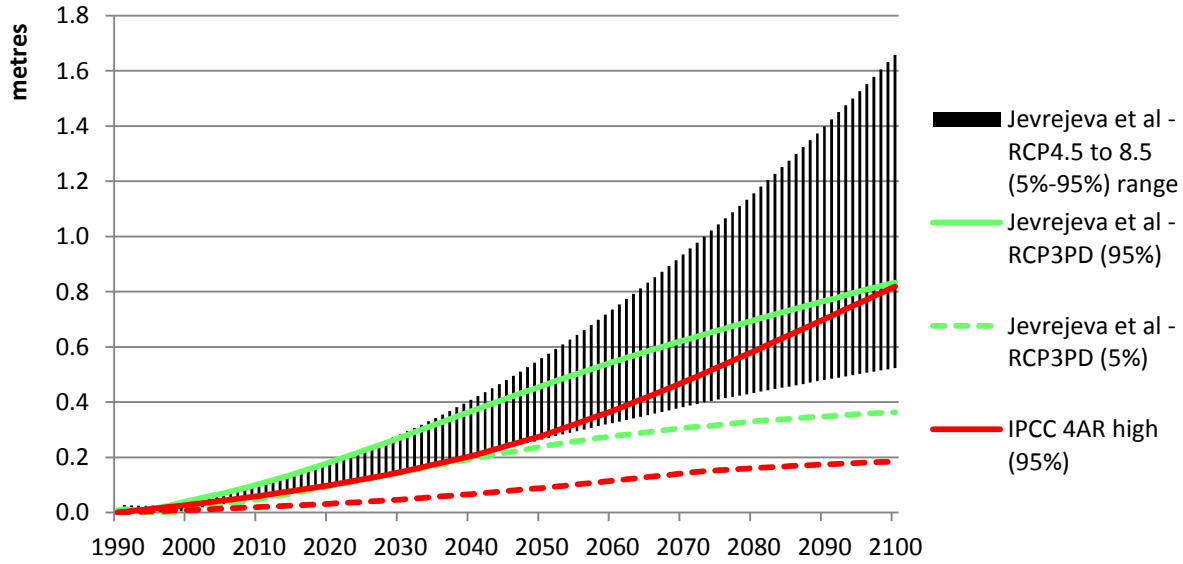
[32] Total anthropogenic radiative forcing at 2100 relative to pre-industrial under the RCP3PD is 2.4 W/m^2.

[33] Church J et al, 'Understanding and projecting sea level change' (2011) 24(2) *Oceanography* 130.

[34] Rahmstorf S, 'A Semi-Empirical Approach to Projecting Future Sea-Level Rise' (2007) 315 *Science* 368; Rahmstorf S, 'A new view on sea level rise' (2010) 4 *Nature Climate Change* 44; Vermeer M and Rahmstorf S, 'Global sea level linked to global temperature' (2009) 106(51) *Proceedings of the National Academy of Sciences* 21527; Grinsted A, Moore J and Jevrejeva S, 'Reconstructing sea level from paleo and projected temperatures 200 to 2100 AD' (2010) 34(4) *Climate Dynamics* 461; Jevrejeva S, Moore J

IPCC 4AR's range of 19-63 cm, excluding the scaled-up ice sheet discharge estimate.[35] Although these results have attracted considerable attention, questions remain about the reliability of the semi-empirical approach. The method assumes that sea levels rise in proportion to temperature (or radiative forcing) and uses past observations to derive a statistical relationship between the two variables. Unsurprisingly, the models represent past sea level rise well but, as one of the pioneers of the method, Stefan Rahmstorf acknowledges, 'there is no way to ensure that the historic relationship between sea level rise and temperature will continue to hold in future'.[36] Despite recent advances in the field, debates about the validity of the semi-empirical models persist and there remains considerable uncertainty about possible future rates of sea level rise.[37]

Figure 1. Sea level rise projections for the 21st century, 5%-95% confidence interval, IPCC 4AR and Jevrejeva et al (2012)



Source: Meehl G et al, '2007: Global Climate Projections' in Solomon S et al (eds), Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press, 2007); Hunter J, 'Estimating Sea-Level Extremes Under Conditions of Uncertain Sea-Level Rise' (2010) 99 Climatic Change 331; Jevrejeva S, Moore J and Grinsted A, 'Sea level projections to AD2500 with a new generation of climate change scenarios' (2012)80-81 Global and Planetary Change 14.

Finally, as Figure 1 illustrates, the degree of uncertainty associated with sea level rise increases through time. For decisions with only short-term implications, the uncertainty faced by policy makers is limited – the extent of sea level rise is relatively insensitive to the trends in emissions due to the thermal inertia in the climate system. Over time, the uncertainty grows as our capacity to see into the future diminishes. The uncertainties associated with longer-term projections include both what we know but cannot predict and what we do not yet know (i.e. what Donald Rumsfeld famously described as

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and Grinsted A, 'Sea level projections to AD2500 with a new generation of climate change scenarios' (2012) 80-81 *Global and Planetary Change* 14.

[35] The IPCC's scaled-up ice sheet discharge estimate was not based on physical modeling and has 'no firm theoretical or observational basis' (Church J et al, 'Understanding and projecting sea level change' (2011) 24(2) *Oceanography* 130, 133).

[36] Rahmstorf S, 'A new view on sea level rise' (2010) 4 *Nature Climate Change* 44. See also Church J et al, 'Understanding and projecting sea level change' (2011) 24(2) *Oceanography* 130.

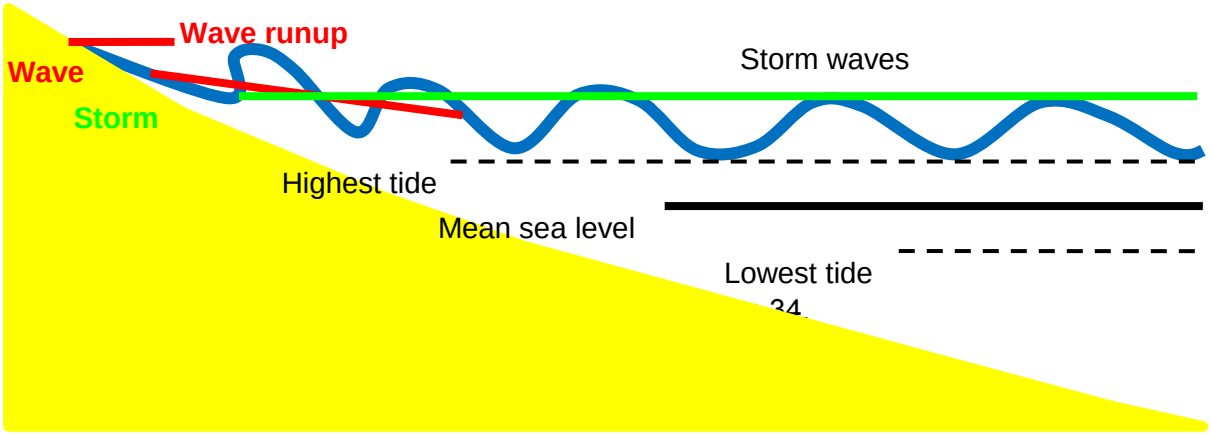
[37] Church J et al, 'Understanding and projecting sea level change' (2011) 24(2) *Oceanography* 130; Rahmstorf S, Foster G and Cazenave A, 'Comparing climate projections to observations up to 2011' (2012) 7(4) *Environmental Research Letters* 044035.

'unknown unknowns'). Due to the unpredictability of certain factors, particularly those associated with human behaviour, and the likely presence of unknown unknowns, our capacity to accurately project sea level changes is unlikely to substantially improve in the future. Further, although not shown in Figure 1, sea level rise (and the continual growth in uncertainty) is likely to extend well beyond 2100.

2.2.1.2 Storm surge

Storm surges are the temporary increases in coastal sea levels that occur during severe weather. They are a product of high winds and low atmospheric pressure.[38] The impacts of storm surges can be aggravated by the cumulative effects of waves breaking on the coast, which further raises water levels (called 'wave setup') and allows water to penetrate further inland ('wave run-up' is the maximum inland penetration of water caused by breaking waves). High tides will also increase the severity of the impacts of storm surges. A diagrammatic representation of the interaction of storm surges, wave setup, wave run-up and tidal variation is provided in Figure 2.

Figure 2. Impact of storm surge, wave setup, wave run-up and tidal variation on coastal sea levels



Change on Extreme Sea Levels along Victoria's Coast (CSIRO, 2009).

The impact of climate change on storm events and storm surge is highly uncertain and subject to considerable regional variation. Current projections suggest there could be an increase in the intensity of cyclone events, southward migration of cyclone events, increases in the intensity of rainfall and hail events in certain areas, and an increase in wind speeds and the frequency of large wave events in southern Australia.[39]

While worsening storm conditions are possible under changed climate conditions, in many areas there is a chance of a reduction in the frequency and/or intensity of storm events. However, even if storm events do not worsen, rising sea levels will increase the risks posed by storm surge events. With higher sea levels, storm surges will penetrate further inland and cause greater inundation and erosion. They will also exacerbate riverine flooding by increasing the elevation of tailwaters. The intensification of storm events would magnify these impacts.

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[38] McInnes K et al, *Climate Change in Eastern Victoria: The effect of climate change on storm surges* (CSIRO, 2005); McInnes K, Macadam I and O'Grady J, *The Effect of Climate Change on Extreme Sea Levels along Victoria's Coast* (CSIRO, 2009); CSIRO and BOM, *Climate Change in Australia 2010: Technical Report* (Commonwealth of Australia, 2010).

[39] Meehl G A et al, '2007: Global Climate Projections' in Solomon S et al (eds), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2007); CSIRO and BOM, *Climate Change in Australia 2010: Technical Report* (Commonwealth of Australia, 2010).

These two scenarios – an increase in sea level but no change in storm frequency and/or intensity versus an increase in sea level coupled with an increase in storm frequency and/or intensity – can be thought of in statistical terms as a shift in the mean coastal sea level with no change in climatic variation, or a shift in the mean and an increase in variability. Figures 3 and 4 below present hypothetical probability density functions of coastal sea levels under these scenarios. In Figure 3, climate variability is unchanged but the shift in the mean sea level increases the probability of extreme inundation events associated with storm surges (represented by point X*, where coastal sea levels exceed a critical threshold). In Figure 4, there is an increase in both the mean and variability, resulting in an even greater increase in the probability of extreme storm surge events.

Figure 3. Probability density function of coastal sea levels – change in mean sea level with no change in climate variability

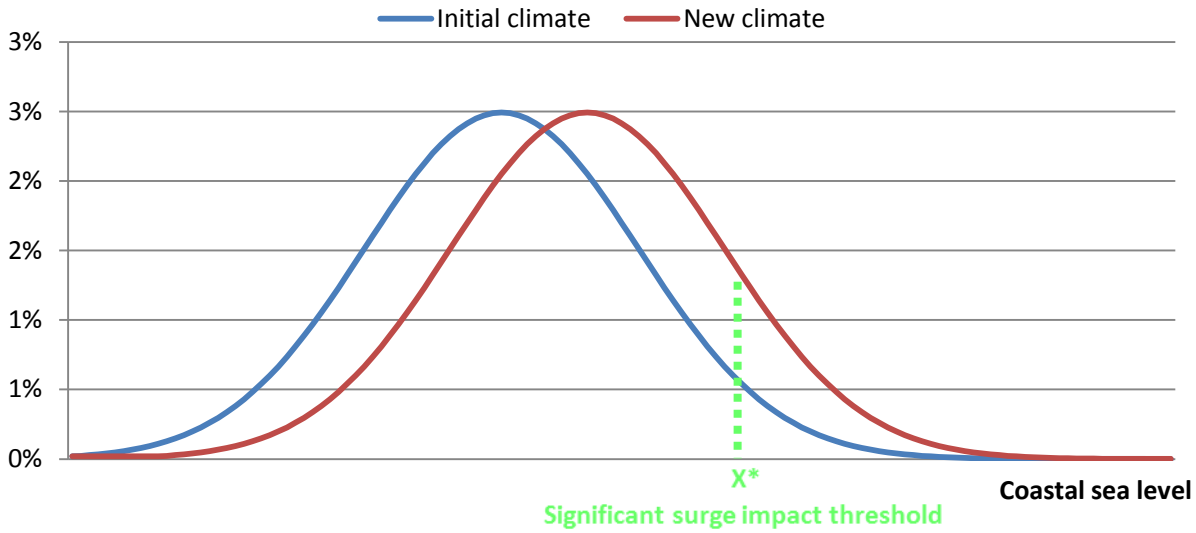
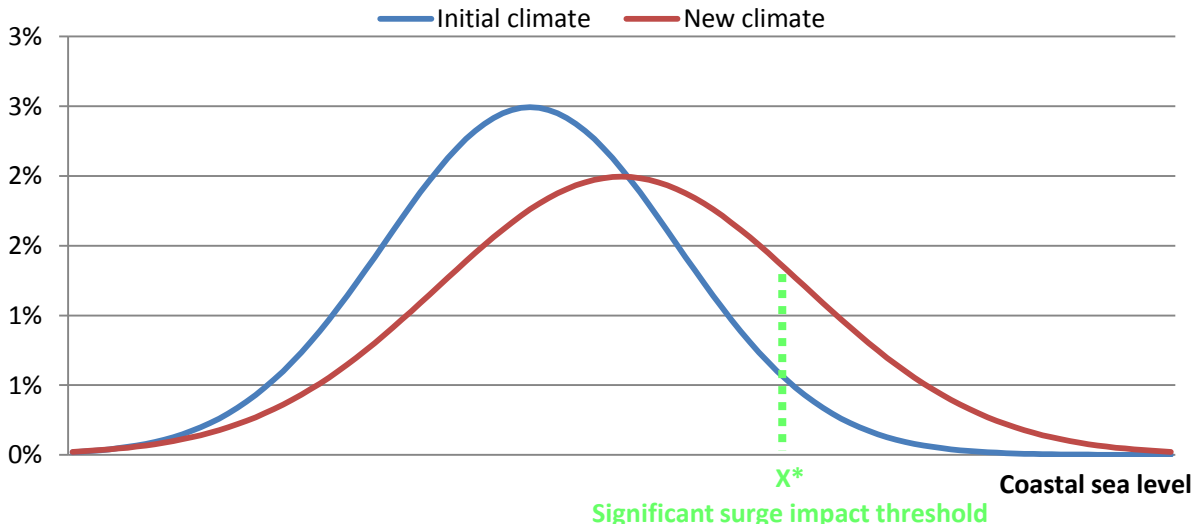


Figure 4. Probability density function of coastal sea levels — change in mean sea level with change in climate variability



2.2.1.3 Coincidence of Events

In many localities, coastal inundation associated with storm surge or king tides may be intensified when it occurs in conjunction with riverine flooding. In the 2011 Queensland floods for example, a prolonged event of heavy rainfall in the Brisbane River catchment coincided with a king-tide event. The combined results were catastrophic for low-lying areas of Brisbane.[40] This example highlights the importance of considering any potential interaction of hazard events in an adaptation planning context.

2.2.2 Bushfire and climate change

All parts of Australia experience bushfires, yet the combination of climate, topography and vegetation in the south-eastern states creates one of the most severe fire environments in the world.[41] In these areas, winter and spring rains allow fuel growth, while the dry summers allow fire danger to build. This normal risk is exacerbated by periodic droughts that occur as a part of natural inter-annual climate variability.[42] The south-east is also where the majority of the population live, and hence of particular concern in relation to potential impacts on settlements and infrastructure.

The danger posed to settlements and infrastructure from bushfire is directly related to the chances of a fire starting, its subsequent rate of spread, intensity and the difficulty of successfully suppressing it.[43] These factors are influenced by three parameters:

- fuel characteristics (vegetation density, species distribution etc.);
- regional topography (e.g. fire travels significantly faster up slope than down); and
- weather variables (temperature, relative humidity, wind speed and direction, and antecedent precipitation).[44]

2.2.2.1 Weather Variables

The potential impact of climate change on fire weather variables has been identified as one of the most important strategic issues for bushfire managers in Australia.[45] Yet, similar to climate projections in other areas including coastal hazards, this is an area of considerable uncertainty, complexity and ongoing research effort.

Reflecting the high level of bushfire risk, much research to date has focused on south-eastern Australia.[46] Current understanding of the potential impacts of climate change on fire weather variables in these regions suggests the following:

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[40] For a discussion of king tides in the context of other types of flooding experienced in Brisbane, see http://www.brisbane.qld.gov.au/community/community-safety/disasters-and-emergencies/types-of-disasters/flooding/understanding-your-flood-risk/types-of-flooding/index.htm (19 February 2013)

[41] Bushfire Cooperative Research Centre (Bushfire CRC), *Fire Note Issue 4 – Climate Change and its impact on the management of bushfire* (2006).

[42] Lucas C et al, *Bushfire Weather in Southeast Australia: Trends and Projected Climate Change Impacts* (Bushfire CRC, 2007), 1.

[43] Bushfire CRC, *Fire Note Issue 4 – Climate Change and its impact on the management of bushfire* (2006).

[44] Hasson et al, *Assessing the impact of climate change on extreme fire weather in south-eastern Australia: CAWCR Technical Report No. 007* (The *Centre for Australian Weather and Climate Research* (CAWCR), 2008). Fire danger indices such as the Forest Fire Danger Index provide an indication of fire risk based on various combinations of these weather variables. See Hennessy K et al, *Climate Change Impacts on Fire Weather in south-east Australia* (CSIRO, 2005).

[45] Bushfire CRC, *Fire Note Issue 4 – Climate Change and its impact on the management of bushfire* (2006).

[46] Lucas C et al, *Bushfire Weather in Southeast Australia: Trends and Projected Climate Change Impacts* (Bushfire CRC, 2007), 1; Hennessy K et al, *Climate Change Impacts on Fire Weather in south-east Australia* (CSIRO, 2005); Hasson et al, *Assessing the impact of climate change on extreme fire weather in south-eastern Australia: CAWCR Technical Report No. 007* (CAWCR, 2008).

- South-eastern Australia is likely to become hotter and drier in the future. If average summer temperatures increase as predicted, the frequency of very high temperature days will increase significantly, especially in inland areas, with the exception of Tasmania;[47]
- modelling the impact of climate change on the combined weather variables used in fire danger indices (temperature, relative humidity, wind speed and direction, and antecedent precipitation) over time frames to 2020 and 2050, suggests a clear increase in the annual cumulative fire danger across south-eastern Australia, particularly in inland areas. It also suggests much larger increases in the number of days of very high fire risk. Fire seasons are also expected to start earlier and end slightly later, while being generally more intense throughout;[48] and
- although clear trends of worsening fire weather have been observed in recent decades in south-eastern Australia, it is difficult to attribute this directly to climate change. Significant remaining uncertainties include the difficulty of separating long term climate changes from natural inter-decadal variability, and the role of fuel management practices on the occurrence and outcomes of bushfires.[49]

Overall, for the purposes of spatial adaptation planning in relation to bushfire, there appears to be sufficient consensus that fire weather across the country is changing and is likely to continue to do so, with a tendency to more dangerous conditions.[50]

2.2.2.2 Fuel Characteristics and Regional Topography

The other key fire risk variables (fuel characteristics and regional topography) can potentially be more directly controlled via human land management practices, such as vegetation clearing, fuel reduction burning and careful siting of dwellings and settlements. Nonetheless, there are potential climate change impacts on fuel characteristics, which will affect planning and management responses. In areas predicted to experience increased rainfall, fires are likely to be larger, mostly as a consequence of higher fuel load and fuel continuity, which increases fire spread.[51] Hazard reduction activities may in turn be affected by climate change (e.g. the earlier start and later finish for fire seasons in south-eastern Australia will result in a smaller window of opportunity for pre-season fuel reduction burns).[52]

2.3 Coastal climate hazards and bushfire risks compared

Climate change related coastal and bushfire hazards share a number of common characteristics. Both have the capacity to cause significant harm to properties and infrastructure and to lead to the loss of lives. As average temperatures increase, the risks associated with these hazards are likely to increase in many parts of Australia. Similarly, the nature, distribution and timing of these hazards are subject to considerable uncertainty and, owing to the nature of the drivers of climate change and the variables that influence the hazards, these uncertainties will persist.

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[47] Hennessy K et al, *Climate Change Impacts on Fire Weather in south-east Australia* (CSIRO, 2005).
[48] Lucas C et al, *Bushfire Weather in Southeast Australia: Trends and Projected Climate Change Impacts* (Bushfire CRC, 2007), 1.
[49] Lucas C, *Climate Change Impacts on Fire Weather* (CAWCR, 2009).
[50] Lucas C, *Climate Change Impacts on Fire Weather* (CAWCR, 2009).
[51] Cary G, 'Importance of a changing climate for fire regimes in Australia' in Bradstock R, Williams J and Gill A (eds), *Flammable Australia: The Fire Regimes and Biodiversity of a Continent* (Cambridge University Press, 2002) 26.
[52] Lucas C et al, *Bushfire Weather in Southeast Australia: Trends and Projected Climate Change Impacts* (Bushfire CRC, 2007), 1.

The shared hazard characteristics are reflected in the options that are available to manage them. The standard typology of climate hazard adaptation strategies[53] as applied to both hazards is represented in the table below.

Table 2: Standard Typology of Climate Hazard Adaptation Strategies

Adaptation Strategy	Application to coastal hazards and bushfire
Avoid	Site dwellings and settlements away from at-risk areas.
Retreat	Abandon land and structures in at-risk areas.
Accommodate	Continued use and development of land in at-risk areas, with non-defensive measures to reduce vulnerability and increase resilience. *Coastal* – no attempt to maintain shorelines, and an acceptance that land, coastal functions and values may be modified or lost. *Bushfire* – ensure buildings are resistant to fire and heat, and that there are evacuation options.
Protect	Treatment of land and structures to reduce exposure. *Coastal* – usually involves the use of hard and soft defence structures to maintain shorelines to allow continued use and development. *Bushfire* – usually involves removing and managing vegetation to reduce risks from fire and heat.

There can be significant negative externalities associated with the response strategies for both coastal and bushfire. In a coastal context, this is particularly the case for protect strategies, where defensive measures (e.g. seawalls) are constructed to defend existing and new settlements. The construction and maintenance of these measures can interrupt sand movement and deflect wave energy, leading to increased erosion to coastlines and public beaches if badly placed or designed. Likewise, retreat strategies can lead to the clearing of native vegetation and loss of valued landscapes to facilitate the relocation of settlements. Where responses to bushfire threats involve the removal and management of vegetation, similar issues will arise. The destruction of vegetation, and increase in management actions (e.g. prescribed burning) to lower fire risk will generally increase carbon emissions and can lead to adverse biodiversity and heritage impacts, and loss of amenity. For both hazards, policy makers are required to weigh these social costs against the benefits of reduced vulnerability in order to effect the lowest impact for the highest benefit.

While sharing a number of characteristics, there are also notable differences between the hazards. Coastal hazards have both acute (e.g. storm surge and erosion) and chronic (e.g. sea level rise and gradual coastal inundation) elements. Climate change is likely to affect both but the chronic issues associated with sea level rise are arguably of greatest policy significance for spatial planners, in part because of their irreversibility. This is a product of the fact that sea level rise could lead to the inundation of large areas and substantially alter the nature and distribution of the threats posed by coastal erosion and storm surge events. Sea level rise is likely to occur relatively slowly

[53] IPCC CZMS, *Strategies for Adaptation to Sea Level Rise* (IPCC, 1990). See also Productivity Commission, *Barriers to effective Climate Change Adaptation – Draft Report* (Commonwealth of Australia, 2012), where it is used in relation to all adaptation issues.

(between 1993 and 2012, the global mean rate of increase was 3.1±0.4 mm yr^{-1})[54] and continue for hundreds, possibly thousands, of years. The timeframes involved with sea level rise, and the extent of uncertainty, leave policymakers with the challenge of whether, how and when to respond to a chronic, slow onset problem, which is overlaid with acute elements.

The response to coastal threats is also complicated by the fact that the management options are all high-cost relative to bushfire, and the risks are correlated: as sea levels rise, large areas will be affected at the same time. Protect strategies will usually involve large upfront costs associated with the construction of defensive measures, ongoing maintenance costs and the externalities that stem from the interference with coastal processes. Accommodate strategies can involve large construction costs as buildings are retrofitted to deal with inundation and drainage systems are modified, along with the costs associated with switching land uses. With retreat strategies, buildings and settlements have to be relocated, land is sacrificed, and buildings and infrastructure are lost before the end of their economic life. In short, there are few low-cost options to deal with coastal climate hazards.

In contrast to coastal hazards, bushfire threats are acute and already pose a risk to many Australian settlements. The susceptibility of Australian settlements to bushfire is a product of Australia's climate and vegetation, and the patterns of settlement. The relevance of climate change is that it could change the frequency, intensity and distribution of an existing and prevalent hazard. The long history of widespread and destructive bushfires has led to the development of considerable expertise in planning for, and responding to, bushfire events. Further, unlike coastal climate hazards, there are also a number of relatively low-cost options available to manage and accommodate fire risks. Moving settlements away from bushfire prone areas is the equivalent of a coastal retreat strategy. While costly, this option is likely to be reserved for extreme cases, where settlements have been located in very high risk areas and where the risk has already materialised.

The more widely used strategies are likely to involve the modification of building standards and retrofitting existing buildings, constructing and maintaining exit options, and removing and managing vegetation, all of which are relatively low-cost compared to the options available to deal with coastal hazards. In the context of vegetation management, the available science suggests that it is only the vegetation in close proximity to settlements that matters.[55] Due to this, if policy responses are well-designed, the associated costs, including the environmental externalities, are likely to be manageable in many situations, and more able to be borne by individual land owners or developers.

2.4 Basic concepts in adaptation policy appraisal

In seeking to evaluate the pros and cons of different adaptation policy options, it is common for analysts to refer to concepts such as efficiency, cost-effectiveness and equity. For example, Adger et al argue that adaptation should be evaluated against four

[54] National Aeronautics and Space Administration (NASA), *Integrated Multi-mission Ocean Altimeter Data for Climate Research* <http://podaac.jpl.nasa.gov/Integrated_Multi-Mission_Ocean_AltimeterData> (accessed 6/12/2012); see also Rahmstorf S, Foster G and Cazenave A, 'Comparing climate projections to observations up to 2011' (2012) 7(4) *Environmental Research Letters* 044035; Leuliette E and Willis J, 'Balancing the sea level budget' (2011) 24(2) *Oceanography* 122; Leuliette E and Scharroo R, 'Integrating Jason-2 into a Multiple-Altimeter Climate Data Record' (2010) 33(1) *Marine Geodesy* 504; Nerem R et al, 'Estimating mean sea level change from the TOPEX and Jason altimeter missions' (2010) 33(1) *Marine Geodesy* 435; Nicholls R and Cazenave A, 'Sea-Level Rise and Its Impacts on Coastal Zones' (2010) 328 *Science* 1517.

[55] Gibbons P et al, 'Land Management Practices Associated with House Loss in Wildfires' (2012) 7(1) *PLoS ONE* e29212.

generic criteria: efficiency, effectiveness, equity and legitimacy.[56] Similarly, the Productivity Commission has sought to identify barriers to 'effective adaptation', which it defines as:

… action taken in response to the impacts of climate change that increases the wellbeing of the community, taking into account all of the positive and negative impacts, the distributional impacts and the timing of the impacts.57

Although commonly used, key terms like efficiency, cost-effectiveness and equity are often given different meanings. For the purposes of this report, the following definitions are used.

2.4.1 Efficiency

The efficiency of an adaptation policy option refers to whether it results in a net improvement in the well-being of the community, or, more technically, whether the social benefits exceed the social costs.[58] When evaluating the efficiency of a policy option, the distribution of costs and benefits (i.e. who wins and who loses) are irrelevant; the focus is on whether the program will result in a net improvement in well-being, even if the policy results in some people suffering losses. For example, the efficiency of a seawall construction program designed to address future climate change-related coastal inundation and erosion risks is evaluated by aggregating the opportunity cost of the resources used in constructing and maintaining the seawall and converting these costs to a present value using a social time discount rate.

To these costs are added the present value of the environmental and other social costs associated with constructing the seawall (e.g. loss of beaches, private property and environmental values), measured as peoples' willingness to pay to avoid (or willingness to accept compensation for) these impacts. These costs are then compared to the present value of the social benefits associated with the seawall, which are likely to include the protection of land, buildings and infrastructure from future impacts. If the social benefits outweigh the social costs, the program is efficient in the sense that it should increase total community wellbeing.

2.4.2 Cost-effectiveness

Effectiveness refers to whether an adaptation program achieves its expressed objectives. In the adaptation planning context, this will typically involve attempts to reduce vulnerability. Cost-effectiveness asks what social costs were incurred in achieving the outcomes from the program and whether the outcomes could have been achieved in a way that involved lower social costs. As with efficiency, the costs that are measured when evaluating the cost-effectiveness of a program are not simply the monetary amounts paid by relevant governments and individuals; they are the total social costs, or the opportunities foregone by the whole community as a result of the program, and can include non-market items such as human mortality and morbidity, cultural heritage values and the environment.

2.4.3 Equity

In the current context, equity means fairness and has two dimensions: procedural and substantive. The fairness of a process relates to who is involved in decision making, the rules by which decisions are made and the underlying distributions of power or

[56] Adger W, Arnella N and Tompkins E, 'Successful adaptation to climate change across scales' (2005) 15 *Global Environmental Change* 77.

[57] Productivity Commission, *Barriers to effective Climate Change Adaptation – Draft Report* (Commonwealth of Australia, 2012) 5.

[58] This reflects what is known as the Kaldor-Hicks efficiency criteria where an outcome is said to be efficient if it results in at least one person being made better off and those that are made better off could theoretically compensate anybody made worse off so there are no net losers.

influence. The fairness of the substantive outcomes of adaptation programs concerns the distribution of their costs and benefits across the community. Examples of the types of substantive equity issues that can arise in land-use planning processes concerning adaptation include:

- whether residents that are exposed to climate-related risks should pay for measures to reduce their vulnerability or whether the costs of these measures should be borne by the wider community;
- whether people who take risks should be given government assistance if the risks materialise;
- whether people should be able to take measures to protect their property interests that result in costs or risks being transferred onto their neighbours or the broader community; and
- whether the current generation should incur costs to reduce the vulnerability of future generations to climate hazards.

3. COMPLICATIONS IN ADAPTATION PLANNING

3.1 Classifying adaptation options

For every potential climate impact, there will usually be a number of different approaches and measures available to avoid or reduce the harm or exploit relevant beneficial opportunities. The adaptation literature contains several systems for classifying these options.[59] Feenstra et al (1998) use a framework based on Burton et al (1993),[60] which places potential adaptation measures in eight broad categories: bear losses; research; educate and inform; modify the threat; prevent effects; change use; change location; and share losses.[61] Table 2 below relates these categories to the land-use planning measures available to address climate change-related coastal and bushfire threats.

Table 3: Classification of general land-use planning measures available to address climate change-related coastal and bushfire threats

Category	Description	Planning measures
Bear loss	No new measures are introduced to deal with climate-related threats and the impact costs are borne according to current arrangements (i.e. business-as-usual)	Continuation of existing land-use policies and practices for coastal hazards and bushfire
Research	Undertake research to improve information base on nature and timing of threats	Coastal inundation and flood risk modelling under climate scenarios Bushfire hazard modelling under climate scenarios
Educate and inform	Dissemination of hazard information with the intent of prompting autonomous adaptation	Mandatory disclosure of hazards in planning certificates Non-regulatory zonings to identify 'at risk' areas Community education programs
Prevent or modify threat	Measures that prevent climate-related hazards from materialising or reduce their severity	There are no 'adaptation' measures that would eliminate coastal climate hazards For bushfire, planning regulations requiring or allowing landholders to remove vegetation
Prevent effects	Measures that reduce or eliminate the harmful effects of climate-related threats	For coastal climate hazards: mandatory seawalls and protective infrastructure, raised floor levels and elevated buildings

[59] Watson R, Zinyowera M and Moss R (eds), *Climate Change 1995. Impacts, Adaptations and Mitigation of Climate Change: Scientific-Technical Analyses. Contribution of Working Group II to the Second Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 1995); Feenstra J et al (eds), *Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies* (UNEP and Institute for Environmental Studies, 1998); Smit B et al, 'The Science of Adaptation: A Framework for Assessment' (1999) 4 *Mitigation and Adaptation Strategies for Global Change* 199.

[60] Burton I, Kates R and White G, *The Environment as Hazard* (Gilford Press, 2nd edition, 1993).

[61] Feenstra J et al (eds), *Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies* (UNEP and Institute for Environmental Studies, 1998).

Category	Description	Planning measures
		For bushfire: enhanced building design, siting and landscaping requirements, improved monitoring and enforcement, better integration of planning and emergency management to improve emergency response
Change use	Changes in land use to reduce exposure to climate-related hazards and exploit opportunities	Rezoning of land to move sensitive uses (e.g. residential, aged care, child care, schools and hospitals) away from at risk areas Imposition of differential rates and levies to prompt land use change Acquisition of land for buffers and reserves
Change location	Wholesale movement of settlements away from areas susceptible to coastal and bushfire hazards	Regulatory bans on use and/or development in certain areas Rezoning areas to facilitate relocation Imposition of differential rates and levies to prompt land use change Land swaps, buy backs, transferable development rights
Share losses	Measures to facilitate the sharing of hazard costs across the community	Mandatory insurance for at risk areas Taxes, charges and levies

Sources: Burton I, Kates R and White G, *The Environment as Hazard* (Gilford Press, 2nd edition, 1993); and Feenstra J et al (eds), *Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies* (UNEP and Institute for Environmental Studies, 1998).

At a conceptual level, the measures that are available to address climate hazards are relatively simple. However, their application is complicated by the characteristics of the hazards and the institutional framework in which they operate. The major sources of complexity in devising spatial planning responses for climate hazards can be classified as:

- uncertainty and uncertainty preferences;
- political ideology and property rights;
- externalities and distributional issues;
- government presence and moral hazard;
- correlation of hazards; and
- distribution of powers and responsibilities.

3.2 Uncertainty

As discussed in Section 2.2, climate change-related bushfire and coastal hazard impacts are characterised by the high degree of uncertainty surrounding their scale, distribution and timing. The nature of the uncertainties cover:

- standard risk – where the precise outcome is not known with certainty but there is a reasonable basis for the assignment of probabilities to potential outcomes;
- uncertainty – where the potential range of outcomes is known but there is no reasonable basis for assigning probabilities to them;
- ignorance – where we do not know of a potential outcome (i.e. unknown unknowns); and
- indeterminacy – where the causal chains that lead to outcomes are open.[62]

The extent of the uncertainty associated with climate impacts creates a number of difficulties. From a practical perspective, the complexities and degree of uncertainty can overwhelm decision makers, leading to unnecessary delays and excessive expenditure on information gathering. Decision makers can also easily mischaracterise the nature of the uncertainties, for example by assuming there is a reliable basis for assigning probabilities (standard risk) whereas the hazard actual involves true uncertainty, ignorance and/or indeterminacy. This can lead to reliance on inappropriate decision support tools and, ultimately, to poor decision making.

At a more fundamental level, climate adaptation raises questions for which there are no theoretically optimal solutions. This is due to the fact that there is no widely accepted theory of rational choice under uncertainty.[63] Where there is a firm basis from which to assign probabilities to potential outcomes, expected utility analysis is often used to derive theoretically optimal choices (maximum expected utility) and guide decision making. The uncertainty associated with climate impacts complicates the application of this approach as there is no objective way of deriving relevant probabilities and the depth of the uncertainty raises questions about the validity of methods for eliciting subjective probabilities (known as Bayesian probabilities).[64] The extent of uncertainty and complexity also raises issues about the ability to extract reliable information on peoples' preferences regarding how to approach the uncertainties (i.e. the degree of risk aversion or aversion to uncertainty).

A number of alternatives to optimal expected utility have been proposed to guide decision making under uncertainty, including:

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[62] Wynne B, 'Uncertainty and environmental learning: reconceiving science and policy in the preventive paradigm' (1992) 2(2) *Global Environmental Change* 111; Walsh K et al, 'Using Sea Level Rise Projections for Urban Planning in Australia' (2004) 202 *Journal of Coastal Research* 586; Swart R et al, 'Agreeing to disagree: uncertainty management in assessing climate change, impacts and responses by the IPCC' (2009) 92 *Climatic Change* 1. For alternative ways of classifying uncertainty, see Courtney H, *20/20 Foresight: Crafting Strategy in an Uncertain World* (Harvard Business School Press, 2001); Walker W et al, 'Defining uncertainty: a conceptual basis for uncertainty management in model-based decision support' (2003) 4(1) *Integrated Assessment* 5; Makridakis S, Hogarth R and Gaba A, 'Forecasting and uncertainty in the economic and business world' (2009) 25 *International Journal of Forecasting* 794; Walker W, Marchau V and Swanson D, 'Addressing deep uncertainty using adaptive policies' (2010) 77 *Technological Forecasting & Social Change* 917.

[63] Machina M, 'Choice Under Uncertainty: Problems Solved and Unsolved' (1987) 1(1) *Journal of Economic Perspectives* 121; Dasguta P, Barrett S and Karl-Goran M, *Intergenerational Equity, Social Discount Rates and Global Warming* (Beijer International Institute of Ecological Economics, 1996); Neumayer E, *Weak versus Strong Sustainability: Exploring the Limits of Two Opposing Paradigms* (Edward Elgar, 1999); Lembert R, 'Characterizing Climate-Change Uncertainties for Decision-Makers' (2004) 65 *Climatic Change* 1.

[64] Royal Commission on Environmental Pollution, *Adapting Institutions to Climate Change* (UK Government, 2010).

The Precautionary Principle: The principle states that when faced with a threat of serious or irreversible harm, and uncertainty as to the nature and scope of the threat, decision makers should assume the threat is a reality. Proportionate measures may then be required to avoid or mitigate the threat. The principle does not dictate any particular response, it merely requires the decision maker to treat the threat as a reality and, when devising responses, to act proportionally.[65]

Safe Minimum Standards (SMS): The SMS approach suggests that, when faced with uncertainty and irreversibility, a safe minimum standard should be adopted to avoid critical thresholds in natural systems, unless the costs of doing so are unacceptably large.[66] The approach has much in common with the precautionary principle and is often used in a biodiversity conservation context.

Minimax (or Maximin) Decision Criterion: The minimax decision rule suggests that, when faced with uncertainty, the optimal decision is that which minimises the losses under the worst case outcome.[67] Where the uncertainty surrounds the gains associated with different options, the focus is on maximising the minimum gain (maximin).

Robust Decision Approaches: Robust decision approaches characterise uncertainty using multiple representations of the future and use 'robustness' as the decision criteria. Typically, robust decisions are defined as those that perform satisfactorily across a range of possible outcomes.[68] The objective of satisfactory

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[65] The precautionary principle is a common feature of international and domestic legal and policy regimes. For a formal definition of the precautionary principle, see *Rio Declaration on Environment and Development* (1992), Principle 15. For discussion of the varying interpretations and applications of the principle, see Bodansky D, 'Scientific uncertainty and the precautionary principle' (1991) 33(7) *Environment* 4; O'Riordan T and Cameron J (eds), *Interpreting the Precautionary Principle* (Earthscan Publications, 1994); Goklany I, *The Precautionary Principle: A Critical Appraisal of Environmental Risk Assessment* (Cato Institute, 2001); Bondansky D, 'Deconstructing the precautionary principle' in Caron D and Scheiber H (eds), *Bringing New Law to Ocean Waters* (Brill, 2004); and Neumayer E, *Weak versus Strong Sustainability: Exploring the Limits of Two Opposing Paradigms* (Edward Elgar, 1999).

[66] Ciriacy-Wantrup S, *Resource Conservation: Economics and Policy* (University of California Press, 1952); Bishop R, 'Endangered Species and Uncertainty: The Economics of a Safe Minimum Standard' (1978) 60(1) *American Journal of Agricultural Economics* 10; Bishop R 'Endangered Species, Irreversibility, and Uncertainty: A Reply' (1979) 61(2) *American Journal of Agricultural Economics* 376; Ready R and Bishop R, 'Endangered Species and the Safe Minimum Standard' (1991) 73(2) *American Journal of Agricultural Economics* 309; Hohl A and Tisdell C, 'How Useful are Environmental Safety Standards in Economics? – The Example of Safe Minimum Standards for Protection of Species' (1993) 2 *Biodiversity and Conservation* 168; Palmini D, 'Uncertainty, risk aversion and the game theoretical foundations of the safe minimum standard: a reassessment' (1999) 29 *Ecological Economics* 463; Berrens R, 'The safe minimum standard of conservation and endangered species: a review' (2001) 28(2) *Environmental Conservation* 104.

[67] Resnik M, *Choices: an Introduction to Decision Theory (*University of Minnesota Press, 1987); Bishop R, 'Endangered Species and Uncertainty: The Economics of a Safe Minimum Standard' (1978) 60(1) *American Journal of Agricultural Economics* 10; Bishop R 'Endangered Species, Irreversibility, and Uncertainty: A Reply' (1979) 61(2) *American Journal of Agricultural Economics* 376; Ready R and Bishop R, 'Endangered Species and the Safe Minimum Standard' (1991) 73(2) *American Journal of Agricultural Economics* 309; Neumayer E, *Weak versus Strong Sustainability: Exploring the Limits of Two Opposing Paradigms* (Edward Elgar, 1999).

[68] Simon H, 'Theories of Decision-Making in Economics and Behavioral Science' (1959) 49(3) *American Economic Review* 253; Ben-Haim Y, *Information-Gap Decision Theory: Decisions under Severe Uncertainty* (Academic Press, 2001); Toth F and Mwandosya M, 'Decision-making Frameworks' in IPCC, *Climate Change 2001: Mitigation. Contribution of Working Group III to the Third Assessment of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2001); Lembert R et al, 'Characterizing Climate-Change Uncertainties for Decision-Makers' (2004) 65 *Climatic Change* 1; Regan H et al, 'Robust Decision-Making under Severe Uncertainty for Conservation Management' (2005) 15(4) *Ecological Applications* 1471; Lempert R and Collins M, 'Managing the Risk of Uncertain Threshold Responses: Comparison of Robust, Optimum, and Precautionary Approaches' (2007) 27(4) *Risks Analysis* 1009; Lembert R and Groves D, 'Identifying and evaluating robust adaptive policy responses to climate change for water management agencies in the American west' (2010) 77 *Technological Forecasting & Social Change* 960; Hall J et al, 'Robust Climate Policies Under Uncertainty: A Comparison of Robust Decision Making and Info-Gap Methods' (2012) *Risks Analysis* DOI: 10.1111/j.1539-6924.2012.01802.x;

performance differs from 'optimality', which is the standard decision criterion under expected utility analysis. The representation of uncertainty with multiple possible scenarios also differs significantly from traditional expected utility analysis, where uncertainty is characterised using a single probability distribution (probability density function) and a single utility function is used to capture risk aversion.

Further details of expected utility analysis and these alternative approaches are provided in Appendix B. While each of these has advantages and disadvantages, the difficulty for decision makers is that there is no solid theoretical foundation to justify the selection of any particular approach. As the discussion in 5.1.2 illustrates, the approach taken to uncertainty will significantly influence the planning response to climate risks, particularly in relation to the selection and design of regulatory instruments. It is therefore important to ensure transparent communication of what approach decision makers are adopting and why.

3.3 Political ideology and property rights

Like all policy issues, adaptation will inevitably be shaped, to varying degrees, by the ideological preferences of decision makers and communities regarding political theory and private property. In Australia, the dominant political views can usually be placed within the broad church of liberalism. There are many different forms of liberalism[69] but what draws the disparate strands of thought together is a belief in the virtue of reserving for the individual a sphere of free choice or autonomy.[70] This freedom is achieved by the state upholding the personal and property rights of the individual against other citizens, and by the imposition of limits on the powers of the state. While there are diverse views on the legitimate role of the state, there is a common presumption throughout liberal political theory in favour of freedom of choice.[71] Beyond this, the paths of liberalism diverge and multiply, with much of the division centring on property rights and the power of the state to interfere with property interests.

While political ideology is relevant to all policy matters, the use of land-use planning systems to address adaptation issues can raise three particularly contentious issues:

- whether governments should second-guess individual choices and intervene to stop people from putting themselves in harm's way;
- the role of government in compensating or assisting individuals who are adversely affected if climate risks materialise (i.e. to share risks and losses); and
- to what extent governments should respect the 'property rights' of landholders in designing and implementing land-use policies.

McInerney D, Lempert R and Keller K, 'What are robust strategies in the face of uncertain climate threshold responses?' (2012) 112(3-4) *Climatic Change* 547.

[69] Michel V, 'Liberalism Yesterday and Tomorrow' (1939) 49(4) *Ethics* 417; Schumpeter J, *History of Economic Analysis* (Oxford University Press, 1954); Levy J, 'Liberalism's Divide, After Socialism and Before' (2003) 20(1) *Social Philosophy and Policy* 278.

[70] Mill JS, *On Liberty* (Library of Economics and Liberty, 2003); Green T, *Lectures on the Principles of Political Obligation and Other Writings* (Cambridge University Press, 1986); Dworkin G, *The Theory and Practice of Autonomy* (Cambridge University Press, 1988); Gray J, *Liberalism* (University of Minnesota Press, 1995); Berlin I, *Liberty* (Oxford University Press, 2002).

[71] Dewey J, *Liberalism and Social Action* (G P Putnam's Sons, 1935); Rawls J, *A Theory of Justice* (Harvard University Press, 1971); Nozick R, *Anarchy, State, and Utopia* (Basic Books, 1974); Rawls J, *Political Liberalism* (Columbia University Press, 1996); Galston W, 'Why the New Liberalism Isn't All that New, and Why the Old Liberalism Isn't What We Thought it Was' (2007) 24 *Social Philosophy and Policy* 289; Satz D, 'Liberalism, Economic Freedom, and the Limits of Markets' (2007) 24 *Social Philosophy and Policy* 120.

Classical liberals (or conservative liberals) will tend to argue that adaptation should be left to the private sector and see little or no role for government. Reflecting the preference toward a minimalist role of the state, they will also generally oppose policy responses motivated by a desire to protect people from their own poor decisions or to spread losses on the grounds they constitute 'nanny statism' – an unjustified violation of the liberty of the individual. Further, most classical liberals will hold a dim view of planning measures that curtail the capacity of landholders to use and develop their property, and will insist on compensation where these freedoms are diminished for public purposes.

At the other end of the liberal spectrum, welfare liberals generally see government intervention as essential for protecting positive liberty (the ability to act autonomously and in accordance with one's conscience) and maximising social welfare. Due to this, those of a welfare liberal perspective are more likely to support an active government role in adaptation, including to stop individuals from exposing themselves and others to risk and to help them when risks materialise. This may be justified on the grounds of bounded rationality (because of the complexity and uncertainty associated with climate impacts individuals will be unable to make rational choices) or political realism (governments will not be able to turn their backs on those who suffer and therefore should have a role in altering behaviour to limit their financial exposure). Moreover, while welfare liberals see property rights as important, the freedoms to enjoy property are not absolute. Curtailing property rights, even without compensation, can be justified to advance the public interest and positive liberty.

Differences in political ideology within the community and government can act as a barrier to adaptation planning reforms, sparking conflict and standing in the way of decisive decision making. It can also lead to inconsistencies in the design and implementation of planning measures.

3.4 Externalities and distributional issues

Judgments about the merits of government intervention are made more difficult by the externalities and distributional issues associated with responses to climate impacts. For example, the construction of sea-walls to defend private property from coastal climate hazards will deflect wave energy and disrupt sand movement, resulting in harm to neighbouring properties and public areas, including beaches. An example of this from Portland in Victoria is provided in Box 1. A simple, albeit extreme, planning response to this situation is to prohibit the construction of defensive structures so as to ensure that the externalities do not materialise. However, in doing so, the increasing risk is retained by the seaside landholders: if coastal climate hazards materialise, their properties will be damaged or lost.

Similar welfare and distributional concerns arise with other restrictions and informational measures designed to promote anticipatory adaptation. Examples include the following:

- *Set-backs*: Preventing development in areas susceptible to future hazards can reduce future losses to landholders, insurers and governments. However, set-backs result in the lost opportunity to use and develop the land, which usually falls on the property owner.
- *Mandatory hazard warnings*: Mandatory planning-based hazard warnings (e.g. planning certificates) can enable property owners and potential purchasers to make more informed choices, thereby facilitating autonomous adaptation. However, any resulting reduction in demand for at risk properties, or increase in supply of these properties as owners seek to leave, can lead to reductions in property values. While this is usually intended, the fact that existing landholders

can suffer losses can lead to political opposition and attempts to wind-back warning schemes.[72]

- *Hazard reduction*: A common response to the existence of bushfire risks is for planning measures to require the removal or alteration of vegetation. While these measures can reduce risks to landholders, they can also impose costs on the community in the form of biodiversity loss, increased soil erosion and increased turbidity in rivers, streams and other water bodies; and a general loss of amenity in affected areas.
- *Protective measures*: One policy option that is available to deal with coastal and bushfire hazards is for governments to construct and maintain protective measures to reduce the vulnerability of exposed houses and properties. Without a mechanism to recoup costs from the landholders in the at-risk areas, this type of response involves a transfer of resources from low-risk to high-risk property owners, something that may be seen as inequitable.

Most economic-based decision tools focus on the efficiency of policy responses and have little regard to distributional concerns.[73] In actual decision-making processes, distributional issues often dominate. The complex distributional issues associated with climate impacts and associated policy responses can create political and practical difficulties for policy makers.

Box 1. Port of Portland breakwater

The Port of Portland breakwater, on Victoria's west coast, was erected in the mid-1950s by the Portland Harbour Trust Corporation to provide improved port access. Almost immediately, it triggered the erosion of the coast to the east of the Port, prompting the construction of the Dutton Way seawall in 1961-1963.[74] In turn, the combined impacts of the breakwater and seawall caused extensive erosion of Henty Bay – further to the east in Portland Bay – leading to the loss of two roads and several residential blocks in the Henty Bay subdivision. Additional seawall construction followed, causing more erosion and then more seawalls.[75] The rolling seawall-erosion-seawall cycle that commenced in the 1960s is still ongoing and has extended to more than 10 km eastward of the original breakwater. These defensive structures have made the stretch of coastline to the east of the Port one of the most degraded in Australia. They have also ensured that the dispute over the breakwater has extended further and further along the coast. In 2009, 50 years after the breakwater was completed, Coastal Seafarms Holdings Pty Ltd, the owners of an abalone farm near Allestree (10.5 km from the site of the breakwater), commenced a tort action in the Supreme Court of Victoria to recover damages from the Port of Portland.[76]

3.5 Government presence and moral hazard

Another factor that complicates land-use planning adaptation responses is that government programs and the presence of government regulations can alter the expectations and incentives faced by individuals. The most relevant issue in this context is moral hazard. If there is an expectation that governments will manage the risks, and cover private losses when risks materialise, the incentive to avoid at-risk areas, and to take appropriate preventative action, will be reduced. In a liberal

[72] Cronshaw R, 'Lake council backdown on sea level', *Newcastle Herald* (Newcastle), 25 February 2012.
[73] For example, in a cost-benefit analysis, negative externalities are usually accounted for but they will generally be aggregated with other costs and benefits.
[74] Reidel P, *Assessment and Management of Coastal Processes within Portland Bay, Coastal Engineering Solutions Report to Department of Natural Resources and Environment and Department of Infrastructure* (Victorian Government, 2002).
[75] Reidel P, *Assessment and Management of Coastal Processes within Portland Bay, Coastal Engineering Solutions Report to Department of Natural Resources and Environment and Department of Infrastructure* (Victorian Government, 2002).
[76] *Coastal Seafarms Holdings Pty Ltd v Port of Portland Pty Ltd* [2010] VSC 167.

democracy like Australia, where there is a significant social safety net and governments provide extensive emergency assistance, eliminating this expectation would be difficult and could involve considerable political cost.

3.6 Correlation of hazards

An additional challenge for decision-makers arises from the fact that climate hazards are often correlated. As sea levels rise, all property owners in low-lying areas adjacent to the coast will suffer harm or increased threat from inundation and erosion (noting that there will be regional variations in sea level rise). Similarly, shifts in the climate that alter bushfire risks are likely to affect large areas. Due to this, there is the potential for large-scale hazard impacts to occur over relatively short time periods, where government responses may be impeded by fiscal limitations. The challenges for government are likely to be compounded by the operation of insurance markets. As climate risks become more apparent, insurers will respond by refusing coverage and increasing premiums.[77] Up to a point, the price signals sent by the insurers will aid adaptation by encouraging individuals to withdraw from at-risk areas. Yet public and private responses are unlikely to be fully rational and it is inevitable that some uninsured assets will be affected by climate impacts prior to the end of their useful life.

3.7 Distribution of powers and responsibilities

The distribution of powers and responsibilities between governments and government agencies can add considerable complexity to the process of devising responses to climate hazards. For spatial planning, the key issues relate to:

- who has the formal legal powers and responsibilities to address the relevant issues;
- whether there are informal governance structures and path dependencies that affect how government agencies exercise their powers and perform their responsibilities; and
- how well government agencies work together to address issues.

In this context, it is also important to acknowledge that climate change adaptation is but one of many relevant policy objectives for spatial planning; and that the spatial planning instruments discussed in the report in the context of bushfire and coastal climate hazards operate within a complex, integrated legal and policy framework, where there are competing objectives. Indeed, as Appendix A outlines, there is no neat statutory framework for climate change adaptation. Rather, there are a number of relevant interacting legal regimes which include statutory frameworks for land use planning; coastal management; native vegetation conservation; local government; public land acquisition; registration and sale of land; emergency management; and in some jurisdictions specific climate change legislation.

3.7.1 Governance within Australian spatial planning systems

Within the Australian federation, spatial planning is primarily the responsibility of the states and territories. In a strategic planning context, the Commonwealth plays only a minor role, which is largely confined to the Australian Capital Territory and Commonwealth areas.[78] Although formally a state issue, state governments have

[77] For example, the response of some major insurance providers following the 2011 Queensland floods has been to raise premiums and withdraw insurance cover from some high risk areas. See for example, Thompson T, 'Insurance premium rises leave Queensland flood victims adrift' *The Courier-Mail* (Brisbane), 9 January 2012.

[78] The Commonwealth can be more directly involved in development assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) if the relevant action is likely to have a significant impact on a matter of national environmental significance (such as federally listed threatened species).

delegated responsibility for many strategic and statutory planning issues to local councils and other government agencies.

Legal frameworks for spatial planning and terminology employed differ markedly across the country,[79] and this is well-illustrated in the comparison of planning regimes for coastal hazards and bushfire presented in Appendix A. Generally, state planning legislation provides for the development of a hierarchy of planning instruments – state, regional and local – that together establish the policy and regulatory framework governing the use and development of land. These instruments generally contain relevant planning objectives and strategies, as well as detailed and often spatially-based planning regulations, which specify the range of land uses allowed or prohibited in certain areas and dictate whether planning approval is required, and, if so, the standards and considerations that apply in the approval process.

State governments exert considerable control over these processes via state planning instruments, which provide both an opportunity to determine much of the content of local planning schemes and the conduct of development assessment functions. Examples include state planning policies (which may be required to be taken into account when making or amending local planning instruments and when assessing development applications), state regulatory provisions (such as codes and regulations) and standard planning scheme provisions (which may include standardised zones, overlays and associated development controls).

At a local level, the overarching local planning instrument is the local planning scheme. Planning schemes are usually prepared by local government and set the regulatory and policy context for land use planning, albeit in line with state instruments. State planning ministers generally have the power to amend planning schemes and are responsible for approving planning schemes drafted by local councils. The key means by which local governments exert influence over strategic planning is via the spatial application of development controls within their jurisdiction, and the variation of these controls to account for local circumstances.

In many instances, local government is the consent authority for planning approvals, although this role is also played by ministers and state agencies (e.g. planning commissions and floodplain, catchment management, fire, and coastal authorities), who can have exclusive approval powers in relation to particular types of development applications. State agencies and ministers also often play a role in decision-making as a referral authority, either providing advice or direction to the consent authority on the determination of the development application.[80] At the local level, most applications are dealt with by professional planning staff, although more controversial developments are considered by elected officials.

The other major institutions involved in spatial planning processes are appeal bodies, which include both courts and tribunals. The functions of planning appeal bodies are generally confined to merits review (i.e. on matters of substance) and judicial review (i.e. on matters of law) of the decisions of consent authorities and other administrative decision makers, although the jurisdiction of these bodies varies considerably between the states and territories. Where merits review is available, the presence of appeal bodies can significantly alter the functioning of the planning process and the influence of consent authorities on planning outcomes.

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[79] Gibbs M and Tony H, *Coastal Climate Change Risk: Legal and Policy Responses in Australia* (Commonwealth of Australia, 2011). See also Productivity Commission, *Performance Benchmarking of Australian Business Regulation: Planning, Zoning and Development Assessments: Research Report* (Commonwealth of Australia, 2011).

[80] The arrangements differ in the territories. In the Northern Territory, local government has only a minimal advisory role in land use planning, and in the ACT the functions usually undertaken by local government are conducted by the territory government; see discussion in d A, Parts 1.2 and 1.4.

The web of institutions involved in planning processes provides for a complicated and dynamic governance structure. At times, planning processes can be hierarchical and monopolistic, with state planning ministers exerting a high degree of control over policies and outcomes. In other cases, the processes operate in a polycentric fashion, with planning powers and responsibilities being shared between multiple bodies – ministers, local governments, government agencies and appeal bodies.[81] The multifaceted nature of Australian planning governance has its strengths and weaknesses. One of the main advantages is that it can provide decision-makers with flexibility to tailor solutions as problems arise. Localised decision making can be relied on where there are minimal cost savings from centralisation and no significant inter-jurisdictional externalities (or spill-over effects), while more centralised decision making can be utilised where either cost savings or externalities make it more efficient.[82] While offering some advantages, there are challenges associated with the current structures, which can be grouped under five broad headings: inconsistency, coordination, fiscal imbalances, path dependency and planning inertia.

3.7.2 Inconsistency

The flexibility in planning systems can produce jumbled governance structures that lead to inconsistent decision-making within and between planning bodies. It is important to differentiate between those differences in planning policies, rules and outcomes that reflect differences in preferences between communities; and inconsistencies in the application of planning policies and rules by one or more decision makers. The former is the normal and legitimate product of polycentric governance structures; the latter describes situations where planning outcomes are unpredictable or erratic. Inconsistent decision-making is often inequitable, undermines public confidence in the planning system and, by creating uncertainty in regulatory processes, can reduce investment and economic growth. Common causes of inconsistent decision making in planning systems include:

- a lack of clarity concerning which institution(s) is responsible for addressing an issue;
- ambiguity in planning policies and regulations, which leaves decision-makers with a large degree of discretion over outcomes; and
- a lack of capacity within planning bodies.[83]

3.7.3 Coordination

Decentralised and polycentric governance structures can only operate effectively if institutions with overlapping powers and responsibilities are able to act in a coordinated fashion. In relation to bushfires and coastal hazards, multiple agencies can be involved in both the strategic and statutory planning processes, including ministers, state planning departments, local governments, coastal bodies, floodplain authorities, catchment management authorities and fire authorities. The efficiency, cost-effectiveness and fairness of planning processes can be significantly affected by the capacity of these bodies to share information, distribute roles and responsibilities, and coordinate the delivery of planning services.

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[81] Ostrom V, Tiebout C and Warren R, 'The Organization of Government in Metropolitan Areas' (1961) 55 American Political Science Review 831; Hooghe L and Marks G, Unraveling the Central State, but How? Types of Multi-Level Governance' (2003) 97(2) *American Political Science Review* 233.

[82] This assumes that Oates' 'decentralisation theorem' is used as the touchstone for deciding governance arrangements. See Oates W, *Fiscal federalism* (Harcourt Brace Jovanovich, New York, 1972); Oates W, 'An essay on fiscal federalism' (1999) 37 *Journal of Economic Literature* 1120.

[83] Macintosh A, 'Coastal climate hazards and urban planning: how planning responses can lead to maladaptation' (2012) *Mitigation & Adaptation Strategies for Global Change* DOI 10.1007/s11027-012-9406-2.

3.7.4 Fiscal imbalances

Fiscal equivalence describes the situation where each level of government has sufficient revenue powers to adequately perform its public functions, or fulfil its expenditure responsibilities. A fiscal imbalance is the opposite; where one level of government does not have sufficient revenue raising powers to fulfil its expenditure responsibilities, while another level of government has excessive revenue powers.[84] In Australia, there are both vertical and horizontal fiscal imbalances, which are addressed through inter-government transfers (e.g. Commonwealth Grants Commission).

The existence of these imbalances creates a number of complications for policy makers, including:

- state and local governments may not have the financial capacity to prepare and respond to climate risks;
- state and local governments may not take appropriate preventative measures to address climate hazards due to the belief that the Commonwealth will act as an 'insurer of last resort' (i.e. it will bail out governments in the event of a natural disaster); and
- the Commonwealth may be tempted to intervene in land-use planning processes to protect its fiscal interests (i.e. from future claims for assistance by communities and state and local governments that are adversely affected by climate events).

3.7.5 Path dependency

Path dependency describes situations where, once a particular course of action is taken, it becomes increasingly difficult to reverse that course and shift to an alternative because of increasing exit costs.[85] The notion is often used to explain how policy options can be closed off by existing institutional arrangements and policy frameworks.[86] In the current context, the distribution of planning powers and responsibilities between governments and government agencies, and the nature of existing land-use policies and regulations, are likely to create path dependencies that limit policy choices. Put at its most simple, land-use planning regimes are unlikely to be completely overhauled in an attempt to create the 'ideal' policy framework for addressing adaptation issues. Accordingly, planning measures will usually have to be tailored to fit existing institutional, regulatory and policy arrangements and all policy options should have regard to the transaction costs associated with their introduction and implementation.

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[84] Row R and Duhs A, 'Reducing Vertical Fiscal Imbalance in Australia: Is There a Need for State Personal Income Taxation' (1998) 28(1) *Economic Analysis & Policy* 69; Groenewegen P, *Public Finance in Australia: Theory and Practice* (Prentice-Hall, 1990); Pincus J, 'Productive reform in a federal system' in Productivity Commission (ed), *Productive Reform in a Federal System: Roundtable Proceedings, Canberra, 27-28 October 2005* (Productivity Commission, 2005).

[85] Levi M, 'A Model, a Method, and a Map: Rational Choice in Comparative and Historical Analysis' in Lichbach M and Zuckerman A (eds), *Comparative Politics: Rationality, Culture, and Structure* (Cambridge University Press, 1997); Pierson P, 'Increasing Returns, Path Dependence, and the Study of Politics' (2000) 92(2) *American Political Science Review* 251; Page S, 'Path Dependence' (2006) 1 *Quarterly Journal of Political Science* 87; Webster M, 'Boiled frogs and path dependency in climate policy decisions' in Schlesinger M et al (eds), *Human-Induced Climate Change: An Interdisciplinary Assessment* (Cambridge University Press, 2007). There is an alternative broader definition of path dependency; namely that 'current and future states, actions, or decisions depend on the path of previous states, actions, or decisions' (Page S, 'Path Dependence' (2006) 1 *Quarterly Journal of Political Science* 87, 88). We adopt the narrow definition for current purposes.

[86] Challen R, *Institutions, Transaction Costs, and Environmental Policy: Institutional Reform for Water Resources* (Edward Elgar, 2000).

One notable source of path dependency in land-use planning systems relates to interests in property. There is an emphasis in Australian planning, natural resource and environmental laws and policies on secure 'property rights'. This reflects the influence of liberal ideology in Australia's culture and institutions, particularly the notion that property is essential to freedom and that secure property interests promote the efficient allocation of resources. The most obvious manifestation of this in Australian planning systems is 'existing use rights', which are entitlements to continue to use land for a particular purpose that was lawful prior to the introduction of planning regulations that prohibit the use. All state and territory planning systems contain provisions that protect existing use rights. Similarly, all states and territories have statutes that guarantee the provision of 'just terms' compensation where interests in land are acquired by government agencies. Tasmania's and Western Australia's planning regimes also provide compensation where land is set aside under planning regulations for a public purpose and Queensland's planning regime provides compensation to the owners of interests in land where changes in planning provisions adversely affect the value of the land (known as 'injurious affection').[87]

As a matter of law, the protections afforded to landholders under state and territory property and planning statutes are not absolute and they can be altered or removed entirely by parliament. Technically, this provides policy makers with broad scope to introduce land-use planning measures to address climate hazards. Moreover, these rights create no entitlement to protection against natural processes – they relate only to land use restrictions imposed by planning changes. However, the scope for law makers to introduce adaptation planning measures is narrowed by community values and expectations regarding property, particularly those built up by the existing property protections, and the associated political and social costs of altering the current distribution of 'property rights'.

3.7.6 Planning inertia

Closely related to path dependencies is inertia, or the internal resistance to change in planning processes. There are a number of issues that could contribute to the resistance of planning bodies to effectively incorporate adaptation into planning processes. Those related to the formal and informal distribution of powers and responsibilities include:

- ambiguity over planning responsibilities or policies, which can lead decision makers to defer decisions on the basis that they are waiting for direction from 'higher authorities' or for others to act;
- actual or perceived legal constraints on the ability of planning agencies to address an issue;
- difficulties in coordinating the response of different levels of government and different government agencies;
- lack of capacity within planning bodies that is a product of vertical and horizontal fiscal imbalances; and
- the absence of leadership by and within relevant public agencies.[88]

[87] See Appendix A, Part 1.5.1.4 for further details of these provisions.

[88] Podsakoff P et al, 'Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviors' (1990) 1 *Leadership Quarterly* 107; Young O, 'Political leadership and regime formation: On the development of institutions in international society' (1991) 45 *International Organisation* 281; Manring S, 'Creating and managing inter-organizational learning networks to achieve sustainable ecosystem management' (2007) 20 *Organization & Environment* 325; Olsson P, Folke C and Hughes T, 'Navigating the transition to eco-system based management of the Great Barrier Reef, Australia' (2008) 105(28) *Proceedings of the National Academy of Sciences* 9489; Tribbia J and Moser S, 'More than information: What coastal managers need to plan for climate change'

4. SPATIAL PLANNING INSTRUMENTS FOR ADAPTATION

As discussed in section 3.1, there are a number of different approaches that can be employed to deal with adaptation issues and alternative ways of classifying them. Here we use a modified version of the frameworks proposed by Feenstra et al[89] and Hamilton and Macintosh[90] to assign the spatial planning instruments that can be used to address climate change-related hazards to the following general categories:

- framing instruments;
- information instruments;
- fixed and flexible regulatory instruments;
- compulsory acquisition instruments;
- voluntary instruments;
- taxes and charges; and
- liability shield instruments.

These categories of instruments are not mutually exclusive and any planning framework might include a mixture of these different instrument types. Indeed there are important linkages between various instruments, including opportunities to combine different types of instruments and/or introduce instruments sequentially to maximise their utility. Further, some individual instruments can be placed in multiple categories depending on how they are designed and used. Details of the categories are provided below, with examples of instruments drawn from current practice across Australia.

4.1 Framing instruments

Framing instruments are formal legal instruments, statements or documents that set the objectives and principles to guide strategic and statutory spatial decision-making in relation to climate hazards. As legal instruments, they will be required to be taken into account in decision-making, and may be the subject of a formal statutory duty to this effect. The primary role of framing instruments is to articulate what the planning policy is seeking to achieve and the broad principles and strategies that will be used to realise these objectives.

These instruments do not directly control development but they are usually linked to instruments that do. For example, the framing instruments often set the planning objectives and applicable principles, which are then operationalised through detailed regulatory instruments (e.g. zoning, regulations, codes and guidelines). In administering the regulatory instruments, decision makers are usually required to have regard to the content of the framing instruments and act in a manner consistent with their principles.

Typical forms of framing instruments are the objects clauses in planning statutes; and the objectives, principles and strategy clauses in state, regional and local planning policies. In a coastal context, strategies prepared under specific coastal management legislation are also often required to be taken into account in planning decisions, and play a similar framing role.

While framing instruments do not seek to directly impose restrictions or obligations on specific land uses or developments, they play a vital role in setting the direction of

(2008) 11 *Environmental Science & Policy* 315; Moser S and Ekstrom J, 'A framework to diagnose barriers to climate change adaptation' (2010) 107(51) *Proceedings of the National Academy of Sciences* 22026.

[89] Feenstra J et al (eds), *Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies* (UNEP and Institute for Environmental Studies, 1998).

[90] Hamilton C and Macintosh A, 'Environmental Protection and Ecology' in Jorgensen S (ed), *Encyclopedia of Ecology* (Elsevier, 2008).

policy and the framework in which other regulatory and non-regulatory instruments are used. An example of a relevant framing instrument is clause 13 of the *Victorian State Planning Policy Framework*, which establishes the objectives and strategies for addressing coastal climate hazards. These include:

- to consider the risks associated with climate change in planning and management decision-making processes; and
- ensure that land subject to coastal hazards is identified and appropriately managed to ensure that future development is not at risk.

More detailed strategies are also specified, including:

- to plan for possible sea level rise of 0.8 m by 2100, and allow for the combined effects of tides, storm surges, coastal processes and local conditions such as topography and geology when assessing risks and coastal impacts associated with climate change;
- in planning for possible sea level rise, an increase of 0.2 m over current 1 in 100 year flood levels by 2040 may be used for new development in close proximity to existing development (urban infill); and
- for new greenfield development outside of town boundaries, plan for not less than 0.8 m sea level rise by 2100.

These objectives and strategies are complemented by several guidelines, including the *Victorian Coastal Strategy* and regional coastal management and action plans (see section 4.3.1.4 below for further discussion of codes and guidelines).

There are no known examples of statutory objectives in Australian planning legislation that function as a framing instrument for the implementation of adaptation policy as such. In 2010, the Victorian Coastal Climate Change Advisory Committee recommended including a new objective in the *Planning and Environment Act 1987* (Vic) to this effect. The proposed wording for the objective was: 'to identify and plan for the potential impacts of climate change in order to minimise risks to human health and safety and to ecological communities'.[91] This recommendation was not supported by the Victorian Government on the grounds that the existing statutory objectives were sufficiently broad to accommodate the consideration of climate change impacts, and it was deemed inappropriate to highlight the protection of specific natural resources, ecological processes or assets, when planning seeks to balance environmental, social and economic considerations.[92]

An alternative to including adaptation-specific statutory objectives in planning legislation is to include a mechanism in overarching climate change legislation to ensure that planning decisions consider climate change adaptation objectives. For example, the *Climate Change Act 2010* (Vic) includes provision for climate change to be taken into account in decisions made or actions taken under prescribed legislation,[93] although the *Planning and Environment Act 1987* (Vic) is not included in the prescribed list.[94]

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[91] Coastal Climate Change Advisory Committee, *Coastal Climate Change Advisory Committee: Final Report* (Victorian Government, 2010) 32, 150.

[92] Guy M, Victorian Minister for Planning, *Coastal Climate Change Advisory Committee: Response from the Minister for Planning* (Victorian Government, 2012) 2.

[93] *Climate Change Act 2010* (Vic) s 14.

[94] *Climate Change Act 2010* (Vic) Schedule 1 prescribes a range of statutory decision-making functions for which climate change must be taken into account, including decisions made under the *Coastal Management Act 1995* (Vic), *Catchment and Land Protection Act 1994* (Vic), and *Water Act 1989* (Vic).

4.2 Information instruments

Information instruments provide information to existing and prospective landholders about potential hazards so as to facilitate autonomous adaptation. They do not regulate land use or development or provide any other direct positive or negative incentives to alter land use practices; their functions are purely communicative. The intent is to alter behaviour through education and increased awareness, although they can also be used by planning agencies to manage legal risks. If climate hazards materialise in the future, planning agencies are less likely to be held liable for the performance of any relevant functions if they can demonstrate that the landholder was notified of the potential hazard and knowingly assumed the risk.

Other planning instruments can and are used to convey information. For example, agreements on title are commonly used in planning processes to place positive and negative covenants on land. They are typically voluntary agreements between responsible authorities and landholders, and the burden of their covenants generally 'run with the land' (i.e. they apply to all subsequent owners of the land) and can be registered on title. These agreements have been used as a way of conveying information on hazards to landholders in addition to placing actual restrictions on the use and development of land. These mechanisms have been used by several coastal councils in Victoria (e.g. Wellington Shire Council and Bass Coast Shire Council) to require landholders who undertake residential development in areas threatened by coastal hazards to prepare climate change management or response plans and register these agreements on title. The primary purpose of this process has been to protect councils from future liability and ensure current and future landowners are aware of the coastal hazard risks associated with the property.

While other instruments are available, however, here we are concerned only with 'pure' information instruments – those whose scope is confined to transmitting information in order to facilitate autonomous adaptation and/or manage legal risks. These 'pure' information instruments can be split into two categories: statutory and non-statutory. Statutory information instruments are those that are made under statute and have some formal legal status. There may be public rights to access these instruments (e.g. planning certificates) or for these instruments to be registered on titled (e.g. agreements on title). Alternatively, the instruments may be embedded within a statutory instrument (e.g. a planning scheme). Non-statutory information instruments have no specific statutory basis (other than the general executive powers of the state and equivalent powers of planning agencies). They are simply documents published or issued by government agencies in order to disseminate information on climate hazards and/or manage legal risks associated with these hazards. In some circumstances, planning agencies can have a common law duty to publish hazard-related information. In particular, where there is a sufficiently close relationship between a planning agency and a landholder (or prospective landholder) (e.g. the agency is considering an application to subdivide and develop land for residential purposes), and the agency possesses information on hazard risks to the land that are not readily apparent or widely known, it may be under a legal duty to disclose the information.[95] However, usually the preparation and release of non-statutory information instruments will be at the discretion of the relevant planning agency.

Reflecting the scope of this report, the following discussion focuses on statutory information instruments. The three main types of these instruments are:

- planning certificates;
- notations on title; and

[95] *Armidale City Council v Finlayson* [1999] FCA 330. Given the obvious nature of coastal and bushfire hazards, it is unlikely that this duty to disclose will apply widely, although agencies should seek their own advice on the extent of their legal exposure.

- non-regulatory zones or overlays.

4.2.1 Planning certificates

Planning certificates are generally used as a way of providing information about planning controls to potential purchasers of a property. The laws governing the issuance of planning certificates differ between jurisdictions. They can be issued by local or state governments and must contain details of the planning controls (and proposed amendments to planning controls) that apply to the subject land. In addition to containing information on planning controls, these certificates can also be used to alert purchasers and others to hazards that could affect the land. For example, in New South Wales, the *Coastal Protection Act 1979* (NSW) allows for one of three coastal hazard risk categories to be assigned to land within the coastal zone. Where land has been assigned a risk category, any planning certificate issued in relation to the land *must* contain details of the category and the date on which the risk category determination was made.[96] This type of process allows planning certificates to be used as a means of raising awareness about climate hazards.

Another mechanism by which to convey information about potential hazards affecting a property is through the standard form real estate contract. No jurisdiction has modified its contracts of sale to require vendor disclosure of natural hazards affecting the property but this is an alternative tool by which to achieve the same informational outcome as planning certificates.

4.2.2 Notations on title

Some jurisdictions allow for the placement of notations on title in the absence of an agreement with the landowner, for example in respect of the presence of contamination on site.[97] These notations serve to alert potential purchasers to statutory restrictions on the use and development of land. The advantages of using notations include the accessibility of information on land titles and the fact that notations can be applied at a lower cost more consistently across at-risk areas than an approach reliant on agreements with landholders. The Northern Territory has already employed notations on title as a form of climate hazard information instrument. Under existing requirements, if a property falls within a mapped storm surge hazard area, this information must be included on the administrative title, which is publicly accessible via a land search.[98] Similarly, the new draft coastal planning policy in Western Australia has proposed the use of notations on title to disclose information on coastal hazards.[99]

4.2.3 Zones and Overlays

Zones and overlays are spatially-based instruments that are used to express and implement planning policy objectives by encouraging specified types of use and development, and regulating and prohibiting others. Typically, zones regulate land use, while overlays control development. The expression of planning objectives through zones and overlays conveys information to landholders about desirable land uses and development, and the presence (or absence) of environmental risks. This often

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[96] For further details, see Appendix A, Part 1.3.1.2. These provisions are currently under review – see discussion at 5.1.2.

[97] For example, in Queensland, a notation on title is made in conjunction with a listing of probable, confirmed or restricted contaminated sites under the contaminated land provisions of the *Environmental Protection Act 1994* (Qld) s 25.

[98] *Land Title Act* (NT) s 38 provides for the maintenance of both a register of administrative interests and a formal land register. The record of administrative interests provides details on the rights, obligations and restrictions pertaining to a particular property, including in relation to planning zones, planning applications and determinations.

[99] Western Australian Government, *Draft State Planning Policy – Coastal Protection 2.6* (Western Australian Government, 2012).

involves the imposition of permit requirements and other restrictions (e.g. a hazard zone that requires a planning permit for a residential use), but zones and overlays could also be designed simply to convey information about potential hazards rather than necessarily restricting use and development. The use of incorporated documents in planning schemes, such as maps of identified hazard areas, could also achieve this, although the existence of an incorporated document will not usually be communicated in a planning certificate.

4.3 Fixed and flexible regulatory instruments

Land-use planning systems generally involve the use of command-and-control style regulation, whereby legally enforceable restrictions are placed on land use activities dictating where, what and how use and development occurs. The 'command' component refers to the fact that planning regulations prohibit or mandate certain actions. The 'control' refers to the punishments used to motivate compliance (fines, imprisonment, confiscation of property etc).[100] The phrase 'regulatory instruments' is used in this analysis to refer to these command-and-control aspects of planning systems.

In contrast to framing and information instruments, regulatory instruments involve the direct regulation of the location and nature of land use and development in order to: prevent or reduce the severity of climate hazards; eliminate or reduce the harmful effects of climate hazards; or reduce exposure to climate hazards. They can operate to:

- prevent new development or certain types of development in vulnerable areas;
- regulate land uses in existing settlements to a certain extent, and
- ensure any development within a hazard area meets certain standards to achieve an 'acceptable level of risk' to life and property.
- The range of regulatory instruments that are available to address climate hazards can be placed in two broad categories:
- fixed regulatory instruments; and
- flexible regulatory instruments.

4.3.1 Fixed regulatory instruments

Australian planning systems are typically based on the notion that, once a land use is lawfully commenced, the power or 'right' of government to stop or control that existing use via the planning system is lost. Accordingly, existing uses are generally exempt or immune from new planning controls unless they are intensified, expanded or abandoned.[101] The loss of regulatory powers after a use is lawfully commenced essentially involves the transfer of an economic property right (i.e. the right to control the use of property) from government to the landholder.[102] If a government subsequently wants to stop an existing use, or alter the planning conditions that apply

[100] Hamilton C and Macintosh A, 'Environmental Protection and Ecology' in Jorgensen S (ed), *Encyclopedia of Ecology* (Elsevier, 2008).

[101] It is important to distinguish between regulations that interfere with existing use rights (which are expressly protected in all jurisdictions) and the situation where regulation involves reducing the development potential associated with a piece of land (for example, back-zoning land from residential to low density residential or rural/agricultural). In most jurisdictions, lost development potential does not trigger an entitlement to compensation. Only in Queensland are there currently stronger protections for development expectations and compensation may be payable in some instances where there has been a diminution of development rights following amendment of a planning scheme – see Appendix A, Part 1.5.1.4.

[102] Coase R, 'The Problem of Social Cost' (1960) 3 *Journal of Law and Economics* 1; Alchian A, 'Some Economics of Property Rights' (1965) 30 *Il Politico* 816; Allen D, 'Transaction Costs' in Bouckeart B and de Geest G (eds), *Encyclopedia of Law and Economics* (Edward Elgar, 2000).

to it, it will usually be required to purchase that right back from the landholder, that is, to compensate for its removal or regulation.

For this reason, traditional planning instruments that regulate land use and development are often viewed as 'fixed' or 'static.' Lawfully commenced land uses are treated as beyond the reach of the planning system and can continue indefinitely unless intensified, expanded or abandoned. Accordingly, planning instruments that regulate use and development are predominantly directed towards new development, redevelopments and changes in land use.

Fixed regulatory instruments fall within this paradigm. Their defining features are that they:

- regulate where land use and development occurs, and the design and conduct of use and development, in order to reduce sensitivity or exposure to climate hazards; and
- are based on the assumption that the ability of the state to actively regulate a use or development expires once it has lawfully commenced, so that the use can continue indefinitely unless intensified, expanded or abandoned.

The main fixed regulatory instruments are:

- zones and overlays;
- hazard mapping and management plans;
- non-spatial regulatory restrictions;
- permit requirements and approval conditions;
- compulsory insurance;
- codes and guidelines;
- agreements on title; and
- reserves.

4.3.1.1 Zones and overlays

As noted in 4.1, zones and overlays are spatially-based instruments that are used to regulate the use and development of land. Due to their spatial basis, they are effective mechanisms for identifying areas prone to climate change hazards and specifying the planning objectives and processes applicable to use and development in these areas.

Zones are typically used to set land use objectives for an area and delineate the types of land *uses* that are deemed compatible with these objectives. As such, land use zoning provides a fundamental basis on which to prohibit, limit or control the types of land use that occur in areas exposed to hazards. Overlays add an additional layer of regulation and typically specify the types of *development* that will require planning approval and the applicable development control standards. Overlays are commonly used to identify hazards (particularly bushfire) that might affect developments on the subject land and to set standards for development.

The development controls applied through zones and overlays are often prescribed in codes and guidelines, regulations or other provisions within the planning scheme, and are generally actioned via conditions on development approvals. These may include:

- setbacks, and the creation and maintenance of defendable space, to ensure development is not located in close proximity to hazards (see Box 2 below);

- siting requirements such as minimum elevations for buildings to manage flood risk and design standards for redevelopments in at-risk areas (see Box 5 in section 4.3.2.2); and
- requirements to prepare and comply with management or development plans before new uses or development commence.

Zones and overlays are also used to trigger certain procedural requirements for development approval. For example, a consent authority may be required to refer certain types of development within identified hazard areas to a referral authority, who may have the power to direct the consent authority to approve, approve with conditions or refuse the proposal. This is a mechanism to ensure that expert consideration, relevant to the nature of the hazard, is given to the development proposal to determine its compliance with relevant planning objectives and controls.

Zones and overlays are used differently in different jurisdictions and, in practice; there is some overlap between their functions. An example of a hazard-based planning overlay is the Victorian *Bushfire Management Overlay*. In areas subject to the overlay, a planning permit is required for the subdivision of land; construction of a building; or carrying out works associated with a wide range of uses (including accommodation, child care, education, hospital, leisure and recreation). Exemptions from the need to obtain a permit apply for an alteration or extension to an existing building that does not increase the floor area by more than 50% or if a schedule to the overlay in a local planning scheme specifies that no permit is required. The overlay is linked to particular provisions of the State Planning Framework, which set out the applicable development standards (such as defendable space, access and water requirements).[103] All development applications covered by the overlay are required to be referred to the relevant fire authority, who must make a recommendation on the development against the applicable regulatory provisions. In ultimately deciding whether or not to approve the development, and what conditions to attach to any approval, the responsible authority must take into account the fire authority's recommendations.

Box 2. Setbacks and Defendable Space

Development setbacks are a prescribed minimum distance between a building and a property boundary. Defendable space is a similar concept – it describes an area around a property in which vegetation is removed, modified or managed. Both setbacks and defendable space requirements are used to provide a safety buffer from natural hazards, particularly bushfire, coastal erosion, flooding and coastal inundation. Within the setback or defendable space area, development may be prohibited or restricted, and landholders may be required to maintain vegetation or undertake other similar management activities to reduce the threats posed by climate hazards.

In a coastal context, elevation setbacks can be used to manage flood risk, while lateral setbacks can be used to manage erosion. They can either be determined as a fixed setback (which may prohibit development for a fixed distance landward of the high water mark for example) or as a floating setback (which may use dynamic natural phenomena, such as the distance from the erosion escarpment to the dwelling, to determine the set-back distances). The latter, more flexible approach is discussed in the context of flexible planning tools below. Setbacks and defendable spaces may be combined with reserves or formal buffer zones (see below) where an area is formally dedicated for coastal or bushfire management purposes.

Setbacks are commonly used in a coastal planning context. For example, the standard principles of development control included in all local development plans in coastal

[103] See Victoria Planning Provisions, cl 44.06 (Bushfire Management Overlay) and Victoria Planning Provisions, cls 52.47 and 52.48, which contain requirements for specific uses and developments and provide the details to facilitate the implementation the overlay.

areas in South Australia provide that development should be set back a sufficient distance from the coast to provide an erosion buffer, which will allow for at least 100 years of coastal retreat for single buildings or small scale developments, or 200 years of coastal retreat for large scale developments (ie new townships) unless:

- the development incorporates appropriate private coastal protection measures to protect the development and public reserve from the anticipated erosion; or
- the council is committed to protecting the public reserve and development from the anticipated coastal erosion.[104]

Requirements for defendable space are a common means of addressing bushfire risks in planning processes. Landholders can be required to remove or manage vegetation around buildings to reduce the risk of flame contact and to minimise the impacts of flames and radiant heat associated with bushfires. These requirements are often imposed via overlays, which can make the creation and maintenance of defendable spaces a mandatory condition of development within at risk areas. For example, the Victorian Bushfire Management Overlay and the associated particular provision, *52.47 Bushfire Protection: Planning Requirements* set down specific defendable space requirements for subdivisions and buildings.

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Development setbacks are a prescribed minimum distance between a building and a property boundary. Defendable space is a similar concept – it describes an area around a property in which vegetation is removed, modified or managed. Both setbacks and defendable space requirements are used to provide a safety buffer from natural hazards, particularly bushfire, coastal erosion, flooding and coastal inundation. Within the setback or defendable space area, development may be prohibited or restricted, and landholders may be required to maintain vegetation or undertake other similar management activities to reduce the threats posed by climate hazards.

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Setbacks are commonly used in a coastal planning context. For example, the standard principles of development control included in all local development plans in coastal areas in South Australia provide that development should be set back a sufficient distance from the coast to provide an erosion buffer, which will allow for at least 100 years of coastal retreat for single buildings or small scale developments, or 200 years of coastal retreat for large scale developments (ie new townships) unless:

(a) the development incorporates appropriate private coastal protection measures to protect the development and public reserve from the anticipated erosion; or

(b) the council is committed to protecting the public reserve and development from the anticipated coastal erosion.[105]

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[104] For further details see Appendix A, Part 1.6.1.2.
[105] For further details see Appendix A, Part 1.6.1.2.

4.3.1.2 Hazard mapping and management plans

Similar in nature to zoning and overlays, hazard mapping and management planning can be used to impose spatially-based restrictions on the use and development of land in order to minimise or manage climate hazards. Hazard mapping involves the identification of areas that are, or could be, at risk from natural hazard events. Once hazard areas have been identified, management plans can be used to dictate what land uses can occur in identified hazard areas and under what conditions, and how these areas must be maintained.

An example of this type of instrument is the coastal zone management planning process under the New South Wales *Coastal Protection Act 1979*. Local councils can prepare plans that assign land to one of three risk categories:

- *Risk category 1* – the land is, or is likely to be, adversely affected by the coastal hazard at the present time (a current coastal hazard);
- *Risk Category 2* – the land is not, and is not likely to be, adversely affected by the coastal hazard at the present time, but is likely to be adversely affected by the coastal hazard in the year 2050 (a 2050 coastal hazard); and
- *Risk Category 3* – the land is not, and is not likely to be, adversely affected by the coastal hazard at the present time or in the year 2050, but is likely to be adversely affected by the coastal hazard in the year 2100 (a 2100 coastal hazard).[106]

This hazard mapping can serve as the basis for associated development controls within the applicable planning schemes. For example, in the Tweed Shire of northern NSW, the Coastal Hazards Development Control Plan introduces development controls for all three categories of coastal hazard that have been mapped as the immediate hazard zone, 2050 hazard zone and 2100 hazard zone.[107] For the immediate hazard zone, council will not permit the construction of new buildings and will only permit minor alterations to existing buildings.[108] In the 2050 hazard zone, new development should be modular, detachable and relocatable, and no building is to be located within 20m of the current erosion escarpment.[109] In the 2100 zone, a precautionary approach should be adopted and new buildings and infrastructure should be positioned to avoid the risk of damage from coastal processes and avoid the need for protective works.[110]

New South Wales uses a similar approach to deal with bushfire risks. Under the *Rural Fires Act 1997* (NSW) (RF Act), bush fire risk management plans can be prepared by the Commissioner of the Rural Fire Service (RFS Commissioner) or a Bush Fire Management Committee and approved by the Bush Fire Co-ordinating Committee. If a bushfire risk management plan applies to land within the jurisdiction of a local council, the council must ask the RFS Commissioner to designate land within the area to be 'bushfire-prone land' and record the designated area on a 'bushfire-prone land map'. In practice, local councils prepare draft bushfire-prone land maps in accordance with guidelines issued by the RFS Commissioner.[111]

Once land has been designated as bushfire prone, it triggers specific strategic and statutory planning requirements. In particular, where a local environmental plan is prepared that affects bushfire prone land, the local council must: (a) consult with the RFS Commissioner and have regard to the Commissioner's comments; (b) have regard to the guideline *Planning for Bush Fire Protection*; and (c) introduce controls

[106] *Coastal Protection Act 1979* (NSW) Part 4A.
[107] Tweed Shire Council, *Coastal Hazards — Development Control Plan* section B25.
[108] Tweed Shire Council, *Coastal Hazards — Development Control Plan* cls 3.1.2, 3.1.3.
[109] Tweed Shire Council, *Coastal Hazards — Development Control Plan* cl 3.2.2.
[110] Tweed Shire Council, *Coastal Hazards — Development Control Plan* cl 3.3.2.
[111] NSW Rural Fire Service, *Guideline – Bush Fire Prone Land Mapping* (NSW Government, 2006).

that avoid placing inappropriate development in hazardous areas. Further, development consents cannot be granted for development on bushfire-prone land (other than a residential or rural-residential subdivision or development for a special fire protection purpose) unless the development conforms to the requirements and specifications in *Planning for Bush Fire Protection* or the consent authority has consulted with the RFS Commissioner concerning measures to be taken with respect to the development to protect persons, property and the environment from danger that may arise from a bush fire. Similarly, before subdividing bushfire-prone land for a residential or rural-residential development, or undertaking development of bushfire-prone land for a 'special fire protection purpose' (e.g. a school, child care centre, hospital, hotel, retirement village), the proponent must obtain a bushfire safety authority from the RFS Commissioner.

4.3.1.3 Permit requirements and approval conditions

Planning permit requirements (or development approval requirements) are one of the most important command-and-control instruments used in planning systems as they ensure prescribed activities are subject to regulatory oversight and allow responsible authorities to impose conditions on use and development. These features make them well suited to addressing climate hazards as they allow responsible authorities to dictate the location, nature and form of use and development so as to minimise risks. For example, a planning permit may be required to construct a dwelling or other building in a bushfire prone area. The planning permit could then set conditions requiring the creation and maintenance of defendable space and building design features to ensure the safety of occupants in a bushfire event.

Event-dependent approvals are an innovative type of approval that can be used to address climate hazards. They can be defined as approvals that make regulatory interventions or requirements contingent upon a specified trigger-event. In their fixed form, they are an approval that imposes a requirement to modify a use or development in a particular way, or carry out specific works, if a predetermined trigger-event occurs (e.g. raising floor levels or constructing a defensive seawall in the event that the mean sea level reaches a certain point). Other flexible forms of event-dependent approvals can also be used, and are discussed below in section 4.3.2. In addition to providing the means of regulating use and development, permit requirements can be used as a way of triggering risk assessment processes (see Box 3).

Box 3. Risk assessments

In Victoria, the State Planning Policy Framework and accompanying General Practice Note on coastal climate hazards has promoted the use of coastal hazard vulnerability assessments (CHVAs) to aid decision making processes. This has led many coastal councils and the Victorian Civil and Administrative Tribunal to require CHVAs to accompany planning permit applications for new developments in areas deemed susceptible to coastal climate hazards.[112]

While a site-specific risk assessment may be appropriate for large-scale urban developments, requiring CHVAs for smaller-scale developments on a case-by-case basis can be ineffective, inefficient and inequitable. Lack of fine-scale data can hinder the capacity of coastal engineers to provide meaningful forecasts. The uncertainty surrounding coastal climate hazards can also cast doubt over the usefulness of the projections. Within Victoria, the broad discretion to require CHVAs has led to variability in when they are required. In addition, questions have been raised about the quality of many of the submitted CHVAs.[113] If site-specific risk assessments are to be used, the Victorian experience suggests that outcomes can be improved by requiring all CHVAs to be carried out by a suitably qualified coastal engineer, for state government to prescribe methods and standards for the preparation of CHVAs, and for processes to be established to certify that submitted CHVAs meet the prescribed requirements.

In a bushfire context, site-based risk assessments are a key, and well-established, element of the development approval process. Unlike many CHVA processes, site-based risk assessments for bushfire are generally well-supported by an accreditation process for consultants and standardised guidelines for the preparation of the assessments. For example, in New South Wales and the Australian Capital Territory, development applications in bushfire prone areas must be accompanied by a bushfire assessment report prepared in accordance with the *Australian Standard for Building in Bushfire Areas*[114] and other relevant requirements. In Victoria, the Bushfire Management Overlay provides that an application must be accompanied by a locality and site description and a bushfire management statement and sets out the requirements for these documents.[115]

4.3.1.4 Codes and guidelines

Codes and guidelines are often used in planning processes to regulate land use and development, and to frame decision making. For example, in some jurisdictions, certain types of development do not require planning approval if undertaken in accordance with applicable codes. Decision makers are also often required to have regard to, or comply with, codes and guidelines when deciding whether to approve development applications. From a legal perspective, codes and guidelines are no different from any other form of regulation and/or mandatory legislative consideration. What distinguishes them from standard legislative instruments in practice is that they usually contain technical or practical detail on use and development requirements and use non-legalistic (and often more accessible) language and concepts. This makes codes and guidelines well-suited to practical application by non-lawyers.

[112] Macintosh A, 'Coastal climate hazards and urban planning: how planning responses can lead to maladaptation' (2012) *Mitigation & Adaptation Strategies for Global Change* DOI 10.1007/s11027-012-9406-2.
[113] Macintosh A, 'Coastal climate hazards and urban planning: how planning responses can lead to maladaptation' (2012) *Mitigation & Adaptation Strategies for Global Change* DOI 10.1007/s11027-012-9406-2.
[114] Council of Standards Australia, *Australian Standard 3959–2009: Construction of buildings in bushfire prone areas* (2009).
[115] Victoria Planning Provisions cl 44.06-2.

A common feature of codes and guidelines is that they are applied across municipalities, and even jurisdictions, so they can be used to promote consistency in the approach to particular issues. For example, the bushfire planning provisions across the southern jurisdictions effectively codify requirements for the siting of development, its proximity to vegetation and relative construction standards. Specifically, the Victorian bushfire planning provisions provide prescriptive guidelines to frame the scope of decision-making for development consent authorities, providing substantive guidance as to what constitutes an acceptable level of risk to life and property from bushfire. If these siting and construction standards cannot be achieved, the implication is that the risk to life and property would be deemed unacceptable and development should not proceed.[116] Similarly, in the ACT, the *Planning for Bushfire Risk Mitigation General Code* is the primary means by which bushfire risks are managed in planning processes. The code requires bushfire risk assessment to be undertaken for new developments and allows for them to be imposed on certain redevelopments in existing urban areas (see Box 3 for more details on risk assessments). It also requires certain developments to comply with the *Building Code of Australia* and *Australian Standard for Building in Bushfire Areas*, which contain regulations and guidelines on building and landscaping in order to reduce bushfire risks.

As with bushfires, there are a number of codes and guidelines for the management of coastal climate hazards. In New South Wales, much of the planning framework for addressing climate hazards is contained within the Sea Level Rise Policy Statement and accompanying guidelines, including *NSW Coastal Planning Guideline: Adapting to Sea Level Rise*, *Coastal Risk Management Guide: Incorporating sea level rise benchmarks in coastal risk assessments*, *Guidelines for Preparing Coastal Zone Management Plans*, and *Flood Risk Management Guide: Incorporating sea level rise benchmarks in flood risk assessments*. The policy statement sets out the broad policy objective (i.e. to minimise social disruption, economic costs and environmental impacts of sea level rise) and the actions and principles for achieving it, while the guidelines contain more detailed material on how to put these actions and principles into practice.[117]

4.3.1.5 Agreements on title

As noted above, registering an agreement on title can bind current and future landholders to either carry out or refrain from certain activities in order to reduce climate hazards. For example, negative covenants imposed via agreements could include prohibitions on the placement of structures on areas of properties that are at risk, prohibitions on particular types of structures or land uses, or prohibitions on the construction of protective measures that could cause harm to the environment or other properties. Positive covenants might include requirements to maintain structures, to clear and/or maintain vegetation, and to make payments to maintain hazard works or to construct defensive measures if hazards materialise.

In Victoria, positive covenants are central to the bushfire planning provisions. For new subdivisions, agreements on title (s 173 agreements under the *Planning and Environment Act 1987* (Vic)) are used to bind landowners to agreed bushfire mitigation measures and their ongoing maintenance. This typically includes vegetation management to maintain defendable space around dwellings and water supply and road access requirements to facilitate emergency management objectives.[118]

4.3.1.6 Reserves and buffers

A reserve is an area that is set aside for a public purpose, or where the uses that may be undertaken on the land are restricted to specific uses that advance the public

[116] For further details, see Appendix A, Part 1.8.2.2.
[117] These documents are discussed in detail in Appendix A, Part 1.3.1.2.
[118] Victoria Planning Provisions cl 44.06-4.

interest. Often reserves are for open space, recreation and conservation but they can also be for a wide variety of other purposes, including telecommunications, roads, electricity infrastructure, schools, hospitals, cemeteries and airports. Land can also be reserved on the basis that it may be required for a public purpose in the future. In the current context, reserves can be used to provide buffers between settlements and hazards and to set aside land for future hazard management actions (i.e. a real option),[119] including the construction of defensive structures and the movement of settlements. For coastal hazards, land can be reserved as an erosion and sea level rise buffer in order to allow the inland migration of coastal habitats and maintain public access to beaches. Reserves could also be used to set aside land to facilitate the movement or modification of infrastructure (roads, airports, bridges etc.) and settlements, and to enable the construction of seawalls and other defensive measures. For bushfires, reserves can be used to provide an area of defendable space around settlements or subdivisions, where vegetation is then managed so as to mitigate bushfire risk.

An example of using reserves in a coastal context is the South Australian principles of development control for coastal zone development, which include a requirement for some new development (other than small-scale infill development in a predominantly urban zone) to incorporate a public coastal reserve of at least 50 m width, in addition to development setbacks which accommodate potential impacts of sea level rise on coastal erosion.[120] Similarly, for a subdivision adjacent to or within a high bushfire risk area, a bushfire buffer zone is required to isolate the residential area from areas posing an unacceptable bushfire risk.[121]

Reserves can be created by a number of legal means. Special purpose legislation can be passed to dedicate specific areas as reserves. National parks statutes and other related environmental legislation usually contain powers to create conservation reserves by proclamation. Land can also be reserved for a public purpose in planning schemes. Irrespective of the legal means used to create reserves, there is a widely held belief that, where an area is set aside for public purposes, the relevant government or government agency should acquire the land or provide compensation to affected landholders. Most planning legislation provides for the compulsory acquisition and/or provision of compensation where land is reserved or dedicated for a public purpose in a planning instrument.[122] However, compensation need not be provided where the dedication of the reserve forms part of a development approval process. For example, in Queensland, the *Coastal Management and Protection Act 1995* (Qld) provides for the surrender of coastal land as a condition of approval for the reconfiguration of a lot within the Coastal Management District that is either within an identified erosion prone area or within 40 m of the shoreline. No compensation is payable for land surrendered and there are no rights to appeal such a condition. The surrendered land must be dedicated as a reserve for coastal management purposes.[123]

4.3.1.7 Compulsory insurance

An important factor in many adaptation planning policy processes is the risk or perception that, if hazards materialise and properties are lost, governments will be required to compensate or otherwise assist those who are affected. Compulsory insurance requirements are one way of dealing with this issue. Under a compulsory insurance instrument, landholders are required to hold insurance to cover them against

[119] See Dobes L, 'Getting Real About Adapting to Climate Change: Using 'Real Options' to Address the Uncertainties' (2008) 15(3) *Agenda* 55.
[120] South Australian Department of Planning, Transport and Infrastructure, *Principles of Development Control: Maintenance of Public Access*, principles 11, 12. For further details, see Appendix A, Part 1.6.1.2.
[121] SA Government, *Minister's Code: Undertaking Development in a Bushfire Prone Area* (February 2009, as amended May 2010), provision 2.2.3. For further details, see Appendix A, Part 1.6.2.2.
[122] The relevant statutory provisions are outlined for each jurisdiction in Appendix A.
[123] *Coastal Protection and Management Act 1995* (Qld) Part 6, Division 3.

relevant hazards prior to commencing a new use or development. The imposition of this requirement could be achieved via zoning and overlay requirements, planning regulations, permit conditions or agreements on title.

In addition to shielding governments from potential future liabilities, compulsory insurance requirements ensure landholders and prospective purchasers receive price signals on hazards through premiums or, in extreme cases, the refusal of insurers to offer contracts of insurance. However, because the term of many insurance contracts is short (i.e. annual), and premiums are calculated over the same period, compulsory insurance is unlikely to provide long-term price signals.

A familiar example of where these types of instruments have been used is compulsory third party insurance requirements associated with motor vehicle registrations. Under these regulatory requirements, third party insurance is rolled into the cost of motor vehicles registrations and ensures compensation to crash victims where the owner or driver of a registered vehicle is at fault. With compulsory hazard insurance, the intent is to cover impacts on the landholder and ensure that governments are not called upon to cover the costs of private impacts where people have elected to live in at risk areas.

The *National Disaster Insurance Review* 2011, recommended against making home building and contents insurance compulsory.[124] A distinction was drawn between schemes designed to protect third parties (e.g. third party motor vehicle insurance) and those that involve no third parties (e.g. home and contents insurance).[125] The review considered that such a requirement would be difficult to enforce and fundamentally alter the insurance market. While the review raised doubts about the merits of a compulsory national scheme – at least in relation to flood insurance – its arguments do not apply where the requirements are targeted to specific developments or areas. Targeted compulsory insurance requirements have the potential to both shield governments from liability and provide price signals to prospective landholders and developers.

4.3.1.8 Non-spatial regulation of hazard mitigation activities

Australian spatial planning regimes are all based on a similar structure. At the heart of the regime is a land-use planning statute, which contains broad powers to facilitate the regulation of land use and development and that establishes the framework and objectives for the planning system. Planning schemes, which are the primary medium through which spatial-based regulations are applied, are legislative instruments made under the relevant planning Act. The primary planning statute and planning schemes are complemented by a series of other Acts, including in relation to local government, appeal bodies (e.g. administrative appeals tribunals), and subject-specific natural resource issues (e.g. coastal, catchment, bushfire and water management, and national parks and other reserves). Legislative instruments are usually made under each of these statutes to effect and facilitate the regulation of land use and development.

The Acts and legislative instruments that make up the planning regime can impose non-spatial regulations on use and development to address climate hazards. These regulations typically perform two main functions:

- regulating where and how land use and development occurs; and
- framing and defining the powers of governmental bodies to authorise the location and design of land use and development.

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[124] Trowbridge J, Minto J and Berrill J, *National Disaster Insurance Review: Inquiry into flood insurance and related matters* (Commonwealth of Australia, 2011).

[125] Trowbridge J, Minto J and Berrill J, *National Disaster Insurance Review: Inquiry into flood insurance and related matters* (Commonwealth of Australia, 2011).

Of particular importance in the current context is the use of non-spatial regulations to control hazard mitigation activities. These can include restrictions on undertaking coastal protection works to mitigate coastal hazards, and environmental and native vegetation regulations that affect the capacity of landholders and public land managers to undertake hazard reduction activities.

An example of the former is in New South Wales, where the *Coastal Protection Act 1979* (NSW) qualifies the power of consent authorities to approve coastal protection works by requiring that they be satisfied, before granting approval, that the works will not unreasonably limit public access to a beach or headland or pose a threat to public safety.[126] Consent authorities are also required to be satisfied that there are satisfactory arrangements for the life of the works to ensure their maintenance and to ensure that, if the works increase erosion, that the impacted beach or land is restored.[127] As noted above, this Act also introduces a process of coastal zone management planning,[128] which identifies actions required in the relevant coastal zone to address priority management issues, including longer term and emergency protection works. Such management planning provides an important strategic context for the consideration of coastal protection works. Where there is no coastal zone management plan in place, a newly created Coastal Panel is the consent authority for such protective works.[129]

In relation to management of bushfire risks, all Australian jurisdictions have laws governing the clearing of native vegetation, which require approvals to be obtained before vegetation is harmed or destroyed. Exemptions are usually available to deal with the management of bushfires. For example, in South Australia, recent amendments to the Native Vegetation Regulations under the *Native Vegetation Act 1991* (SA) now provide a clear exemption to the requirement to obtain development consent for the clearing of vegetation around a dwelling site to achieve the required asset protection zone (minimum 20 m).[130] Beyond the asset protection zone, consent is still required. Such measures may be combined with fire prevention activities led by local government or fire agencies to encourage or require landholders to implement bushfire mitigation measures on their properties.[131]

4.3.2 Flexible regulatory instruments

A key deficiency associated with fixed regulatory instruments is their inflexibility. Once land uses have lawfully commenced, the regulatory powers are expended and they provide planning authorities with few options to shape land use and development. This is particularly problematic for climate hazards, where the distribution, timing and magnitude of the impacts are highly uncertain. Due to this uncertainty, there is a significant risk that fixed regulatory responses will later be judged to be an under- or over-reaction.

Flexible regulatory instruments are intended to address this issue by facilitating changes in land use and development in response to changing hazard threats. Like fixed regulatory instruments, they regulate where land use and development occurs, and the design and conduct of use and development, in order to reduce sensitivity or

[126] *Coastal Protection Act 1995* (NSW) s 55M(1)(a).
[127] *Coastal Protection Act 1995* (NSW) s 55M(1)(b). This allows the consent authority to secure funding for the carrying out of any such restoration and maintenance, either by legally binding obligations imposed on the landholder or by payment to the relevant council of an annual charge for coastal protection services.
[128] *Coastal Protection Act 1995* (NSW) Part 4A.
[129] NSW Department of Planning and Infrastructure, *State Environmental Planning Policy – Infrastructure* (2007) reg 129A.
[130] *Native Vegetation Regulations 2003* (SA) reg 5A.
[131] For example, in Victoria, fire prevention officers are employed by local government under the *Country Fire Authority Act 1958* (Vic), and work in conjunction with the relevant fire authority to ensure landholders manage potential fire risks. For further details, see Appendix A, Part 1.8.2.4.

exposure to climate hazards. However, in contrast to fixed regulatory instruments, they provide the state with powers to control land use and development, even after it has lawfully commenced.

It is important to emphasise that the term 'flexible' is not intended to imply that the relevant instruments necessarily give decision makers greater discretion. The degree of discretion will depend on the design of the instrument. The distinctive feature of these instruments is that they enable the state to exercise control over a use or development after it has commenced without acquiring an interest in the affected property. They could also be described as adaptive. The term 'flexible' was preferred to avoid confusion with other types of instruments that facilitate adaptation to climate change.

Flexible regulatory instruments can be split into two subgroups:

- those that confer qualified use and development rights; and
- those that modify the rights and freedoms associated with existing uses in order to manage climate hazard risks.

The former are directed toward new development and redevelopment; the latter toward existing settlements.

4.3.2.1 Qualified use and development rights

In this context, qualified use and development rights take two general forms:

- an entitlement to use land for a specific purpose that either:
- is subject to an ongoing power of the state (i.e. an option) to stop the use, or alter the conditions on which it is undertaken; or
- is subject to an event-dependent condition that requires the use to be modified or abandoned if a predetermined trigger-event occurs ('contingent approvals'); and
- an entitlement to use land for a specific purpose over a specified period ('time-limited approvals').

Contingent approvals

Contingent approvals can provide responsible authorities with the power to stop a use that has been lawfully commenced, or alter the conditions on which it is undertaken, in order to avoid or minimise the impacts of climate hazards. This power could be unqualified, allowing a responsible authority to intervene at any time, but it is more likely to be event-dependent. An event-dependent approval would give responsible authorities the power to revoke approvals only when a predetermined trigger-event occurs. The alternative form of contingent approval would see the entitlement to use land expire if a predetermined trigger-event occurs, at which point the use becomes illegal unless the approval is renewed or a new approval is granted.

There is a range of different hazard response options that could be implemented via these mechanisms, and these will depend on the underlying adaptation strategy adopted for the area. Full abandonment of the land use lies at the extreme end of the continuum and there are several less intrusive options that can be employed. For example, if defence is considered to be an appropriate strategy in relation to an area, a landholder could be required to contribute funds to the construction and maintenance of any defensive response once this becomes necessary to defend the property. Alternatively, a landholder could be required to prepare an emergency management plan, undertake improvements to the structure to withstand hazard exposure, or relocate the building further from the hazard.

In a coastal context, hazard triggers may be set on the basis of changes in mean sea level, the high water mark, erosion lines, or another natural occurrence. For example, the Tweed Shire Council in northern NSW provides for the use of event-dependent development approval based on the position of the erosion escarpment relative to the development. In the 2050 hazard zone,[132] any development consent granted will be subject to the proviso that if the erosion escarpment comes within 20 m of any building then the use of the building will cease.[133] The application of contingent approvals to bushfires is less clear-cut. Due to the nature of the hazard, which involves event recurrence without any gradual change in overall conditions, it is difficult to articulate potential trigger events. In some circumstances, however, it may be possible to specify a trigger that is based on the number of extreme fire days, or the occurrence of a specified number of bushfires in a region over a set period.

The attraction of contingent approvals is that they provide a means by which planning authorities can ensure future hazard impact costs are minimised, while also allowing for potential risk areas to be used until hazards materialise. They can also provide an effective means of delaying mitigation costs. In a coastal context, these features make event-dependent approvals an ideal means of implementing rolling easements (Box 4).

[132] This zone is mapped in the Development Control Plan to identify land that is not, and is not likely to be, adversely affected by the coastal hazard at the present time but is likely to be adversely affected by the coastal hazard in the year 2050.

[133] Tweed Shire Council*, Coastal Hazards – Tweed Development Control Plan Section B25* (2011) cl 3.2.2. This is to be achieved by placing a covenant on the land under s 88E of the *Conveyancing Act 1919* (NSW). A similar approach is taken in neighbouring Byron Shire. See, Byron Shire Council, *Development Control Plan 2010* (2011) Chapter 1, Part J: Coastal Erosion Lands'.

Box 4. Rolling Easements

The rolling easement concept requires the abandonment and removal of physical infrastructure and human habitation in order to permit beaches and coastal habitats, such as wetlands and tidal marshes, to migrate inland. It has specific application to coastal climate hazards to manage the gradual migration of shoreline habitats while allowing the land to be used in the short- to medium-term consistent with a more flexible approach to spatial planning.[134] Rolling easements are conceptually different to setbacks, as they do not seek to prevent development in the hazard zone, but rather prohibit the protection of the shoreline and allow the use and development of the land until the hazard materialises.

There is a range of regulatory and property law mechanisms by which to achieve rolling easements, many of which are discussed in section 4 of this report. Regulatory mechanisms include regulations prohibiting shoreline protection and requiring the removal of structures, development permit conditions that require continued access to a dry beach, and transferable development rights that enable relocation of those who surrender land to the sea. Property law mechanisms include easements granting public access to a dry beach even if the beach migrates inland, restrictive covenants binding parties to avoid shore protection and permit ongoing beach access, and ambulatory property lines that enable waterfront properties to migrate inland.

Time-limited planning approvals

Time-limited planning approvals allow a use or development to occur over a specified period, at the end of which the approval expires and the use and development becomes illegal unless the approval is renewed or a new approval is granted. They are similar to event-dependent approvals and offer similar advantages, the major difference being that a specific date is the trigger-event in a time-limited approval. The downside of using a date as the trigger-event for the expiry of an approval is that it bears no relationship to the hazard that the approval is trying to manage. This means that approvals may expire even though the hazard may not have materialised.

Agreements on title

Agreements on title can be used to implement both contingent and time-limited approvals. The key advantages of using these instruments are that the positive and negative covenants set out in the agreement bind successive landholders and that they are easily identified by prospective purchasers because they appear on the land title. Agreements on title are further discussed above, in sections 4.1 and 4.2.

4.3.2.2 Instruments that modify existing use rights

A fundamental obstacle that stands in the way of the management of climate hazard threats to existing settlements is the traditional assumption that, once a land use has lawfully commenced, the state's economic property rights in the land (i.e. 'regulatory rights') are effectively transferred to the landholder. If this is accepted, and a government subsequently wants to stop an existing use, or alter the planning conditions that apply to it, it must purchase the 'regulatory right' back from the landholder (i.e. provide compensation).

There are a number of compulsory buyback and voluntary instruments that can be used for these purposes, discussed in sections 4.4 and 4.5 below. However, as a matter of law it is important to emphasise that there is no constitutional limit or restriction on the powers of state governments and state government agencies (including local councils) to regulate existing uses, including stopping them or

[134] Titus J, 'Rising seas, coastal erosion, and the takings clause: How to save wetlands and beaches without hurting property owners' (1998) 57(4) *Maryland Law Review* 1279; Titus J, *Rolling Easements* (US EPA, 2011) available at <http://water.epa.gov/type/oceb/cre/upload/rollingeasementsprimer.pdf> (accessed 30/09/2012).

substantially modifying the conditions on which they are allowed to be undertaken. There is also no constitutional requirement for state governments and state government agencies to provide compensation in these circumstances.[135] Hence, it is conceivable that the states could impose new hazard-related regulations on existing uses without providing compensation, including that buildings be removed or modified to minimise risks. This legal power could be relevant in dealing with existing settlements where there is a need for houses to be retrofitted to minimise risks (see Box 5).

Box 5. Design Standards for Redevelopment and Retrofit

Where existing developments are exposed to climate hazards, particularly coastal flooding and bushfire, design standards for redevelopment can be used to accommodate or manage the associated risks. For example, the Northern Territory Planning Scheme seeks to avoid new residential development in identified storm surge areas but allows redevelopment and intensification in existing developed areas subject to certain design-based development controls. These include provision for the minimum floor level of habitable rooms to be 300 mm above the flood level for the site, and a requirement to avoid the use of fill to achieve the required floor levels.[136]

Such standards are relatively easy to impose on redevelopment involving a change of use or intensification of development. The downside of this approach is that it typically will only lead to an incremental improvement in building standards in the hazard area as individual properties are improved on a case-by-case basis. Depending on the stringency of the design standards, it could even provide a disincentive to redevelopment and contribute to a decline in building conditions.

Due to these limitations, alternative instruments are usually required to incentivise retro-fits on existing housing stock. This could include the imposition of regulatory requirements that dwellings in prescribed high risk areas undergo retro-fitting to meet minimum safety standards. Depending on the nature of the required redevelopment, this sort of regulation could be imposed without compensation. A precedent for such an uncompensated, retrospective regulation is the requirement to fit all swimming pools with an approved safety fence.

In contrast to the situation in the states, the powers of the Commonwealth and territories to acquire interests in property are constrained by section 51(xxxi) of the *Australian Constitution*, which provides the Commonwealth with the powers to make laws with respect to the acquisition of property on just terms from any State or person for any purpose in respect of which that Parliament has power to make laws. This arms the Commonwealth and, through it the territories, with the power to acquire property. It also qualifies that power with the requirement that any acquisition must be on 'just terms'. Due to this, neither the Commonwealth nor territory governments can resume land (i.e. take title to, or assume possession and control of, the land) without providing compensation.[137] However, the Commonwealth and territory governments can regulate existing uses without providing just terms, only their powers to do so are not unlimited. Far reaching regulations that effectively sterilise the land could trigger the constitutional guarantee of just terms contained in s 51(xxxi).[138] For example, if existing use rights are modified to prohibit any land use in areas declared to be hazard-prone, the affected

[135] *P J Magennis Pty Ltd v Commonwealth* [1949] HCA 66; *Tunnock v Victoria* [1951] HCA 55; *Pye v Renshaw* [1951] HCA 8; *Mabo v Queensland* [1988] HCA 69; *Kable v Director of Public Prosecutions (NSW)* [1996] HCA 24; *Newcrest Mining (WA) Ltd v Commonwealth* [1997] HCA 38; *Commonwealth v WMC Resources Ltd* [1998] HCA 8; *Durham Holdings Pty Ltd v New South Wales* [2001] HCA 7.

[136] For further details, see Appendix A, Part 1.4.1.2.

[137] *Newcrest Mining (WA) Ltd v Commonwealth* [1997] HCA 38; *Wurridjal v Commonwealth* [2009] HCA 2.

[138] *Newcrest Mining (WA) Ltd v Commonwealth* [1997] HCA 38; *ICM Agriculture Pty Ltd v Commonwealth* [2009] HCA 51; *JT International SA v Commonwealth* [2012] HCA 43; Macintosh A and Cunliffe J, 'The significance of ICM in the evolution of s 51(xxxi)' (2012) 29(4) *Environmental and Planning Law Journal* 297.

landholders may be entitled to compensation. However, regulation that merely qualifies how existing uses are undertaken and leaves landholders with options for the use and enjoyment of the land is unlikely to trigger s 51(xxxi). As a result, the territory governments are likely to be able to require modifications and retrofits to buildings and existing uses without being constitutionally obliged to provide compensation.

4.4 Compulsory acquisition instruments

Spatial planning responses to climate hazards necessarily affect interests in property. Often, this will be through the imposition of restrictions on the use and development of land, either in existing settlements or greenfield sites. This can give rise to disputes about government interference with private property interests and claims for compensation. As discussed in section 4.3, the states and territories have broad legal powers to impose restrictions on existing uses and prospective development without providing compensation. The states also have the constitutional power to acquire land outright without providing compensation to the affected landholders or otherwise affording them just terms.

In practice, these broad powers are qualified by well-established legal, social and political norms.[139] In all Australian jurisdictions, land resumption is governed by statute, meaning government agencies will need to rely on specific statutory authority and follow specific procedures to compulsorily acquire land.[140] The community will generally expect landholders to be compensated where their interests in land are acquired. Similarly, where existing uses are stopped or required to be substantially modified under regulations introduced after they commence, societal norms support the provision of just terms. Courts will also presume that the legislature intended to provide compensation in these circumstances, unless a clear contrary intent is expressed in the enabling statute.[141]

Compulsory acquisition of hazard-prone land can be combined with certain voluntary instruments to lower costs to government. Two of the best examples of this are property purchase-lease back schemes and purchase-covenant-resale schemes.

4.4.1 Property purchase – leaseback/covenant – resale schemes

Property purchase-leaseback schemes involve government acquisition of land in hazard-prone areas, after which the land is leased back to the former landholders (or other lessees) on terms and conditions that facilitate the management of climate hazards. The leaseback conditions could include such things as restrictions on the location of uses, requirements to maintain defendable space or setbacks in a particular condition, restrictions on development, and shortened tenancies with options to renew. As with other flexible instruments, the benefit of these types of schemes is that it facilitates the management of impact costs, while allowing continued use of the land until the hazards materialise. Under a property purchase-covenant-resale arrangement, the government acquires the land, after which it is resold subject to positive or restrictive covenants regarding use and development.

4.4.2 Designation of land for future acquisition

An alternative approach to the immediate acquisition of hazard-prone land is to use 'acquisition land' declarations, as has occurred in Queensland following the 2011

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[139] *Durham Holdings Pty Ltd v New South Wales* [2001] HCA 7; Gray K, 'Can environmental regulation constitute a taking of property at common law?' (2007) 24 *Environmental and Planning Law Journal* 161.

[140] For further details on the arrangements in each jurisdiction, see the discussion in Appendix A.

[141] *C J Burland Pty Ltd v Metropolitan Meat Industry Board* [1968] HCA 77*; Bropho v Western Australia* [1990] HCA 24; *Durham Holdings Pty Ltd v New South Wales* [2001] HCA 7; Gray K, 'Can environmental regulation constitute a taking of property at common law?' (2007) 24 *Environmental and Planning Law Journal* 161.

floods. Under the *Queensland Reconstruction Authority Act 2011* (Qld), regulations can be made declaring an area to be a 'reconstruction area' and land within the reconstruction area may be declared to be acquisition land.[142] Once land is declared to be acquisition land, the owner(s) must be notified and the contents of the declaration noted on the land title.[143] The import of the declaration is that, while it does not oblige the owner to immediately sell the land, it prohibits the disposal of the land to anyone other than the Queensland Reconstruction Authority or a specified local government.[144] This allows residents to continue to occupy and use land that is needed for hazard mitigation or reconstruction, subject to the qualification that, if they want to sell it, it must be bought by a relevant government agency. After the land is acquired, the intent of the scheme is that the land will be transferred to more suitable uses (e.g. public recreation).[145] There are similar processes in other jurisdictions. For example, in Victoria, the Public Acquisition Overlay is used to identify land for future acquisition. Once the overlay is created, acquisition by the nominated authority is triggered by a request from the landowner.[146]

The principle difference between this and the compulsory approach is a matter of public perception and political acceptability. On either approach, compensation based on market values will be payable. Properties that have been subjected to repeated damage and which are targeted by an acquisition program are likely to be compensated at a lower value which represents the market response to this risk exposure. Land that has been designated acquisition for some time may have a significantly reduced value, and this may create an incentive for affected landholders to dispose of acquisition land immediately upon its designation.

4.5 Voluntary instruments

Voluntary instruments can be defined as those instruments that use positive incentives to control or influence where, what and how land use and development occurs in order to reduce sensitivity or exposure to climate hazards. Unlike regulatory and compulsory acquisition instruments, voluntary instruments do not compel participation. Involvement is voluntary and no direct penalties are imposed on those that choose not to participate, other than foregone positive inducements.

There are four main types of voluntary instruments:

- financial inducements;
- voluntary buy-backs;
- land swaps; and
- transferrable development rights.

4.5.1 Financial inducements

Financial inducement instruments involve the provision of monetary incentives to alter land use or development. These types of instruments are the equivalent of 'beneficiary pays' environmental programs, where polluters are offered payments to reduce pollution or landowners are paid to provide ecosystem services. The theoretical justification for these types of programs is that, as the community will benefit from actions taken by private landholders to modify their land use, it should pay for those

[142] *Queensland Reconstruction Authority Act 2011* (Qld) s 43.
[143] *Queensland Reconstruction Authority Act 2011* (Qld) s 44.
[144] *Queensland Reconstruction Authority Act 2011* (Qld) s 100.
[145] *Queensland Reconstruction Authority Bill 2011 (Qld) Explanatory Notes* (Queensland Government, 2011).
[146] Victorian Department of Planning and Community Development (DPCD), 'Public Acquisition Overlay', *Victoria Planning Provisions* cl 45.01.

benefits. Theoretically, governments should only pay for the public benefits associated with the mitigation action, not the benefits that accrue solely to the landholder.

Programs of this nature will typically involve governments making an offer to cover all or part of the costs of making changes to reduce vulnerability to climate hazards. With financial inducements, there is no transfer of title to land, merely a voluntary incentive to modify where, what and how use and development occurs. In a bushfire context, this might include the provision of funds to assist landholders to establish and maintain asset protection zones to mitigate bushfire risks, or to assist in the upgrade of buildings to minimise exposure to natural hazards. In the coastal context, incentives could be used to encourage landholders to remove barriers between their land and estuaries in order to allow mangroves and saltmarsh communities to migrate inland.

4.5.2 Voluntary buy-backs

Closely related to financial inducements are voluntary buy-back programs, where the government or a government agency makes a specific or general offer to voluntarily acquire land in at-risk areas in order to reduce vulnerability to climate hazards. The key features of buy-backs are that they involve the formal transfer of title to land (which differs from financial inducements) and are voluntary (in contrast to compulsory acquisition). Buy-backs can be useful where the subject land is seen as unsuitable for any land use because of exposure to natural hazards, or where other programs have failed to prompt the desired changes in land use and development.

The main limitation with buy-backs is the cost. Acquiring the formal title to land can be expensive and, as a result, buy-backs are typically only used in very high risk areas.[147] Complementary measures can be used to offset or redistribute these costs, including taxes (see section 4.6), property purchase-lease back schemes and purchase-covenant-resale schemes (discussed above).

To date there have been only isolated examples of voluntary buyback schemes for coastal properties, one of which is the Narrabeen Beach scheme offered by Warringah Council. Despite the Council's willingness to pay market prices, the scheme had little uptake and, ultimately, it proved unsustainable due to the high value of Sydney beachfront property.[148]

There are several examples of where buybacks have been used to deal with flood risks to existing settlements in Australia. One of the best known is the Brisbane City Council's 'Voluntary Home Purchase Scheme', which was established after a 2005 investigation into flood risks in Brisbane. Under the scheme, offers to purchase several hundred residential properties in areas subject to regular flooding were made by the Council. By late 2011, the program had funded the voluntary purchase of five properties at a total cost of $24.21 million.[149] Similar flood buyback programs have been considered in other nearby areas in Queensland, including Bundaberg and Moreton Bay.

Voluntary buybacks have also been used to deal with bushfire threats, most notably in Victoria, where a voluntary buyback program was established in the aftermath of the 2009 bushfires. The program was aimed at acquiring properties affected by the fires in order to reduce the number of dwellings that were re-built in areas of high bushfire risk and facilitate the resettlement of affected landholders. The program was available to owner-occupiers whose principal place of residence was destroyed in the fires, who had not commenced rebuilding, and where a site was not available on the property that

[147] Holmes C, *Queensland Floods Commission of Inquiry* (Queensland Government, 2012).
[148] Helman P, Thomalla F and Metusela C, *Storm Tides, Coastal Erosion and Inundation* (National Climate Change Adaptation Research Facility, 2010); Gilmore H, 'Council offer of $3m for at-risk house declined', *Sydney Morning Herald,* 24 June 2007.
[149] Holmes C, *Queensland Floods Commission of Inquiry* (Queensland Government, 2012).

would enable a replacement dwelling to meet standards relating to defendable space and proximity to hazardous vegetation.[150]

4.5.3 Land Swaps

A land swap is an alternative to the compulsory acquisition or voluntary buyback of hazard-prone land. Landowners in a hazard zone are given the opportunity to swap their land for land in another less hazardous area. This mechanism was used in the Lockyer Valley in Queensland, where landholders affected by the 2011 flood were offered land in a more elevated area in exchange for their flood-prone land. To facilitate the program, Lockyer Valley Regional Council acquired 18 lots of land across a 378 ha area. Residents in the flood affected towns of Grantham, Helidon, Murphy's Creek, Postman's Ridge and Withcott were then given the option of exchanging their land for a parcel of land of comparable size in the relocation area. Those accepting the land swap were responsible for building their own homes and no compensation was offered if a landholder elected to take a lot that was smaller than their land.[151]

The implementation of the program was assisted by the simultaneous creation of a new development scheme for the Grantham reconstruction area by the Queensland Reconstruction Authority, which exempted certain reconstruction works from planning approval requirements if they were carried out in accordance with the Residential Living Zone Code and imposed restrictions on the redevelopment of land in areas affected by the floods.

Grantham and surrounds were again affected by flooding in February 2013. Recent media coverage has highlighted that very few homes were impacted by these recent floods, and this has been directly attributed to the relocation of residents away from flood-prone areas implemented through the land swap program.[152]

4.5.4 Transferable Development Rights

In contrast to buyback schemes involving the use of public funds to purchase land, transferable development rights (TDRs) provide a mechanism to compensate landholders in hazard-prone areas whose development rights have been restricted by regulation, without requiring public investment.[153] They can therefore be used as a way of lowering the direct costs of facilitating changes in land use in hazard-prone areas.

TDRs function by separating the development right from the land itself and transferring this right from the 'sending' parcel of land to a 'receiving' parcel of land where development is permitted. The development rights may be either sold to the owner of the recipient parcel or transferred directly to the receiving site if both parcels of land are under common ownership.[154] Once the development right has been transferred, the selling landholder is restricted from developing the 'sending' parcel of land, usually by a restrictive covenant or easement that prevents the current, and any subsequent, landowner from undertaking development on their land. [155]

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[150] Victorian Department of Justice, *Bushfire Buy-back Scheme: Frequently Asked Questions* (Victorian Government, 2012); available at <http://www.justice.vic.gov.au/buyback> (accessed 5/12/2012).

[151] Holmes C, *Queensland Floods Commission of Inquiry* (Queensland Government, 2012).

[152] Rebecca Lynch, 'Grantham receives only minor damage' *The Queensland Times*, 8 February 2013, available at: http://www.qt.com.au/news/grantham-receives-only-minor-damage/1747545/

[153] Williams P, 'Use of transferable development rights as a growth management tool' (2004) 21 *Environmental and Planning Law Journal* 105.

[154] Williams P, 'Use of transferable development rights as a growth management tool' (2004) 21 *Environmental and Planning Law Journal* 105.

[155] For an overview of the application of TDRs internationally and in Australia, see Karanja F and Rama I, 'Land use planning challenges and tools – transferable development rights: design considerations' (Paper presented at the Australian Agricultural and Resource Economics (AARES) 2011 Conference, Melbourne, 8–11 February 2011).

Although discussed here under the category of voluntary instruments, transferable development rights are often categorised as either 'mandatory' or 'voluntary' according to the level of regulation involved. The 'mandatory' approach is typically to designate two separate, pre-zoned sending and receiving areas. The sending area would be 'down-zoned' to reduce development potential. The receiving area may also be re-zoned to establish a low 'base density' so that developers must purchase development rights to build at a higher density. Landowners then sell development rights as a way to receive compensation for the down-zoning and developers have an incentive to purchase these rights. In contrast, a 'voluntary' approach does not separate sending and receiving areas. Rather, landowners within one single zone have the choice between developing some or all of their land under comparatively permissive zoning densities, or selling some or all of the development rights. While this is more politically acceptable, the second approach would not be appropriate where there is a desire to prohibit or substantially restrict further development in an area.[156]

There has been limited practical experience with TDRs in Australia. Where they have been used, there have been particular difficulties in establishing the regulatory and institutional support required for an effective TDR scheme. For example, the South Australian Government introduced TDRs in the Mount Lofty Ranges near Adelaide in 1992. Development rights were to be transferred from a water protection area where existing zoning did not allow additional housing and land subdivision to areas more appropriate for urban expansion and infrastructure provision. The scheme was generally considered a failure and was abandoned. A key reason for the failure was that planning authorities did not identify and establish clear sending and receiving areas, particularly in relation to the areas that could support more development.[157] Without strong examples of successful TDRs, their value as an adaptation planning tool is uncertain.

4.6 Taxes and charges

Taxes are generally defined as 'a compulsory exaction of money by a public authority for public purposes … that is not a payment for services rendered'.[158] The most common taxes used by planning authorities (local governments) are council rates, which are typically calculated on the basis of land value and are a form of property tax. In the current context, there are two key applications of taxes:

- to provide incentives to alter land use and development in response to climate hazards; and
- to raise funds to assist in preparing for, or responding to, climate hazards.

In many cases, taxes will serve both purposes — they will be designed to simultaneously incentivise behaviour change and raise revenues to fund preparatory activities and responses. For example, taxes could be imposed on landholders or developers in at risk areas in order to provide a signal that the area is susceptible to future impacts and provide a source of revenue to fund public interventions, should they be deemed necessary.

There are currently no known examples in Australia of taxes being used specifically to provide incentives to landholders or developers to alter land use patterns in response to bushfire and coastal hazards. However, there is increasing consideration of how these instruments can be used in an adaptation context to spread the costs associated with adaptation measures to reflect the appropriate balance between private and

[156] Williams P, 'Use of transferable development rights as a growth management tool' (2004) 21 *Environmental and Planning Law Journal* 105.
[157] Williams P, 'Use of transferable development rights as a growth management tool' (2004) 21 *Environmental and Planning Law Journal* 105.
[158] *Air Caledonie International v Commonwealth* [1988] HCA 61.

community benefits. In the Tasmanian Coastal Adaptation Pathways Project, various funding models were explored to address the costs of protecting community values and private property. For example, general rates and land taxes were suggested as possible mechanisms by which to fund activities with wider community benefits such as beach nourishment which maintains public beach access. In contrast, special charges based on total property value were recommended to raise contributions for properties in identified hazard areas.[159]

Similarly, the Victorian Coastal Climate Change Advisory Committee has recommended the use of differential rates, permitted under the *Local Government Act 1989* (Vic), to either reduce rates for property owners undertaking climate change adaptation measures or negatively to charge higher rates for properties in a settlement or part of a settlement to contribute to climate change adaptation measures.[160] Such an approach would also be applicable to the bushfire context. Taxes have been more widely used to raise funds to finance hazard responses (see examples in Box 6 below).

Box 6. Taxes to raise funds for hazard management and response

One of the most high profile contemporary examples taxes being used to finance hazard responses is the Victorian Government's Fire Services Property Levy.[161] Under the existing funding system, the cost of providing fire services is covered by a tax on insurance. The 2009 Bushfire Royal Commission recommended that this system be changed as it is both inequitable and inefficient; it penalises those who insure their properties and rewards those that do not.[162] Acting on this recommendation, the Victorian Government has proposed that, from 1 July 2013, the cost of providing fire services be rolled into council rates. Under the proposal, all property owners will be charged an additional 'levy' on their council rates, consisting of a fixed component ($100 for residential properties and $200 for all other property types) and a proportional charge based on the property's capital improved value. While called a levy, in truth, the Fire Services Property Levy is a property tax that spreads the cost of fire services across the community. At the time of writing, the New South Wales Government was consulting on a similar scheme.[163]

Another well-known instance where taxes have been used to raise funds to address natural hazards is the Australian Government's 'temporary flood reconstruction levy', which was introduced in the wake of the 2010-2011 flood events in Queensland and Victoria to fund recovery and reconstruction efforts.[164] The 'levy' was a one-year, income-based reconstruction tax that applied to individuals that earned more than $50,000 in the 2011-12 financial year. People who were deemed to have been affected by a natural disaster between 1 July 2010 and 30 June 2012 were exempt from the tax. The revenue provided by the tax (an estimated AU$1.8 billion) has been used to finance the reconstruction of flood-affected communities. Like the Fire Services Property Levy, the temporary flood reconstruction levy is a tax as it is not 'exacted for particular identified services provided or rendered individually to, or at the request or direction of, the particular person required to make the payment'.[165]

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[159] SGS Economics, *Models for Funding and Decision-making for Coastal Adaptation Pathways* (Tasmanian Coastal Adaptation Decision Pathways Project) (Local Government Association of Tasmania, 2012).

[160] Coastal Climate Change Advisory Committee, *Coastal Climate Change Advisory Committee: Final Report* (Victorian Government, 2010) 32.

[161] Fire Services Property Levy Bill 2012 (Vic); *Fire Services Property Levy Bill 2012 (Vic) Explanatory Memorandum* (Victorian Government, 2012).

[162] Teague B, McLeod R and Pascoe S, *2009 Victorian Bushfires Royal Commission: Final Report* (Victorian Government, 2010).

[163] NSW Treasury and the Ministry for Police and Emergency Services, *Funding our Emergency Services: Discussion Paper* (2012).

[164] *Tax Laws Amendment (Temporary Flood Reconstruction Levy) Act 2011* (Cth); *Income Tax Rates Amendment (Temporary Flood Reconstruction Levy) Act 2011* (Cth); Tax Laws Amendment (Temporary Flood Reconstruction Levy) Bill 2011 (Cth)*, Bills Digest No. 69 2010-11*; Income Tax Rates Amendment (Temporary Flood Reconstruction Levy) Bill 2011 (Cth)*, Bills Digest No. 70 2010-11*.

[165] *Air Caledonie International v Commonwealth* [1988] HCA 61, [11].

Charges are distinct from taxes and can be defined as levies to cover the costs of providing particular goods or services.[166] They can be used to recoup costs from landholders that benefit from protective measures provided by government agencies, and to recoup the cost of damage remediation measures provided to particular landholders or communities. For example, in New South Wales, recent amendments to the *Local Government Act 1993* (NSW) establish that local councils have the power to impose a charge for the repair and maintenance of coastal protection works in certain circumstances.[167] Provision is also made for special charges and levies in other jurisdictions.[168]

Hazard-related charges are used for various purposes in Australia, including recouping costs from landholders that benefit from protective services or measures provided by government agencies. For example, in some local government areas where sea walls have been constructed to protect vulnerable residential areas, residents pay a levy to contribute to the upfront costs and ongoing maintenance of the structure.[169] In a related context, the 2012 Victorian parliamentary inquiry into flood mitigation infrastructure considered the use of charges to support the management and maintenance of priority flood levees.[170]

4.7 Liability shield instruments

As discussed in section 4.3, an important factor in spatial planning processes concerning climate hazards is that, if hazards materialise and properties are lost, governments may be called upon to compensate those who are affected. A legal liability to compensate victims will only arise if planning authorities are found to have acted negligently in the conduct of their duties and the negligence contributed to the damage incurred. Provided planning authorities acted reasonably, and with regard to the available information, the risk of future legal liability is likely to be small.[171]

Nonetheless, the presence of this risk can have a material effect on the way planning agencies exercise their duties and perform their planning functions. In particular, it can lead to excessive risk aversion and steps being taken that increase the transaction costs associated with land use and development (e.g. requiring proponents to sign indemnity contracts with local governments or to prepare risk assessment and management plans).[172] Similar problems can arise with private landholders. Due to a fear of liability, landholders may be unwilling to take steps to reduce risks, or to cooperate with others to address potential hazard impacts.

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[166] *Air Caledonie International v Commonwealth* [1988] HCA 61, 470.

[167] Recent amendments to the *Local Government Act 1993* (NSW) establish that local councils have the power to impose a charge for the repair and maintenance of coastal protection works under s 496B but only if the owner of the land (or a previous owner) consents to the land being subject to the charge (unless the owner or occupier, or a previous owner or occupier, contributed to the upgrade or expansion of existing coastal protection works after the commencement of s 553B of the *Local Government Act 1993* (NSW) (i.e. 1 January 2011)).

[168] See s 92 of the *Local Government Act 2009* (Qld) and s 163 of the *Local Government Act 1989* (Vic).

[169] For example, some residents protected by sea walls in the Cairns Shire are subject to a levy.

[170] Environment and Natural Resources Committee, Parliament of Victoria, *Inquiry into Flood Mitigation Infrastructure in Victoria* (2012).

[171] McDonald J, 'The Adaptation Imperative: Managing the Legal Risks of Climate Change Impacts' in Bonyhady T and Christoff P (eds), *Climate Law in Australia (*Federation Press, 2007); England P, 'Heating up: Climate change law and the evolving responsibilities of local government' (2008) 13 *Local Government Law Journal* 209; McDonald J, 'Paying the Price of Adaptation' in Bonyhady T, Macintosh A and McDonald J, *Adaptation to Climate Change: Law and Policy* (Federation Press, 2011); Baker and McKenzie, *Local Council Risk of Liability in the face of Climate Change – Resolving Uncertainties: A Report for the Australian Local Government Association* (2011).

[172] *Bankstown City Council v Alamdo Holdings Pty Ltd* [2005] HCA 46.

Liability shield instruments can be used to reduce the tendency for the fear of legal liability to lead to unwanted outcomes. These types of instruments provide a partial or full exemption from legal liability to specified entities if they take a particular action, or fail to act in a particular way, in relation to climate hazards. Typically, the intent in deploying these instruments is to stop people from unjustly pursuing governments or other third parties for legal compensation when hazard risks materialise. As such, these instruments can prevent the risk (or perception of risk) of legal liability from providing perverse incentives.

There are two main options to address both the real and the perceived risk of potential exposure to liability, discussed further below:

- require indemnity from developers as part of the development approval process; and/or
- introduce a statutory exemption from liability.

4.7.1 Indemnity from developers

One strategy for dealing with the concerns of planning agencies about future liabilities is to permit them to require a form of binding indemnity from developers. The indemnity could apply to any legal liability relating to the approval of developments that are subsequently affected by climate hazards and/or costs incurred by the agency to protect the subject land from climate hazards. The intent of the indemnity would be to force developers to internalise the risks associated with development instead of transferring them onto the planning agency and government.

Clarence City Council in Tasmania made specific provision for such an indemnity in its 2007 planning scheme. Under the Sea Level Rise and Storm Surge Overlay, a specific decision requirement provided that 'Council and other relevant bodies should be indemnified against future actions arising from the effect of sea level rise and storm surge activity where necessary.'[173] This provision has not been included in the 2012 amendments to the Scheme, however, following a decision of the Tasmanian Planning Appeals Tribunal that such a requirement was invalid because it was not imposed for a proper planning purpose.[174]

The main deficiency associated with indemnities from developers is more practical than legal: in order to be effective, the developer must still exist at the time the liability arises and must have sufficient resources to cover the associated costs. Due to the timeframes associated with climate hazards, this is far from certain. The preparation and enforcement of indemnities also requires time and money, which may be more efficiently allocated elsewhere.

4.7.2 Statutory exemption from liability

The second approach to managing legal risks involves the use of statutory exemptions from liability. An example of this type of instrument is s 733 of *Local Government Act 1993* (NSW), which provides a broad statutory exemption from liability in negligence or nuisance (or other claims, in respect of actions taken and decisions made in relation to land subject to a range of risks) for local councils, provided they can demonstrate compliance with any applicable manual, guideline or code or otherwise demonstrate good faith.[175] This is specifically directed at actions taken in respect to land that is liable to flooding, subject to bushfire risk or within the coastal zone.

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[173] City of Clarence, 'Sea Level Rise and Storm Surge Overlay' *Clarence City Council Planning Scheme* (2007) cl 7.4.6(b).
[174] *Smith v Clarence City Council,* RMPAT 325/08P (24 April 2009).
[175] *Local Government Act 1993* (NSW) s 733.

Some of the implementation issues associated with using both of these mechanisms are discussed in section 5.

5. INSTRUMENT SELECTION AND IMPLEMENTATION

A range of considerations is relevant to the selection and implementation of the spatial planning instruments discussed in section 4. In this section, each category of instruments is explored in more detail, focusing on the advantages and disadvantages of employing particular instruments in particular ways to achieve climate change adaptation objectives. This discussion is intended to support decision-makers in deciding which instruments to select and how to use them.

It is useful to contextualise this discussion of instrument selection and implementation within an adaptation policy cycle model. Policy cycle models are commonly used within the policy science and planning literature to describe and analyse various parts of the policy making process.[176] For example, Moser and Ekstrom use a nine stage policy cycle, grouped under three headings (understanding, planning and managing), to identify and analyse common adaptation barriers.[177] Like other idealised policy cycles, the Moser and Ekstrom model is based on an assumption that policy making processes are rational and orderly, in the sense that:

- information is gathered and assessed;
- the information is then used to devise and assess policy options;
- the 'optimal' policy instrument(s) is selected using an agreed decision frame; and
- after the policy instrument(s) is selected, it is implemented, monitored and evaluated.

Another key feature of most policy cycle models is that they explicitly incorporate adaptive management principles. This usually involves the notion that, in making and implementing policies, policy-makers seek to predict outcomes from selected instruments, openly monitor and evaluate their impacts, and modify the selected instruments through time in an iterative manner to reflect information on their effectiveness and changing preferences.[178] While policy cycle models are an idealised depiction of reality, they provide a useful framework within which to analyse decision making processes.[179]

In this section, we use an eight stage policy cycle model, shown in Table 3, to frame an analysis of the issues associated with the selection and implementation of the spatial planning instruments described in Section 4. Our analysis is centred on stage C1 of the policy cycle – selection of policy instruments. Instrument choice cannot, however, be assessed in isolation: which instruments are selected and how they are used will

[176] Johnston D, *The international law of fisheries: a framework for policy-orientated studies* (New Haven Press, 1965); McLoughlin J, *Urban and regional planning: A systems approach* (Faber, 1969); Lasswell H, *A Pre-View of Policy Sciences* (Elsevier, 1971); Brewer G and DeLeon P, *The Foundations of Policy Analysis* (Brooks Cole, 1983); Hogwood B and Gunn L, *Policy Analysis for the Real World* (Oxford University Press, 1984); Lasswell H and McDougal M, *Jurisprudence for a Free Society: Studies in Law, Science and Policy* (New Haven Press and Martinus Nijhoff, 1992); Bridgman P and Davis G, *The Australian Policy Handbook* (Allen & Unwin, 2001); Howlett M and Ramesh M, *Studying Public Policy: Policy Cycles and Policy Subsystems* (Oxford University Press, 1995); Dovers S, *Environment and Sustainability Policy* (Federation Press, 2005); Eccles D and Bryant T, *Statutory Planning in Victoria* (Federation Press, 2011).

[177] Moser S and Ekstrom J, 'A framework to diagnose barriers to climate change adaptation' (2010) 107(51) *Proceedings of the National Academy of Sciences* 22026.

[178] Holling C (ed), *Adaptive Environmental Management and Assessment* (John Wiley and Sons, 1978); Walters C, *Adaptive Management of Renewable Resources* (MacMillan, 1986); McLain R and Lee R, 'Adaptive Management: Promises and Pitfalls' (1996) 20(4) *Environmental Management* 437; Tol R, Klein R and Nicholls R, 'Towards Successful Adaptation to Sea-Level Rise along Europe's Coasts' (2008) 242 *Journal of Coastal Research* 432; Dovers S, *Environment and Sustainability Policy* (Federation Press, 2005).

[179] Dovers S, *Environment and Sustainability Policy* (Federation Press, 2005).

depend on the processes that are followed in the problem and policy framing stages, and the capacity for planning agencies to implement instruments and monitor and evaluate the outcomes. The process and governance considerations in instrument choice are examined in section 6. This section assesses the advantages and disadvantages associated with the climate hazard planning instruments described in Section 4.

Table 4: Spatial planning for climate hazards policy cycle

Heading	Policy stage
A. Problem framing	A1. Detect problem
	A2. Assess problem
B. Policy framing	B1. Develop options
	B2. Assess options
C. Policy selection and implementation	C1. Select policy instruments
	C2. Implementation
D. Policy monitoring and evaluation	D1. Monitor impact of instrument
	D2. Evaluate impact of instrument

Sources: Brewer G and DeLeon P, *The Foundations of Policy Analysis* (Brooks Cole, 1983); Bridgman P and Davis G, *The Australian Policy Handbook* (Allen & Unwin, 2001); Dovers S, *Environment and Sustainability Policy* (Federation Press, 2005); Moser S and Ekstrom J, 'A framework to diagnose barriers to climate change adaptation' (2010) 107(51) *Proceedings of the National Academy of Sciences* 22026.

The discussion in this section draws particularly on the empirical investigation of the use of spatial planning instruments for adaptation in bushfire prone and coastal local government areas around Australia. It also includes a sample of the results from a survey conducted at the project symposium in October 2012, which brought together 25 local and state level planners and other adaptation professionals to workshop the research findings.[180] Participants were asked a range of questions to clarify and further refine the conclusions reached by the project team on the advantages and challenges associated with different spatial planning instruments. On average, 20 participants took part in the survey, although precise numbers varied with different topics and questions. Given the nature of the sample involved, and the particular difficulty of capturing important differences between the legal frameworks in each jurisdiction via common multiple choice questions, the results of the survey should not be considered representative and should be approached with caution. They are used here not to assert quantitative validity but rather to highlight key issues.

The range of considerations relevant to instrument selection and implementationis consolidated and presented in Table 4, at the end of this section.

5.1 Framing Instruments

Framing instruments play an important role in the administration of spatial planning processes. When well-designed, they can provide decision-makers and the community with information on the direction of policy, help frame how instruments and processes

[180] Details of the symposium are provided in section 1.3.

are used to achieve objectives, promote consistency in decision making, and minimise the risk of conflict and rent-seeking in planning processes. Poorly designed framing instruments can have the opposite effect and contribute to inefficient and inequitable outcomes.

The mechanisms used to frame the planning response to climate change hazards to date differ between jurisdictions, based on the particularities of the planning framework.[181] Generally, however, most state and territory governments have now developed state planning policies under planning legislation that are incorporated into the planning framework via specific provisions in planning schemes. Given their formal legal status, these instruments are required to be taken into account by decision-makers.

A key concern with the use of framing instruments raised by project participants is the extent to which they provide clear direction on objectives and implementation. As one informant noted:

A challenge is that these often tend to be motherhood type statements (statements of general intent - usually incontestable) and I'd question how well they are then interpreted/implemented in the development standards.182

Improvements in the structure and substance of these instruments at a state level was widely viewed as a way of promoting consistency and reducing conflict, planning appeals and concerns about legal liability, which operate as barriers to adaptation for local government decision makers.183

An alternative approach to addressing concerns about ambiguity in framing instruments is to provide detailed implementation guidance in regulatory instruments such as codes and guidelines. Where regulatory instruments provide sufficient guidance, the role of framing instruments in implementation and administration can be reduced. However, where there remains considerable discretion for decision-makers, clear guidance at the framing level can help promote consistency and reduce transaction costs.

5.1.1 Clarity in framing instruments

The concern among decision-makers over the lack of clarity and implementation guidance in framing instruments was more pronounced in relation to coastal climate hazards than bushfires. Some jurisdictions have developed detailed coastal hazard framing instruments, Queensland's *State Planning Policy for Coastal Protection 2011* (now suspended) being one example.[184] In other jurisdictions, such as Victoria, an analysis of the planning law framework for coastal climate hazards suggests that, while framing instruments have set high-level goals and broad principles, they have left local government and other planning agencies with considerable discretion over policy objectives and instrument choice. The failure to provide detailed guidance, either through the high-level framing instrument or associated regulatory instruments, has contributed to a number of adverse consequences, including:

- delayed implementation of coastal climate hazard responses as local governments have waited for more specific state government direction;

[181] For example, in a coastal context, Queensland employs a state planning policy, recognised directly by the planning law framework, as a central consideration for strategic and statutory planning; in SA a coastal planning policy has been developed under specific coastal management legislation, and its key provisions are translated in local development plans. Further detail on the mechanisms used in each jurisdiction is provided in Appendix A.

[182] Email from planning officer, 9 November 2012, on file with authors.

[183] Research interviews conducted by the authors, coastal planning officers, local government (all jurisdictions) March – August 2012.

[184] See Appendix A, Part 1.5.1.2.

- resource wastage due to local governments and other planning bodies undertaking information gathering and assessment processes that could have been carried out more cost-effectively by state governments;
- inconsistencies in strategic and statutory decision making within and between agencies;
- high levels of conflict and reliance on appeals processes; and
- increased transaction costs for landholders and developers.[185]

Framing instruments that leave local governments with broad discretion are not necessarily negative. Notably, within the Australian adaptation policy literature, there has been a strong emphasis on the 'subsidiarity principle', or the idea that government functions should be devolved to the lowest level of government possible unless there are cost savings from centralisation or significant externalities (spill-over effects).[186] However, this principle does not support the unqualified and wholesale delegation of responsibility for spatial planning responses to local government. In many cases, there are likely to be significant cost savings from centralisation and avoiding externalities associated with hazard events and responses. For example, if a local council pursues a 'protect' strategy to deal with coastal climate hazards, it could magnify the threats faced by adjoining landholders and council areas. In addition, as discussed in section 3.7, there are a number of factors that complicate the distribution of powers and responsibilities in spatial planning processes, including fiscal imbalances, path dependencies, inertia and the role of judicial and quasi-judicial appeal bodies.

Where there is a desire to transfer responsibility for spatial planning responses to local government, the delegation should account for these factors. Specifically:

- the framing instruments should clearly articulate the intention to transfer responsibility to local government and define the scope of their powers and responsibilities;
- local governments must be provided with the necessary resources and capacity to perform the spatial planning functions; and
- planning processes should be reviewed to ensure there are no unintended obstructions to the performance of local governments' hazard planning and management functions.

In instances where state governments want to control hazard planning processes, framing instruments should be used to provide clear direction on the objects and desired outcomes of the policy framework and the distribution of responsibilities and powers between governments, government agencies and the private sector. The same principles apply to framing instruments used by local governments and other government agencies: they should articulate, in unambiguous terms, what the policy is seeking to achieve, how it intends to achieve it and who is responsible for the main aspects of administration and implementation.

The benefits of providing clear objectives and guidance has been illustrated in the way these instruments have been used to address bushfire risks, particularly following recent reforms in Victoria (see Box 7).

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[185] Macintosh A, 'Coastal climate hazards and urban planning: how planning responses can lead to maladaptation' (2012) *Mitigation & Adaptation Strategies for Global Change* DOI 10.1007/s11027-012-9406-2; similar concerns have been expressed by local government planners in coastal areas elsewhere around Australia (Research interviews conducted by the authors, coastal planning officers, local government (all jurisdictions) March – August 2012).

[186] Garnaut R, *The Garnaut Climate Change Review* (Cambridge University Press, 2008).

Box 7. Victorian Bushfire Planning – an example of clear, strong framing instruments

Following the 2009 Black Saturday bushfires in Victoria, one of the key recommendations of the Royal Commission was that the state government "amend the Victorian Planning Provisions relating to bushfire to ensure that the provisions give priority to the protection of human life, adopt a clear objective of substantially restricting development in the areas of highest bushfire risk … and provide clear guidance for decision makers".[187]

The resulting state planning policy is notable for its clear objectives and explicit prioritisation of the objective to protect human life over other policy goals (Victorian *State Planning Policy Framework*, cl 13.05). Thus, in areas prone to bushfire, the protection of human safety is given precedence over any competing policy considerations. This strong expression of objectives is also well supported with regulatory provisions and guidelines (Bushfire Management Overlay and associated Particular Provisions of the Victoria Planning Provisions). The provision of clear planning objectives and guidance for decision makers in overarching state policy instruments provides a strong signal to decision-makers at all levels of government and will help to ensure consistent decision-making across local government areas.

The clarity of purpose now evident in the Victorian bushfire planning provisions was triggered by the bushfires of 2009. In the wake of the Black Saturday fires, there was a strong impetus for reform, both in Victoria and in other bushfire prone jurisdictions such as Tasmania and South Australia. The significant loss of life and property ensured that the reform process centred on the protection of human safety, over and above potentially competing policy objectives. While clear objectives are a notable strength of the Victorian bushfire planning provisions, it is important to acknowledge that there are trade-offs associated with decision-making in this area, and such a strong prioritisation of human safety over other concerns may lead to unwanted environmental externalities. Of particular concern is the potential for development to continue in fire-prone areas but on the condition that vegetation is cleared to mitigate fire risks. As noted in 3.4, the management of fire risks through vegetation removal can lead to increased greenhouse gas emissions, biodiversity loss and other forms of land and water degradation, and loss of amenity.

This issue was raised by the Royal Commission into the 2009 Victorian bushfires. In its recommendations, the Commission suggested that, while the priority should be on the protection of human life, this should be qualified with a requirement that due regard be given to biodiversity conservation.[188] This aspect of the recommendations has not been fully implemented nor is it supported by the new Victorian State Planning Policy Framework (cl 13.05), which creates a clear hierarchy of policy objectives, with the protection of human life prioritised over and above other objectives. As the state policy stands, there is considerable ambiguity around whether or not a consent authority could refuse a development on the grounds of unacceptable vegetation loss associated with meeting the required bushfire planning standards.[189] In some Victorian local government areas where bushfire and significant vegetation are both important considerations, local governments are seeking changes to their planning schemes to clarify how biodiversity is to be managed in relation to bushfire (see the example of Knox City Council in Box 8).

Given the current uncertainties, the State Planning Policy Framework should be reviewed, with the aim of reducing the ambiguities associated with the weighing of

[187] Teague B, McLeod R and Pascoe S, *2009 Victorian Bushfires Royal Commission: Final Report* (Victorian Government, 2010) 240, see also Recommendation 39.
[188] Teague B, McLeod R and Pascoe S, *2009 Victorian Bushfires Royal Commission: Final Report* (Victorian Government, 2010) 215, 230, 240, 244, Recommendation 39.
[189] Stakeholder feedback from local and state-level planners at the 'Limp, Leap or Learn? Project Symposium', Melbourne, 25 October 2012.

conflicting bushfire safety and conservation objectives. In the past, bushfire-related planning disputes in Victoria have often revolved around balancing of the need to clear defendable space around a dwelling against biodiversity and conservation values.[190] Improved clarity in the state framing instruments could assist in avoiding and reducing these conflicts. Ideally, the state framing instruments would clearly acknowledge that reducing bushfire risk may adversely affect other planning objectives and ensure that decision makers are required to consider and mitigate environmental impacts when making strategic and statutory decisions on the management of bushfire risks.

Box 8. Managing Biodiversity and Bushfire – Knox City Council, Victoria

The local government area of Knox includes significant areas in the foothills of the Dandenong Ranges where trade-offs between bushfire and native vegetation conservation are common considerations in planning applications. Following the introduction of the new Victorian bushfire planning provisions, Knox City Council has proposed amendments to its municipal planning scheme to address how development is to be considered where bushfire and significant vegetation are both a consideration. These amendments target the local level framing provisions within the planning scheme. They clearly state that parts of the local government area are at risk from bushfire, and some of these areas also have vegetation that is particularly important for biological and landscape purposes. Accordingly, development should be designed and located to minimise the risk to life and property from bushfire and should be avoided in areas where development may compromise human life or valuable ecological assets. This amendment establishes a clear policy position that the protection of significant vegetation is a legitimate constraint on the development potential of land and that there may be situations where the loss of vegetation associated with required bushfire mitigation measures will be considered unacceptable.[191]

5.1.2 Treatment of uncertainty

Another important aspect of framing instruments is their treatment of uncertainty. In a coastal context across Australia, it has become common to use sea level rise benchmarks in framing instruments. These benchmarks typically employ one or more point estimates of sea level rise for specific years in the 21st century (typically 2050 and/or 2100). The framing instruments then encourage or require decision makers to make planning decisions on the basis of the benchmark(s). The benefit of using these types of planning benchmarks in framing instruments is that they are relatively simple and can help to promote consistency and reduce uncertainty in planning processes. The downside is that they can induce deterministic decision making, where decision makers craft planning responses on the basis that sea level rise will be no more, or less, than the prescribed level. This involves a mischaracterisation of the challenge facing policy makers.

The fundamental policy issue associated with climate hazards is the degree of inherent uncertainty. The failure to adequately prepare for hazard events can lead to significant impact costs, including lost property, infrastructure, environmental values and lives. Equally, there can be substantial costs associated with overly precautionary responses to climate hazards. These can include threat abatement costs (e.g. construction of unnecessary sea walls) and the opportunity cost associated with not developing and using hazard-prone land. The difficulty for decision makers is that they are required to make policy choices where there is no way of knowing with any degree of confidence when the hazard might materialise and in what form. The use of point estimates of sea

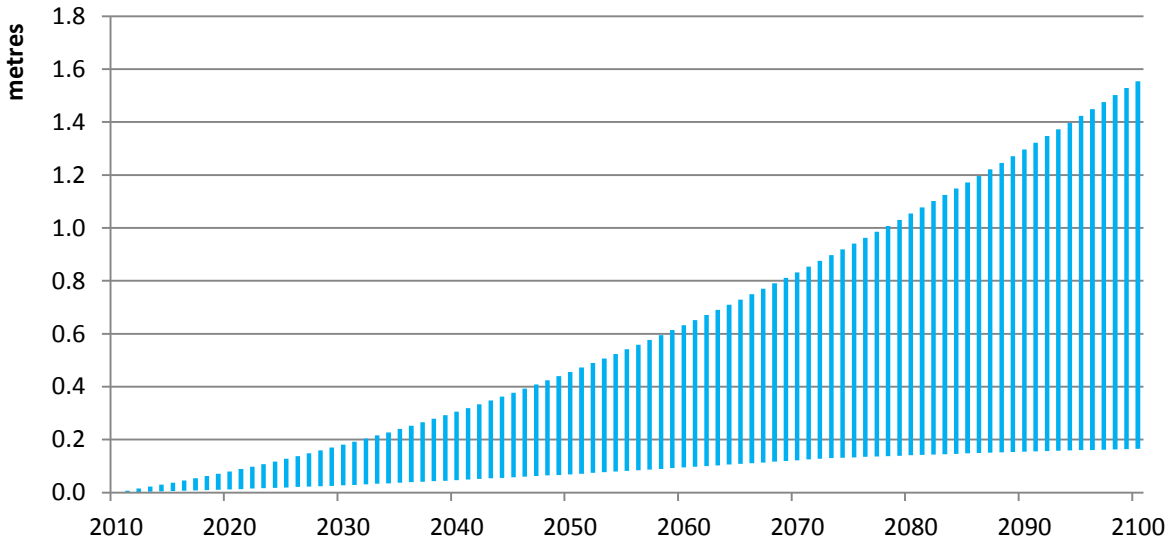
[190] Naylor R, 'Planning to Mitigate the Impact of Bushfire' (2012) 27(10) *Australian Environment Review* 328.

[191] Knox City Council, proposed amendment to the *Knox Planning Scheme* (Amendment C110); this amendment is proposed as a Ministerial Amendment under s 20(4) of the *Planning and Environment Act 1987* (Vic).

level rise or any other hazards in planning processes can create the perception that decision makers are trying to avoid a certain future impact. This can lead to deterministic responses that will later be judged an under- or over-reaction.

To help to avoid deterministic decision-making, efforts can be taken to communicate the nature of the uncertainties in framing instruments. One approach is to use hazard impact ranges (similar to Bayesian confidence intervals) rather than point estimates. Sea level rise benchmarks, for example, could take the form of a range of possible outcomes through time. Figure 5 provides an example of what such a planning range might look like, based on the sea level rise projections from the IPCC 4AR and Jevrejeva et al (2012). The range is based on the global average mean sea level rise above 2010 levels. The benefit of using a hazard impact range is that it can provide an effective means of communicating the extent of uncertainty and provide a basis for promoting robust responses. The downside is that it could lead to regulatory uncertainty and unwanted inconsistencies in approach between municipalities. This may be a situation which calls for a combination of approaches, for example defining minimum benchmarks in overlays controlling development and using information instruments as a means of communicating the full scope of potential risk.

Figure 5. Sea level rise hazard range above 2010 levels – a hypothetical example



Source: Meehl G A et al, '2007: Global Climate Projections' in Solomon S et al (eds), Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press, 2007); Hunter J, 'Estimating Sea-Level Extremes Under Conditions of Uncertain Sea-Level Rise' (2010) 99 *Climatic Change* 331; Jevrejeva S, Moore J and Grinsted A, 'Sea level projections to AD2500 with a new generation of climate change scenarios' (2012) 80-81 *Global and Planetary Change* 14; authors of this *Limp, leap or learn?* Project Report.

5.2 Information Instruments

As discussed in section 4.2, information instruments come in different forms. One of the most notable distinctions is between statutory and non-statutory instruments. Information instruments can also be categorised according to their scope. Broad information instruments seek to convey general information about hazards, mitigation strategies and/or management options (e.g. information brochures and general hazard maps). Narrow or targeted information instruments are designed to provide information at a property-scale and directly influence decision-making surrounding its purchase

and/or management (e.g. planning certificates provided at the point of sale, or agreements and/or notations on title). Irrespective of the type of information instrument involved, they typically serve to encourage and support autonomous adaptation; and help manage liability risks for government.

Current directions in adaptation policy at a federal level in Australia show strong support for the use of information instruments to encourage autonomous adaptation. For example, the Federal Government draft policy statement, *Roles and Responsibilities for Climate Change Adaptation in Australia,* characterises a lack of information about potential climate change risks as a potential market failure that may prevent effective and efficient climate change risk management, and articulates a clear role for government in supporting and incentivising adaptation through the collection and publication of relevant information.[192] Similarly, at a state level, the Tasmanian Government's *Adapting to Climate Change in Tasmania Issues Paper* identifies the provision of sound information at the regional and local level as the first of its roles and responsibilities.[193]

The policy support for information instruments is partially reflected in the practices surrounding existing settlements, where broad, community-education style information measures (non-legislative information instruments) have been popular. For example, in a bushfire context, providing residents with information on bushfire threats and safety, including warnings, evacuation procedures, options for house retro-fit and achieving defendable space around dwellings is central to the functions of fire authorities and emergency management agencies.[194] Similarly, following the 2011 Queensland Floods, the Queensland Reconstruction Authority developed information brochures for existing residents in areas prone to flooding, storm tide and cyclone to inform them of house retro-fit and other resilience options to minimise hazard damage in future events.[195] This community education is underpinned by broader emergency management activities such as ensuring access and evacuation routes, and, in a bushfire context, the establishment of fire breaks and fuel reduction burning.

5.2.1 Barriers to the use of information instruments

While broad information instruments have been widely used, barriers have been encountered to the deployment of more targeted statutory information instruments. This appears to be a product of political resistance associated with scepticism towards climate change and landholder concerns that information disclosure could reduce property prices (see Box 9).[196]

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[192] Council of Australian Governments Select Committee on Climate Change, *Roles and Responsibilities for Climate Change Adaptation in Australia* (Commonwealth of Australia, undated); see also Productivity Commission, *Barriers to effective Climate Change Adaptation – Draft Report* (Commonwealth of Australia, 2012).

[193] Tasmanian Climate Change Office, Tasmanian Department of Premier and Cabinet, *Adapting to Climate Change in Tasmania Issues Paper* (2012).

[194] See Victorian Country Fire Authority website for information on current warnings, home bushfire safety, community specific fire information, and information to support making fire preparation plans, available at <http://www.cfa.vic.gov.au> (accessed 11/12/2012).

[195] Queensland Reconstruction Authority, 'Resilience & Rebuilding Guidelines', <http://www.qldreconstruction.org.au/publications-guides/resilience-rebuilding-guidelines> (accessed 11/12/2012).

[196] Govind P, 'Managing the relationship between adaptation and coastal land use development through the use of s 149 certificates' (2011) 7(1) *Macquarie Journal of International and Comparative Environmental Law* 94.

Box 9. Recent experience with disclosure instruments – New South Wales and Victoria

The recent history of coastal policy development in New South Wales highlights the tensions associated with the use of information instruments. As a result of reforms introduced in 2010, coastal land can be assigned to one of three coastal hazard risk categories: land that is, or is likely to be, subject to a current coastal hazard; land that is, or is likely to be, subject to a coastal hazard in the year 2050; and land that is, or is likely to be, subject to a coastal hazard in the year 2100.[197] Under s 149 of the *Environmental Planning and Assessment Act 1979* (NSW), any person is entitled to apply to a local council for a certificate that details the planning restrictions that apply to a parcel of land within the relevant municipality. In relation to coastal hazards, relevant information required in s 149 certificates includes the details of the coastal risk category that applies to the land and the date of the relevant risk category determination. After a change of government in 2011, and in response to concerns about "negative impacts on property values", steps were taken to wind back these provisions.[198] The government initially proposed to remove the requirements for councils to include information on coastal hazard categories on planning certificates.[199] In September 2012, the government indicated that the hazard information communicated in planning certificates would focus on "current known hazards" and that it would provide further clarification about notifications concerning future hazards at a later date.[200]

Similar issues have arisen in relation to bushfire disclosures. For example, the Royal Commission into the 2009 Victorian Bushfires made explicit recommendations regarding the use of planning certificates.[201] To date, these recommendations have only been partially implemented because of concerns about impacts on property values. The recommendations went beyond merely requiring a vendor's statement (under s 32 of the *Sale of Land Act 1962* (Vic)) to inform prospective purchasers that land is in a designated bushfire prone area. The Royal Commission also recommended that this statement include information on the standard (if any) to which the dwelling was constructed, the bushfire attack level assessment at the time of construction (where relevant) and a current bushfire attack level assessment of the site of the dwelling.[202] The Commission acknowledged that "any increase in risk is likely to have an adverse impact on price" but suggested this should be viewed as an incentive to encourage landholders to undertake mitigation measures.[203] The Victorian government has amended land sale regulations to require notification at the point of sale that land falls under the planning controls of the Bushfire Management Overlay. However, despite earlier commitments to implement all of the Royal Commission recommendations, it has not implemented the further recommendation concerning the provision of site-specific information on bushfire risk, arguing it constitutes unnecessary 'red tape' and that it could adversely affect property values.[204]

The key implementation challenges relating to the use of information instruments, particularly site-specific instruments, include the following.

[197] *Coastal Protection Regulation 2011* (NSW) Part 4: Categorisation of coastal risks to land; the assignment of land in the coastal zone to a risk category can be made through a Coastal Zone Management Plan; the Environment Minister can also make stand-alone risk category determinations; see also discussion of hazard assessment and evaluation in NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 4-7.

[198] Hartcher C, *NSW Moves Ahead on Coastal Management,* Media release (NSW Government, 8 September 2012).

[199] NSW Department of Environment and Heritage, *Stage 1 Coastal Reforms: questions and answers* (2012) <http://www.environment.nsw.gov.au/coasts/stage1CoastRefQaA.htm> (accessed 6/12/2012).

[200] Hartcher C, *NSW Moves Ahead on Coastal Management,* Media release (NSW Government, 8 September 2012).

[201] Teague B, McLeod R and Pascoe S, *2009 Victorian Bushfires Royal Commission: Final Report* (Victorian Government, 2010).

[202] Teague B, McLeod R and Pascoe S, *2009 Victorian Bushfires Royal Commission: Final Report* (Victorian Government, 2010), 266, see also Recommendation 53.

[203] Teague B, McLeod R and Pascoe S, *2009 Victorian Bushfires Royal Commission: Final Report* (Victorian Government, 2010), 266, see also Recommendation 53.

[204] Arup T, 'Bailleau reneges on bushfire risk advice', *The Age* (Melbourne), 8 June 2012, available at <http://www.theage.com.au/victoria/baillieu-reneges-on-bushfire-risk-advice-20120607-1zz2b.html>.

5.2.1.1 False and misleading information

Generally, planning agencies have a duty to act reasonably, or in 'good faith', when providing information in relation to planning processes. The provision of false or misleading information in a planning instrument can constitute a breach of this legal obligation and give rise to liability.[205] This does not mean that all information must be 100% accurate. If there are uncertainties about the nature of the hazards or the accuracy of the information, agencies are merely required to bring these to the reader's attention. As a general proposition, local authorities or state agencies are more likely to face legal liability for non-disclosure than for disclosure. Notwithstanding this, the existence of this duty, and potential legal exposure, can lead to a reticence to voluntarily disclose information on hazards, particularly given the uncertainties surrounding climate change projections.

5.2.1.2 Impacts on property values and insurance premiums

As discussed, there have been a number of instances where planning agencies have faced opposition to the use of information instruments from landholders concerned about the potential adverse impacts on property values. There have also been cases where information instruments have been introduced, only to be revised after a backlash from property owners.[206] Information instruments are intended to alter behaviour, and changes in property values are one manifestation of this (decreases in property values represent an efficient market response to new information).[207] Further, the evidence of adverse long-term property price impacts from the release of information on hazards is not compelling, even in areas where there has been a recent extreme event (see Box 10). This suggests that information instruments alone are unlikely to alter behaviour. Despite this, adverse public reaction to information instruments can still act as a barrier to their use.[208] To manage this opposition, it is important to ensure that all uncertainties associated with hazard projections are fully disclosed and that information is released well in advance of the hazards materialising.

Box 10. Impacts on Property Prices and Insurance Premiums

In a 2003 review, Stephen Yeo found mixed results on the impacts of flooding and flood disclosure on property values.[209] Some studies showed a downturn in property values following flood events and a small number found evidence that disclosure of risks had adverse impacts. Other research had found no long-term impacts of either flood events or the release of public information. Available research supports the proposition that the actual experience of a flood will have a greater effect on property values than the provision of public information about risks. However, most data on the impacts of flood disclosure on property values is of course resolution because of the inability to control for variables other than flooding, including broader market fluctuations and property improvements.

The potential for insurance premiums to increase in areas that have experienced, or which are projected to experience, increased flooding or other hazards, may be another focus of opposition to the introduction of information instruments. As with property price objections, this concern is misplaced and often exaggerated. The

[205] *Port Stephens Shire Council v Booth and Gibson* [2005] NSWCA 323; Eburn M and Handmer J, 'Legal issues and information on natural hazards' (2012) 17 *Local Government Law Journal* 19.

[206] Govind P, 'Managing the relationship between adaptation and coastal land use development through the use of s 149 certificates' (2011) 7(1) *Macquarie Journal of International and Comparative Environmental Law* 94.

[207] Ruppert T, 'Reasonable Investment-Backed Expectations: Should Notice of Rising Seas Lead to Falling Expectations for Coastal Property Purchasers?' (2011) 26(2) *Journal of Land Use* 239.

[208] Govind P, 'Managing the relationship between adaptation and coastal land use development through the use of s 149 certificates' (2011) 7(1) *Macquarie Journal of International and Comparative Environmental Law* 94.

[209] Yeo S, 'Effects of disclosure of flood-liability on residential property values' (2003) 18(1) *Australian Journal of Emergency Management* 35.

insurance industry has sophisticated hazard assessment capabilities and, as a result, in most cases, the deployment of hazard-related information instruments is unlikely to materially affect their risk assessments or resulting premiums.

5.2.2 Instrument selection, design and implementation

The treatment of disclosure mechanisms in the discussion of planning frameworks in Appendix A illustrates the considerable variability between jurisdictions in hazard disclosure requirements.[210] There are also deficiencies in the way other information instruments are used. In seeking to improve current practices concerning information instruments, policy makers should have regard to the following:

- ensuring information is provided to all potential purchasers in a consistent form that can be easily understood;
- ensuring all uncertainties associated with the information are fully disclosed;
- ensuring information is provided to purchasers at a point in time which allows them to factor this information into decision-making;
- providing opportunities for potential purchasers to respond to the provision of this information (e.g. by rescinding the contract of sale); and
- outlining clear roles and responsibilities for the provision of this information and processes to monitor and encourage compliance.

Recent experience of the use of disclosure mechanisms in Florida, USA (see Box 11) illustrates the importance of the nature and timing of disclosure.

Box 11. Lessons from the Use of Coastal Hazard Disclosure Instruments in Florida, USA

In 2006, laws were introduced in Florida requiring vendors in an identified coastal hazard area to notify purchasers that the property may be subject to coastal erosion and special regulations concerning coastal properties. This information is required to be provided at or before the exchange of contracts of sale, although there are no penalties for non-compliance. A study undertaken on the operation of the law in 2012 found it was not achieving its statutory purpose.[211] The researchers found that, of several hundred property owners surveyed for the purposes of the study: (a) 86% did not receive, or did not recall receiving, a disclosure statement; (b) 71% said they had no understanding the disclosure program, or did not understand it well, at the time they purchased the property; and (c) 67% did not know their property was located either partially or wholly seaward of the Coastal Construction Control Line, which delineates the hazard control area. Recommendations for improving the effectiveness of the laws included providing the disclosure statement earlier in the land purchase negotiation phase to allow purchasers time to further consider and investigate potential hazard issues; providing additional information on the hazard profile of the land at this point in time; allowing the purchaser to rescind the contract of sale within a certain period of time after receiving the information or in the situation where no such information was provided; and imposing civil penalties on sellers or agents who knowingly violate the disclosure laws.

5.3 Fixed and flexible regulatory instruments

In current Australian practice, it is common for a combination of spatially-based regulatory instruments to be used to establish minimum requirements for new developments and redevelopments concerning bushfire and coastal hazards. Although

[210] Available disclosure mechanisms for each Australian jurisdiction are outlined in Appendix A, Parts 1.3.1.2, 1.3.2.2, 1.4.1.2, 1.5.1.2, 1.6.1.2, 1.7.1.2, 1.8.1.2, 1.8.2.2, 1.9.1.2, and 1.9.2.2.

[211] Wozniak K, Davidson G and Ankerson T, *Florida's Coastal Hazard Disclosure Law: Property Owner's perceptions of the physical and regulatory environment* (University of Florida, 2012).

there are significant variations between the jurisdictions and between the different hazards,[212] the general approach can be summarised as follows:

- hazard-prone areas are identified and mapped by local governments or other government agencies;
- spatial data on hazard-prone areas is incorporated into planning schemes via zones, overlays, or hazard mapping declarations;
- these instruments place restrictions on the types of uses and development that are allowed in hazard-prone areas, require responsible authorities to have regard to general or specific hazard safety considerations when making development application decisions, and impose certain conditions on development in these areas;
- referral authorities with relevant expertise are required to consent to, or advise on, development applications in hazard-prone areas;
- codes and guidelines are used to set minimum standards and conditions for land use and development, and provide substantive guidance to applicants and decision-makers on what may be considered an 'acceptable level of risk';
- complementary instruments, including agreements on title and compulsory risk assessments, are also used in some jurisdictions. Often the purpose of these instruments is to reduce the exposure of local governments to future legal liability if hazards materialise and/or to increase the information available to decision makers; and
- associated non-spatial regulations address various hazard mitigation responses, such as native vegetation clearing and coastal protective structures.

A notable aspect of current Australian practice is a tendency to rely heavily on fixed regulatory instruments; there has been limited use of flexible regulatory instruments such as time-limited and contingent approvals. Planning agencies have also steered away from using flexible regulatory instruments to override existing use rights without providing compensation. This possibly reflects the strength of the norms surrounding property rights. In addition, there are some instruments, such as mandatory insurance, for which no known example of current practice is available.

The following discussion explores the strengths and weaknesses in the current approach and how regulatory instruments could be used more effectively to achieve desired policy outcomes.

5.3.1 Embedding spatial hazard data as the basis for regulation

Most jurisdictions have incorporated spatial hazard data into the planning law framework via zones, overlays or hazard mapping declarations, or are considering using these mechanisms.[213]

Embedding hazard data into spatially-based planning instruments (e.g. municipal planning schemes) has a number of advantages, including the following:

- the use of spatial instruments ensures there is a clear, unambiguous trigger for development assessment processes;
- the use of spatial instruments can ensure that regulatory measures are targeted at, and tailored to, the areas most likely to be affected by the hazards; and
- spatial instruments that incorporate hazard data can communicate hazard information to decision-makers and the general public. In doing so, they can

[212] For further detail, see Appendix A.
[213] See the discussion of the spatial identification of hazard areas in each jurisdiction, Appendix A.

help promote private autonomous adaptation and serve as the basis for other regulatory and non-regulatory responses.

5.3.2 Barriers to using spatial instruments

While spatial instruments have their advantages, there are challenges associated with their implementation. These can be grouped under four headings:

- relating hazard information to development controls;
- the availability of quality downscaled local data;
- information costs and inertia; and
- deterministic responses and a false sense of security.

5.3.2.1 Relating climate change information to development controls

After hazard mapping has been undertaken to identify areas that could be affected by climate hazards, the next step in the policy cycle is to link that information to development controls. Important considerations in this process include:

- How risk averse (or averse to uncertainty) should planning agencies be in regulating land use and development in identified hazard-prone areas?
- How much discretion should responsible authorities have to determine land use outcomes in hazard-prone areas?

Typically, the central issues that arise when determining the degree of risk aversion in regulatory instruments is whether land use and development in hazard-prone areas should be stopped or prohibited and, when it is allowed, what conditions should be imposed. Zoning instruments can be used to implement prohibitions or restrictions on land *use*; whereas overlays are more suited to regulating development assessment processes. Ideally, policy makers should resolve issues surrounding the level of risk aversion by determining whether the benefits of regulation to the community as a whole (i.e. the avoided impact costs in the future) justify the costs (i.e. the opportunity costs associated with lost development and mitigation conditions). However, as discussed in section 3.2, the application of standard cost-benefit analysis is made difficult by the pervasive nature of climate hazard uncertainties and the fact that there is no widely accepted theory of rational choice under uncertainty.

In practice, the approaches that have been adopted by Australian planning agencies cover the spectrum. At one extreme, business-as-usual (or 'risk loving') approaches have been adopted, where the threats posed by climate hazards have largely been ignored and new development has been allowed to proceed in hazard-prone areas with minimal or no mandatory mitigation measures. With this approach, the opportunity costs associated with regulation are small but the exposure to future impact costs is high. At the other extreme, there have been instances where a highly risk averse approach has been adopted, which has led to developments being prohibited in hazard-prone areas. Here, the future impact costs are small but the opportunity costs of regulation are high. However in general, there is a reluctance to impose prohibitions and stringent restrictions on land use in relation to climate change hazards. Current practice favours reliance on development assessment processes to ensure hazard mitigation standards are met and to impose related conditions on approval (see Box 12).

Box 12. Spatially-based prohibitions

The incorporation of prohibitions on land use into spatial-based planning instruments in order to deal with natural hazards (e.g. hazard zones) is relatively rare, particularly in relation to bushfire and coastal hazards. Zones containing broad prohibitions on all or most land uses have been developed for use in a flood mitigation context, for example the Urban Floodway Zone in Victoria.[214] However, governments have been reluctant to employ the same approaches for coastal and bushfire issues, seemingly because of the associated costs. An exception to this is the Queensland *State Planning Policy for Coastal Protection* 3/11 (currently suspended pending outcomes of a review), which contains a prohibition on development in identified erosion-prone areas in coastal management districts, unless the development in question is coastal dependent development, temporary or readily relocatable, essential infrastructure, or redevelopment that does not increase exposure to coastal hazard impacts.[215] At a local level, in Tasmania, the Clarence City Council Planning Scheme's *Coastal Management Overlay* prohibits all development in the frontal dune system and within 50m of a tidal flat, saltmarsh or lagoon.[216] The prohibition on frontal dune development reflects the requirements of the State Coastal Policy 1996. Yet, there is no mapping of what constitutes the frontal dune, nor is there any definition in the Coastal Policy. Accordingly, there has been significant disagreement amongst experts and planning disputes contesting the application of the prohibition. This highlights the critical importance of clear definitions, criteria or mapping in giving effect to prohibitions or restrictions on land use.

Arguably, the use of spatially-based prohibitions is easier to justify for coastal climate hazards than bushfire because of the nature of the threats and mitigation options. As discussed in section 2.3, bushfires pose an uncertain and acute threat that can usually be managed relatively cost-effectively by modifying buildings, ensuring the availability of exit options, and removing and managing vegetation. Due to this, historically, bushfire risk has tended to be dealt with at the site assessment level, with an underlying assumption that development will proceed, subject to certain conditions to mitigate risks. In contrast, with coastal hazards, there are both acute and chronic elements and few, if any, low-cost mitigation options. Accordingly, in some circumstances, outright prohibitions on land use are likely to be warranted to manage coastal hazards, such as coastal erosion or permanent inundation.

While the historical trend has been to manage fire risks with conditions on development approval, it is important to note that the experience of the 2009 bushfires has prompted a rethink in Victoria. Proposals for the development of a new zone to restrict land uses so as to reflect high levels of bushfire risk were not adopted and bushfire risk continues to be managed via an overlay triggered by certain development actions. Nonetheless, attempts are now being made to deal with bushfire risk at the strategic planning level so as to avoid locating further development in areas of high bushfire risk. For example, the Ministerial Direction governing strategic assessment of planning scheme amendments now specifically requires that special consideration be given to how the amendment addresses bushfire risk.[217]

Climate hazards have a number of features that complicate policy responses. These include that the associated risks can change through time and vary spatially, and that the lifespan of threatened assets and the value placed on those assets by society in hazard zones vary. Due to these issues, targeting and staggering the regulatory response according to time, location and development types can lead to improved cost-

[214] There has been resistance to the use of the Urban Floodway Zone because it prohibits most land uses, including dwellings; see Teague B, McLeod R and Pascoe S, *2009 Victorian Bushfires Royal Commission: Final Report* (Victorian Government, 2010) 228.

[215] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) 44, cl 2.1-2.3.

[216] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) 44, cl 7.3.2.

[217] Victorian DPCD, *Ministerial Direction No. 11: Strategic Assessment of Amendments* (2011) cl 3.1; made pursuant to s 12(2)(a) of the *Planning and Environment Act 1987* (Vic).

effectiveness. Such a risk-based approach to land use zoning has been adopted by some governments and planning agencies, particularly in a coastal context where the nature of the particular hazards lend themselves to a graded regulatory response (see Box 13 below). For example, in New South Wales, the three tiered delineation of coastal hazard zones allows planning authorities to introduce different planning responses for the immediate hazard zone, for areas likely to face hazards by the year 2050; and for areas likely to face hazards by the year 2100.[218] The implementation of this approach by coastal councils in northern New South Wales has been discussed above at 4.3.1 in relation to hazard mapping and management plans.

Similarly, recent reforms to the State Planning Policy Framework in Victoria introduced a different sea level rise planning benchmark depending on the nature of the development in question. For urban infill developments, the planning benchmark is 0.2 m sea level rise by 2040. For new greenfield developments outside town boundaries, the planning benchmark is 'not less than' 0.8 m sea level rise by 2100.[219] The rationale behind this approach appears to be to facilitate further development in existing urban areas but to place more onerous restrictions on the establishment of major new greenfield developments. Arguably, the concentration of investment in existing urban areas is so great that allowing some extra development within these areas is unlikely to make a significant difference to the eventual planning response that may be required for these areas should climate hazards materialise. There is, however, some ambiguity with these new Victorian provisions and little accompanying guidance: for example, urban infill is not defined, leaving each local government to develop their own interpretation.

Box 13. A risk-based approach to land use zoning

A risk based approach to land use zoning recognises that risks and hazards can change over time, that risks will vary spatially, and that the lifespan of assets and the value placed on those assets by society in hazard zones will also vary. Accordingly, a tiered response to zoning delineates areas likely to be exposed to risks across a range of time frames (e.g. immediate, 2050 and 2100) and places controls on development according to the lifespan of an asset and its social value. For example, long-lived critical assets (e.g. hospitals, roads and airports) may require different standards from medium-lived assets (e.g. residential housing), while a reduced standard may be appropriate for short-lived and lower value assets (e.g. recreational facilities).[220] The planning response will then vary according to the level of risk exposure. In a medium risk area, new construction of essential and critical infrastructure and public utilities would only be permitted where it is designed to be capable of remaining operational during extreme climate events. However, the area may be suitable for most other development. In high risk areas, the planning response may be to only approve developments that can be relocated or designed to withstand the impacts of extreme events or flooding without causing adverse consequences for adjoining coastal areas. In very high risk areas, approval would only be given for developments that are compatible with a high degree of disturbance and existing high value assets would be subject to restrictions on new development and the management of potential adverse consequences on adjoining areas.[221]

[218] *Coastal Protection Regulation 2011* (Vic) Part 4: Categorisation of coastal risks to land; the assignment of land in the coastal zone to a risk category can be made through a Coastal Zone Management Plan; the Environment Minister can also make stand-alone risk category determinations; see also discussion of hazard assessment and evaluation in NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 4-7.

[219] Victorian DPCD, *State Planning Policy Framework* (2010) cl 13: Environmental Risks (as amended July 2012).

[220] Department of Climate Change*, Climate Change Risks to Australia's Coast: A First Pass National Assessment* (Commonwealth of Australia, 2009).

[221] Department of Climate Change*, Climate Change Risks to Australia's Coast: A First Pass National Assessment* (Commonwealth of Australia, 2009) 142.

In the absence of an accepted theory of rational choice under uncertainty (see the discussion in section 3.2), there is no one 'best' solution to regulatory design questions. Despite this, there are several key issues that policy makers should be mindful of when making decisions on hazard regulations and the degree of risk aversion embodied in them.

Firstly, to improve transparency and accountability, planning agencies should clearly articulate their approach to risk and uncertainty. This may involve specifying what decision rule or decision frame they adopt in making hazard regulations (e.g. expected utility analysis, robust decision making etc, discussed in Appendix B.). Secondly, if an expected utility approach is adopted, the cost and benefits of different approaches should be determined from the perspective of the whole community (i.e. social welfare). In practice, there is evidence that some planning agencies have weighed the costs and benefits of regulations to government or a particular local council, without giving due consideration to the wider community impacts. Further, the timeframes associated with hazard impacts, and implications of discounting, can have profound implications for the costs and benefits of different options. Costs and benefits that are only likely to materialise in the distant future should be discounted. Policy makers should be aware of the importance of the social time preference rate when analysing the costs and benefits of regulatory choices and the subjectivity associated with its selection.[222] Third, given the inherent uncertainties associated with climate change impacts, there is a strong theoretical case for the use of flexible regulatory instruments, such as qualified use and development rights. Despite this, there are a number of practical obstacles to their use, which are discussed below. Where fixed regulatory instruments are used, policy makers should consider how other policy instruments could be employed to provide the flexibility necessary to deal with potential future hazards.

Fixed versus flexible – dealing with uncertainty

As discussed in section 4, the dominant regulatory approach in dealing with climate hazards to date has been to use fixed regulatory instruments. These instruments offer minimal opportunities to regulate a land use once it has been lawfully commenced, unless the use is intensified, expanded or abandoned. There are only isolated examples of jurisdictions and local government areas experimenting with flexible regulatory instruments. For example, at a state level, in the context of considering options to reduce intensity in urban areas at risk, the *NSW Coastal Planning Guideline* explicitly sanctions the use of flexible measures, including time-limited and/or event-dependent development controls, instead of prohibitions on infill and redevelopment.[223] At the local scale in northern New South Wales, both the Tweed and Byron Shire Development Control Plans provide an event-based trigger for new development in areas subject to coastal erosion.[224] A similar approach was adopted in Glenelg Shire in western Victoria, where the planning scheme was amended in 2011 by the Planning Minister to allow residential development in an area between Portland and Narrawong on the condition the 'dwelling is designed to enable relocation in the event future coastal processes threaten the safety of the land and appurtenant dwelling'. In October 2012, the Glenelg Planning Scheme was amended again to deal with development in

[222] When considering public goods and services, including regulations, a social time preference rate derived using the 'Ramsey formula' is typically used (i.e. social time preference rate = pure time preference rate + real rate of expected consumption growth x elasticity of the marginal utility of consumption). The difficulty for policy makers is that there is no agreement within the literature about what the social time preference rate should be, and there is a decades-old debate about the suitability of different rates.

[223] NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 9-10.

[224] Byron Shire Council*, Development Control Plan 2010* (2011) Chapter 1, Part J: Coastal Erosion Lands, see particularly cl J2.2; Tweed Shire Council*, Coastal Hazards – Tweed Development Control Plan Section B25* (2011) cl 3.2.2.

the Narrawong area.[225] The 2012 amendments set development restrictions on a lot-by-lot basis to manage existing and future coastal hazards. Most of the lot-based restrictions include a quasi-event-dependent condition; namely, that a 's 173 agreement' be made and registered on title that 'requires the removal or relocation of buildings should coastal erosion require this'.[226]

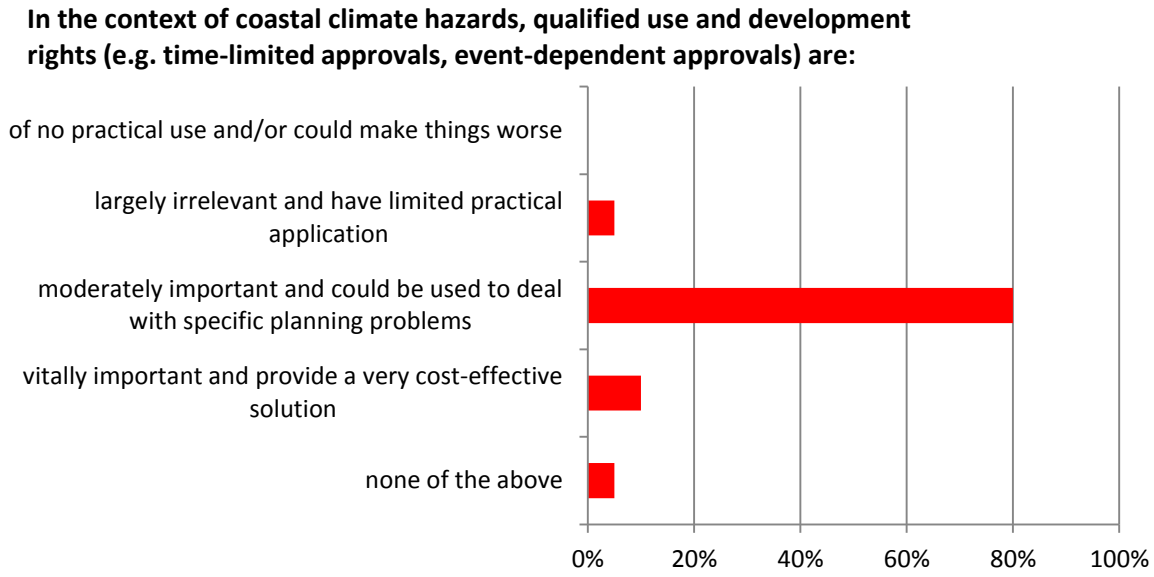
The key advantage of using contingent and time-limited approvals is that they allow current use and enjoyment of land until such time as the hazard materialises. The particular nature of these instruments makes them most appropriate for use in areas prone to coastal erosion or permanent coastal inundation, where the hazards are likely to develop incrementally over an extended period of time and the changes are likely to be largely irreversible. In contrast, they appear to have less application to the bushfire planning context, where the hazard is an extreme event, the timing and extent of which depends on numerous variables, and which is difficult to accurately predict.

Even in a coastal context, there are likely to be a number of practical challenges associated with the use of contingent and time-limited approvals. In particular, some policy makers argue it will be difficult for future governments to exercise the options to require buildings to be removed without facing claims for compensation or demands for coastal protection measures. Utility providers have also expressed concern about how contingent and time-limited approvals could affect their capacity to plan for, and provide, reticulated services such as sewerage. As a consequence, there is a view that these instruments benefit current landholders while transferring risks and responsibilities to future governments.

A further issue that has arisen with the use of flexible instruments is that some financial institutions appear to be reluctant to lend money on the security provided by land subject to contingent and time-limited approvals. This may be a product of the novel nature of the instruments or it may reflect rational market judgment of the associated financial risk. Because of these issues, most planning practitioners tend to prefer fixed regulatory responses (e.g. setbacks and buffer zones) and see flexible regulatory instruments as having more limited application.[227] This was reflected in the results of a real-time poll conducted at the project symposium, where participants were asked for their views on the use of qualified use and development rights. The question and results are shown in Figure 6. In the associated discussion, participants highlighted that the use of these instruments will depend on the context and that more thought needs to be given to their design and implementation.

[225] Victorian DPCD, *Glenelg Planning Scheme: Amendment C93* (2012).
[226] Victorian DPCD, *Glenelg Planning Scheme, Incorporated Document, Lot 1 Ocean View Drive East, Narrawong (PS518204W), September 2012* (2012) 3.
[227] Research interviews conducted by the authors, coastal planning officers, local government (all jurisdictions) March – August 2012.

Figure 6. Symposium participants' perspectives on qualified use and development rights



The discussion in section 4 highlighted that there are few legal restrictions on the ability of state governments to impose new restrictions on existing uses, and even federal and territory governments are likely to be able to regulate existing uses without the requirement to pay compensation, provided the regulations do not effectively sterilise the land. Notwithstanding this, to date, governments have preferred information and voluntary instruments to encourage landholders in existing dwellings to carry out retro-fitting and building modifications. This partly reflects prevailing norms concerning existing uses and property, which are likely to make any regulatory response controversial. However, where landholders are unresponsive to these measures, the options available to policy makers are largely confined to compulsory acquisition instruments and regulations that modify existing use rights. Where regulatory responses are considered necessary, one option is to combine them with voluntary instruments, such as financial incentives. Research on voluntary environmental instruments suggests they are more likely to be effective when combined with the threat of regulation.[228] In the current context, the combination of voluntary instruments and a background regulatory threat would create a 'carrot-and-stick' arrangement, with the financial assistance under the voluntary instrument constituting the carrot and the stick provided by the prospect of a mandatory regulatory response.

Delegation and discretion

The other major issue that policy makers face when relating hazard information to development controls is deciding on the degree of discretion that responsible authorities should have to determine land use outcomes in hazard-prone areas. The

[228] Segerson K and Miceli T, 'Voluntary environmental agreements: good or bad news for environmental protection?' (1998) 36 *Journal of Environmental Economics and Management* 109; Khanna M and Damon L, 'EPA's Voluntary 33/50 Program: Impact on Toxic Releases and Economic Performance of Firms' (1999) 37(1) *Journal of Environmental and Economic Management* 1; Khanna M, 'Non-mandatory approaches to environmental protection' (2001) *Journal of Economic Surveys* 291; Albernini A and Segerson K, 'Assessing environmental programs to improve environmental quality' (2002) 22 *Environmental and Resource Economics* 157; Gamper-Rabindran S, 'Did the EPA's voluntary industrial toxics program reduce emissions? A GIS analysis of distributional impacts and by-media analysis of substitution' (2006) 52 *Journal of Environmental Economics and Management* 391; Sam A, Khanna M and Innes R, 'How do voluntary pollution reduction programs (VPRs) work? An empirical study of links between VPRs, environmental management and environmental performance' (2009) 85(4) *Land Economics* 692.

issues here are similar to those discussed in the context of framing instruments (section 5.1). Drafting regulatory instruments in a manner that leaves decision makers with a broad discretion allows for regulatory solutions to be tailored to local circumstances. This flexibility can lead to improved outcomes and promote greater community involvement in hazard management but it can also lead to chaotic and inconsistent decision-making.

In the context of the current governance arrangements for land use planning in Australia, a number of factors support limiting the administrative discretion embodied in regulatory measures. Many responsible authorities lack the financial and human capacity to devise a coherent and effective response to climate hazards. Due to capacity constraints, local governments may be reluctant to devise long-term strategies for dealing with climate hazards, leading to prolonged delays in policy processes. Some responsible authorities may not take appropriate preventative measures to address climate hazards due to the belief that a higher level of government will act as an 'insurer of last resort'. There can also be negative externalities associated with land use responses to climate hazards (e.g. allowing development in a hazard-prone area could have adverse impacts on biodiversity or coastal processes in other areas). Finally, broad discretionary instruments can lead to conflict and excessive planning appeals that increase transaction costs and inconsistencies in policy responses (Box 14).

Box 14. The Victorian Civil and Administrative Tribunal - the implications of broad discretion

The Victorian coastal climate hazards planning framework that was first introduced in 2008 provides responsible authorities with considerable discretion in considering zoning and planning permit applications in areas that are potentially at risk from future impacts. Key terms and phrases used in the framework are also ambiguous, a fact that further expands the discretion of decision makers. The breadth of the discretion and ambiguity in the framework have contributed to inconsistencies within and between municipalities, increased transaction costs and aggravated planning disputes. A study published in 2012 found that, between January 2008 and June 2012, there were at least 46 planning permit appeals to the Victorian Civil and Administrative Tribunal where coastal climate hazards were raised as a material issue in the proceedings.[229] The study also found evidence of disputes over the framework in other planning processes, including planning panels, and inconsistencies in approach within planning agencies. In appeals to the Victorian Civil and Administrative Tribunal, Tribunal members often adopted vastly different approaches to key issues, including when coastal hazard vulnerability assessments were required, whether the likelihood of future defensive measures should be considered in permit applications, and the weight that should be given to threats that are only likely to materialise after the economic life of the building has expired. A further finding in the study was that the responses of many local councils had been strongly influenced by concerns about future legal liability and that, in attempting to shield themselves, councils had often required landholders to enter into section 173 agreements. The Victorian framework, and the way it has been implemented, highlights the dangers associated with devolving broad discretionary powers to local decision makers and the need for consideration to be given to the needs and capacity of local councils in devising adaptation planning responses.

[229] Macintosh A, 'Coastal climate hazards and urban planning: how planning responses can lead to maladaptation' (2012) *Mitigation & Adaptation Strategies for Global Change* DOI 10.1007/s11027-012-9406-2.

These arguments were raised repeatedly in the interviews conducted with local government planners for this project. Participants expressed strong support for state governments to provide clearer policy direction, including improved guidelines on how to incorporate climate change hazard information into decision-making processes so as to circumscribe the discretion of local decision-makers.[230] These perspectives highlight the important role played by codes and guidelines within the regulatory framework. In a bushfire context particularly, there is a clear trend towards mapping and more prescriptive codification of certain standards and conditions relating to the siting of dwellings, defendable space, and building standards. For example, recent reforms to the Victorian planning provisions have introduced highly prescriptive requirements for these parameters.[231] This development was driven by the perceived failure of the previous regulatory framework (which was characterised by less prescriptive, broad discretionary guidelines) to prevent development in areas affected by the 2009 fires.[232]

Notwithstanding the support for greater state government direction, there will be situations where standard rules and conditions require tailoring to respond to local conditions. An example of an instrument that balances these competing demands is the Bushfire Management Overlay in Victoria, which sets clear, prescriptive guidance on standards and conditions but also allows for the development of local schedules to the overlay that can tighten or weaken the regulatory controls to respond to local circumstances.[233]

5.3.2.2 Quality down-scaled local data

One of the main challenges associated with the use of spatial-based regulatory instruments is accessing relevant down-scaled, local data on climate hazards. In many jurisdictions, state governments have prepared broad-scale hazard mapping, however, for this to be embedded in planning schemes, further work at a local scale is often required. This task is often left to local government, sometimes even development proponents (see the South Australian example, Box 15 below). Requiring local government to take the lead in generating local hazard mapping can be wasteful and lead to inconsistencies in methods and data outputs. Once information has been incorporated into hazard mapping for the purposes of zones or overlays, it is assumed to be more accurate than may in fact be the case, leading in turn to concerns about liability for inaccuracies.[234] Cost savings can be realised by centralising the generation of this information. Local governments can also struggle to find the resources to undertake sufficiently detailed mapping to support policy development. Due to the limited availability of resources, data and expertise, there is a strong case for this task to be performed by a Federal Government agency like the Bureau of Meteorology, CSIRO or Geosciences Australia. Failing that, to promote consistency and comparability, state government agencies and local government should be given clear guidance on roles, responsibilities, methods and outputs in hazard mapping.

[230] These issues are discussed further at 5.2.
[231] See further discussion in Appendix A, Part 1.8.2.2.
[232] Teague B, McLeod R and Pascoe S, *2009 Victorian Bushfires Royal Commission: Final Report* (Victorian Government, 2010).
[233] Victorian DPCD, *Victoria Planning Provisions* cl 44.06-3.
[234] Email from local planner, 12 November 2012, on file with authors.

Box 15. South Australian coastal planning – Port Adelaide Enfield Council

South Australia has been an innovator in devising planning responses to coastal climate hazards and has had a state-level policy in place (including sea level rise planning benchmarks) since 1991. This policy has been translated to objectives and principles of development control, which are now included in all local development plans in coastal areas, including the Port Adelaide Enfield local government area. One of the standard objectives is: "development must be able to accommodate anticipated changes in sea level due to natural subsidence and probable climate change during the first 100 years of the development".[235] The standard principles of development control include a number of prescriptive standards in relation to site levels, floor levels and erosion buffers which require consideration of potential sea level rise impacts. For example, commercial, industrial, tourism or residential development, and associated roads and parking areas should be protected from sea level rise by ensuring that site levels are at least 0.3 m above the standard sea-flood risk level (defined as the 1 in 100 year average return interval flood extreme sea level); building floor levels are at least 0.55 m above the standard sea-flood risk level; and there are practical measures available to protect the development against a further sea level rise of 0.7 m above the minimum site level required.[236] The Development Plan also provides that development should be set back a sufficient distance from the coast to provide an erosion buffer which will allow for at least 100 years of coastal retreat for single buildings or small scale developments, or 200 years of coastal retreat for large scale developments.[237]

Despite being the first jurisdiction to introduce a comprehensive policy on planning for sea level rise, there is still no state-level mapping of coastal hazard areas against the sea level rise planning benchmarks in South Australia to assist planning practitioners to apply the development controls. There is also no clear direction on whether this information should be provided by local government, state government, or private developers. The lack of sufficiently detailed sea level rise mapping has been raised as a critical issue for local planning authorities, such as the Port Adelaide Enfield Council. In practice, this gap is partly filled in the South Australian context by a state referral agency, the Coast Protection Board, which plays an active role in providing expert advice on coastal development in many instances (see further discussion at 6.1.4.1). Current projects as part of the Climate Change Adaptation Framework under the *Climate Change and Greenhouse Emissions Reduction Act 2007* (SA) will also generate important data.

5.3.2.3 Information costs and inertia

While local, spatially-explicit hazard data can provide insights into hazard vulnerabilities and provide a basis for the design and implementation of regulatory instruments, generating and accessing this information is costly. As noted above, some government agencies have few resources to devote to this task. Before expending resources on generating and collating these data, policy makers should evaluate whether its benefits justify the cost.

Since the mid-2000s, many state and local governments have invested large amounts in detailed spatial modelling to help in devising policy responses to climate hazards. An outstanding research question is whether the generation of this data has improved decision making and whether the benefits associated with spatial hazard mapping could be realised at lower cost. The depth of the uncertainties associated with climate change raise issues about the value of investing large amounts of scarce public resources in mapping that is incapable of capturing the full profile of climate hazards.

A related issue that has arisen in practice is the potential for the absence of spatially-explicit hazard data to serve as an obstacle to reform. A norm requiring detailed hazard

[235] SA Department of Planning, Transport and Infrastructure, *Port Adelaide Enfield Council Development Plan* (2012) 27.
[236] SA Department of Planning, Transport and Infrastructure, *Port Adelaide Enfield Council Development Plan* (2012) 29.
[237] SA Department of Planning, Transport and Infrastructure, *Port Adelaide Enfield Council Development Plan* (2012) 30.

mapping as a precursor to policy change may develop within government agencies. While hazard mapping can serve important functions, excessive reliance on it can create inertia in policy processes, resulting in delays and a lack of responsiveness in regulatory structures. The approach to bushfire in Tasmania provides an example of regulating land use and development without relying on detailed hazard mapping (Box 16).

Box 16. Bushfire Hazard Mapping — Tasmania

Following a 2010 *Review of Construction and Development Control in Bushfire Prone Areas*,[238] the Tasmania Government introduced a *Bushfire-Prone Areas Code*[239] in September 2012, which requires a permit to be obtained for all development (subdivision and construction of habitable buildings) and hazardous or vulnerable uses on bushfire-prone land.[240] Bushfire-prone land is defined to cover land that is within the boundary of a bushfire-prone area shown on an overlay on a planning scheme map or any land that is within 100m of an area of bushfire-prone vegetation equal to or greater than 1 hectare.[241] The 2010 Review recommended that the state undertake statewide mapping of bushfire prone areas, based on that definition. However, the Tasmanian Government has not mapped these areas because the high levels of vegetation cover across the state would mean that most areas would be mapped as bushfire prone. Moreover, vegetation clearance on public or private land will affect the accuracy of mapping. Accordingly, it is up to individual authorities to prepare bushfire overlays should they wish to do so, or to leave the determination of bushfire-prone land to site by-site assessment.[242] Yet, similar to the example of Port Enfield Council in Box 15, some Tasmanian local governments have expressed concern about the lack of available data to apply the new development controls and the concern that definition-based approaches involve subjective judgments about the type and size of vegetation that requires the 100m buffer. Some would prefer the state government to prepare a mapped overlay similar to the Bushfire Management Overlay that applies in Victoria.[243] As one informant noted:

> …when we rely on a definition (and no map) whether or not a property is or is not bushfire prone needs to be assessed at the time of enquiry and may be different from one day to the next (i.e. following the removal of nearby vegetation). This is problematic because it requires an assessment each and every time we need to classify the property, this leads to uncertainty and the added likelihood of mistakes (often based on outdated information such as aerial photography). However the advantage is that this approach is dynamic and enables the classification to reflect the actual level of risk any given time. Conversely, a map (based on the definition) is static and unable to reflect on ground bushfire risk as vegetation levels vary. Notwithstanding this a map provides a very high level of statutory certainty (either it's in or it's out) and the assessment does not vary between officers.[244]

5.3.2.4 Deterministic responses and false sense of security

A downside of spatially-based mapping and regulatory instruments is that, like point estimates of sea level rise, it can lull public and private decision makers into believing they represent the full extent of the threat posed by the hazard. Deterministic responses may then be devised without appropriate consideration of the relevant uncertainties, leading to both under- and over-reactions. For example, with bushfire mapping, decision makers outside identified bushfire-prone areas may not give adequate consideration of the risks to their properties. Conversely, those within bushfire-prone areas may overreact, believing the threat is immediate. As discussed in

[238] Tasmanian Government, Office of Security and Emergency Management, Department of Premier and Cabinet, *Review of Construction and Development Control in Bushfire Prone Areas* (2010).
[239] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (Tasmanian Government, 2012).
[240] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (Tasmanian Government, 2012) E1.2.
[241] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (Tasmanian Government, 2012) E1.3.1.
[242] Interview with Tasmanian State Government Officer, personal comments, 13 September 2012.
[243] Research interviews with local planners, July - September 2012; and stakeholder feedback from local planners (Tasmanian bushfire-prone areas) at the 'Limp, Leap or Learn? Project Symposium', Melbourne, 25 October 2012.
[244] Email from local planner, 5 November 2012, on file with authors.

5.1.1 in the context of framing instruments, where spatial hazard mapping and spatial-based instruments are used, the data should be presented in a way that emphasises the extent of uncertainty and encourages robust responses.

Monitoring and enforcing compliance

The false sense of security created by deterministic decision-making is exacerbated by the absence of low levels of monitoring and enforcement of compliance. The fixed regulatory response to climate hazards that dominates current practice relies heavily on the use of approval conditions to manage risks associated with allowing development in hazard-prone areas. For example, in a bushfire context, conditions on development approval typically include requirements to maintain defendable space and adequate access to the property and water supply for emergency services. Maintaining these measures over time is a critical factor in bushfire hazard mitigation. Despite this, there is strong anecdotal evidence that monitoring of, and compliance with, bushfire management conditions is low in many, if not most, jurisdictions.[245]

One strategy being used to address this issue in Victoria is to give consideration to maintenance and compliance issues in the development assessment process. For example, the Victorian Planning Provisions require a decision maker to consider ongoing maintenance requirements in their decision to approve a particular development[246] and express a preference that defendable space be achieved on land owned by the proponent rather than neighbouring land where maintenance cannot be controlled.[247] Another approach used is to require proponents to enter into agreements on title that mandate that current and future owners maintain the bushfire mitigation measures.[248]

These approaches are unlikely to overcome monitoring problems or significantly reduce the risk of non-compliance. Local governments are particularly concerned about their lack of resources to monitor compliance and enforce mitigation conditions.[249] If governments want to rely on mitigation conditions that require ongoing maintenance and management of buildings and vegetation, additional resources are likely to be necessary to ensure their effectiveness. These resources should be targeted to high risk areas, where the maintenance of conditions on individual developments is likely to contribute to overall hazard mitigation goals. In the absence of sufficient resources for monitoring and enforcement, care should be taken to avoid excessive reliance on maintenance conditions as a way of justifying the approval of development in areas of high risk.

An additional concern that has arisen in practice in the context of new developments within existing settlements is that, in some cases, bushfire risks have been managed primarily through mitigation and maintenance conditions, even though neighbouring properties have not been subject to the same requirements. It is questionable whether this type of approach will be effective in mitigating bushfire risks.[250] Similar issues have arisen in relation to coastal climate hazards, where redevelopments in existing settlements have been subject to elevated floor level conditions. This type of incremental strategy can provide a disincentive to redevelopment and fail to adequately

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[245] Research interviews conducted by the authors, bushfire planning officers, local government (all jurisdictions) March – August 2012.

[246] DPCD, *Victoria Planning Provisions* cl 52.47-5.

[247] DPCD, *Victoria Planning Provisions* cl 52.47-9; in Tasmania, the Southern Regional Land Use Strategy contains a specific commitment to developing enhanced monitoring and compliance in respect of bushfire management provisions.

[248] DPCD, *Victoria Planning Provisions* cl 44.06-4.

[249] Research interviews conducted by the authors, bushfire planning officers, local government (Victoria) March - June 2012.

[250] Research interviews conducted by the authors, bushfire planning officers, state and local government (Victoria) March - June 2012.

deal with the threats to the broader community. It can also lead to planning conflicts and disputes about the amenity impacts of higher buildings.[251]

Non-spatial regulation

Non-spatial regulatory measures can play an important role in the management of climate hazards. Two of the most significant types of these measures in the current context are those regulating the clearing of native vegetation and construction of coastal protection works. In both cases, there is the potential for conflict between the interests of private landholders and those of society. Landholders will often seek to clear vegetation to reduce bushfire risks and, in doing so, impose costs on society in the form of increased greenhouse gas emissions and lost biodiversity and amenity. Similarly, private landholders faced with coastal hazards often seek to construct seawalls and groynes to protect their property, which can cause additional erosion, beach loss and other adverse environmental impacts. The weighing of these competing interests is a contentious issue for planning agencies.

Generally, in all Australian jurisdictions, the clearing of native vegetation is subject to planning and environmental regulations. Exemptions are then provided for particular types of vegetation removal, including clearing necessary for managing bushfire risks. Victoria has a particularly broad exemption for native vegetation clearing, which could lead to considerable adverse environmental outcomes (Box 17).

Box 17. Victoria – clearing vegetation around existing dwellings to manage bushfire risk

Across Victoria, in all areas mapped under the Bushfire Management Overlay, landholders are exempt from the need to obtain a permit for the removal, destruction or lopping of any vegetation within 10 m of an existing building used for accommodation, and the removal, destruction or lopping of any vegetation except trees within 50 m of an existing building used for accommodation (10:50 rule). In areas not mapped under the overlay, the area in which any vegetation except trees (understorey vegetation) can be removed is within 30 m of an existing building used for accommodation (10:30 rule). [252] There is considerable concern among some local councils in the urban fringe area around Melbourne, that if landholders take up the option of clearing vegetation as permitted by these exemptions, this could result in significant losses of biodiversity. These provisions, introduced in the wake of the 2009 fires, clearly prioritise bushfire hazard mitigation over native vegetation conservation and other related considerations. Yet their very broad application (even in areas not mapped under the Overlay as high bushfire risk) raises questions about whether the associated risk of biodiversity loss can be justified in the context of relatively low bushfire risk. There appears to be limited capacity within relevant government agencies to monitor the uptake and associated implications of these measures.

Similar to the native vegetation case, works associated with coastal protection (such as beach nourishment and sea walls) generally require development approval.[253] In many coastal areas around Australia, applications for these works, and the regulatory frameworks in which they are assessed, are highly contested.[254] Reflecting these tensions, over the past five years, pressure from landholder groups has led to

[251] For example, there have even been cases of developments being subject to elevated floor level requirements that have then been rejected on the basis of breaches of height restrictions, see *Findlay v Surf Coast Shire Council* [2011] VCAT 1919.

[252] DPCD, *Victoria Planning Provisions* cl 52.48-1.

[253] Some of the relevant provisions are discussed in Appendix A.

[254] Protection of private property via coastal protection works intersects with complex issues of property law. Detailed consideration of these issues is beyond the scope of this report. For further discussion, see Corkill J, 'Principles and Problems of Shoreline Law' (Presentation to the 10th National Coast to Coast Conference, *Living on the Edge*, Brisbane, 18-21 September 2012); Corkill J, 'Claimed Property Right does not hold water' *Australian Law Journal* (accepted for publication 2012).

legislative changes in some jurisdictions to reduce the regulatory obstacles to the construction of these works. NSW has seen the most controversial changes. Amendments to the *Coastal Protection Act 1995* (NSW) in 2010 allowed landholders to undertake emergency works provided they were certified by the local council or the Director-General; were carried out and maintained in accordance with any applicable provisions of a Coastal Zone Management Plan; and only remained in place for a maximum period of 12 months, after which they must be removed or approved as a permanent structure under Part 4 of the *Environmental Planning and Assessment Act 1979* (NSW).[255] The *Coastal Protection Amendment Act 2012* (NSW) introduced further changes to allow private property owners to undertake such temporary coastal protection works on their land without the requirement to obtain a certificate or development consent, and such works can now remain in place for 2 years.

The New South Wales regime and other similar regulatory processes based on project-level assessment and approval of coastal protection works are incapable of managing cumulative impacts and undermine the capacity for planning agencies to adopt strategic responses to coastal hazards. The use of strategic planning and assessment processes can provide a way of addressing cumulative impacts and capturing the benefits of collective responses, while also minimising the transaction costs faced by landholders seeking approval for coastal works. These considerations have played in a significant role in recently-completed Tasmanian Coastal Adaptation Pathways Project (Box 18).[256]

Box 18. Coastal Adaptation Planning – Tasmanian Climate Adaptation Pathways Project

Approaches to coastal management differ considerably depending on land tenure and management arrangements. Even within a discreet local government area, there can be a diversity of approaches and inconsistencies. For example, in the community of Lauderdale, within the Clarence local government area in Tasmania, part of the foreshore to the high water mark is owned by the Crown and managed by Crown Land Services; part is owned and managed by Council; and part is owned by private landowners to the high water mark. There is a significant difference between these different tenures in their approach to coastal management. The Council has provided some restoration works to protect private properties from coastal erosion in the form of sand to reinforce and raise dunes following storm events. However, it has made it clear that they are providing short-term protection only and not committing to long-term maintenance of the works. In contrast, no obvious works have been undertaken along the stretch of foreshore managed by Crown Land Services following recent storm events, putting private properties along this foreshore at increasing risk from erosion. The disparity of coastal protection works in different parts of Lauderdale has raised considerable community concern.[257]

In a recent discussion paper produced for the Tasmanian Coastal Adaptation Pathways Project, governance and funding models for coastal adaptation are proposed. Particular emphasis is placed on the need for planning and approval processes to avoid site-by-site assessment, consider the protection of wider community interests in the affected land (beyond directly affected private property), and coordinate responses between diverse landholders and managers to ensure effective and efficient outcomes.[258]

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[255] *Coastal Protection and Other Legislation Amendment Act 2010* (NSW).

[256] SGS Economics, *Models for Funding and Decision-making for Coastal Adaptation Pathways* (Tasmanian Coastal Adaptation Decision Pathways Project) (Local Government Association of Tasmania, 2012).

[257] SGS Economics, *Models for Funding and Decision-making for Coastal Adaptation Pathways* (Tasmanian Coastal Adaptation Decision Pathways Project) (Local Government Association of Tasmania, 2012) 22.

[258] SGS Economics, *Models for Funding and Decision-making for Coastal Adaptation Pathways* (Tasmanian Coastal Adaptation Decision Pathways Project) (Local Government Association of Tasmania, 2012) 22-28.

5.4 Compulsory acquisition instruments

The compulsory acquisition of hazard-prone land is an option that has been employed very sparingly in Australia to date.[259] As the discussion in section 4.4 illustrated, governments may have broad legal powers to compulsorily acquire land, however in practice, prevailing social, political and legal norms mean that the resumption of land for public purposes is generally only carried out with compensation, and this is the subject of a statutory guarantee in all jurisdictions.

Compulsory acquisition is a controversial and potentially costly option, and there are a range of legitimate questions about the role that these instruments may play in climate change adaptation, including when an investment of public funds will be justified and who should pay.

5.4.1 Justifying public investment

Following the 'beneficiary pays' logic, the use of public funds to compulsorily acquire property is only justified when it will generate public benefits. If this is accepted, acquisition must be seen not only to directly benefit private landholders in the hazard-prone area but also achieve some broader public policy purpose. Further, the investment by government should be in proportion to the public benefits.

The public benefit derived from compulsory acquisition could be an improvement in the allocation of environmental resources (i.e. efficiency). For example, where there are high value coastal ecosystems (such as mangroves) and a desire to facilitate their landward migration as sea levels rise, compulsory acquisition of properties that would impede this migration may be justified. Compulsory acquisition may also be warranted on equity grounds, for example to assist lower socio-economic groups whose property is threatened by climate hazards. In such situations, the designation of 'acquisition land', along the lines of the approach used by the Queensland Reconstruction Authority (see 4.4.2), may be preferable because it allows continued occupation of the land until the owner is ready to sell.

Who pays?

The question of who should, and how to, fund compulsory acquisition schemes can raise contentious issues, including:

- whether people who have chosen to live in low risk areas should be required to buyout those who have assumed the risk of living in high risk areas;
- whether the choice of financing structure can exacerbate moral hazard problems; and
- what level of government can and should finance compulsory acquisition programs.

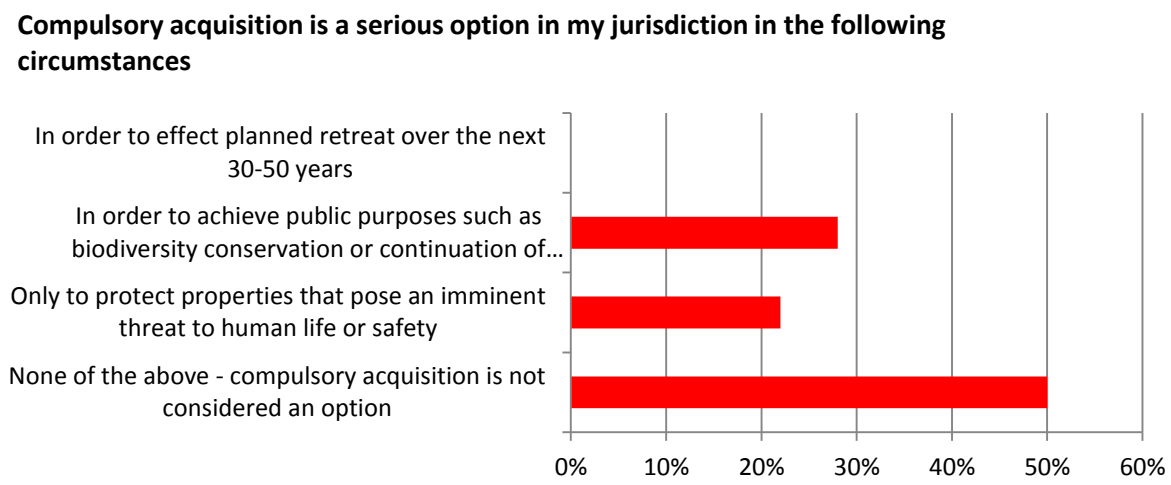
The question of who funds acquisition programs is an issue of particular concern for local government. Due to fiscal imbalances, local government may be in a position to identify areas appropriate for compulsory acquisition but it often does not have the revenue base to purchase the land. Due to this, most acquisition programs are likely to require state and/or federal government involvement.

The contentious nature of compulsory acquisition instruments and concerns about financing were reflected in the opinions of planning practitioners at the symposium. When asked about the role of compulsory acquisition, 50% said it was not considered an option and a further 22% said it was only likely to be a serious option when there was an imminent threat to human life or safety (Figure 7). While the results are not

[259] One recent example is the program of designation of acquisition land following the Queensland Floods of 2011. See further discussion at 4.4.

representative and further work is warranted to clarify opinions, they are illustrative of the difficulties associated with the utilisation of these instruments.

Figure 7. Symposium participants' perspectives on compulsory acquisition

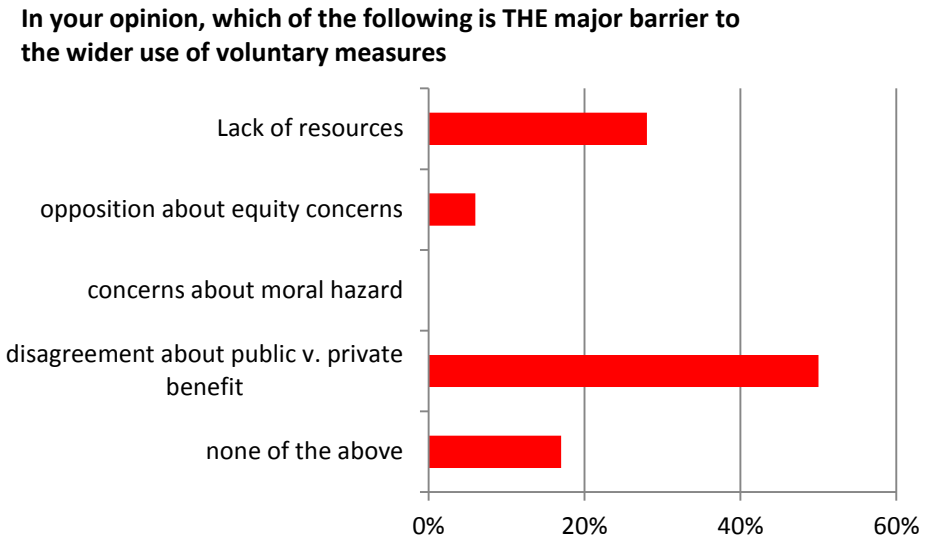


5.5 Voluntary instruments

Voluntary instruments can be designed to achieve the same outcomes as those that mandate compliance and participation (e.g. regulatory and compulsory acquisition instruments). Their principal advantage over these instruments is that they typically attract less opposition and, as a consequence, the political costs associated with their use are lower. This is one of the main reasons for their widespread use in environment policy - polluters object less when someone else is paying. The difficulty with voluntary instruments is that they can involve significant direct financial cost to government. The resulting budgetary pressures can be an obstacle to their use. An additional complication associated with voluntary instruments is that, like compulsory acquisition instruments, they can easily be misdirected and generate private rather than public benefits. Ideally, all voluntary instruments should be designed so that investments by government are proportional to the associated public benefits.

From the interviews conducted for the purposes of this study, it appears that budgetary issues and concerns about capturing public rather than private benefits have been significant barriers to the use of voluntary instruments in Australian planning processes. This was also evident in the feedback from planning practitioners at the symposium. When asked to identify the single most significant barrier to the wider use of voluntary instruments, 50% nominated 'disagreement about public versus private benefits' and a further 28% selected 'lack of resources' (Figure 8). Similarly, when asked about the circumstances in which governments should fund schemes to help people to move away from hazard-prone areas, 17% said that government should never fund these schemes and a further 44% said that the beneficiaries of such schemes should be confined to those without the means to help themselves. Again, these results highlight the contentious nature of the policy decisions associated with the use of voluntary instruments.

Figure 8. Symposium participants' perspectives on voluntary measures



One of the most notable issues that arose in our investigation of voluntary instruments is the lack of empirical work on their use and effectiveness. The limited and problematic use of transferable development rights in an Australian context has been noted at 4.5. Similarly, minimal information was available on the design and deployment of financial inducements. Several examples of buybacks and land swaps were identified (see discussion in section 4.5), however, there was a lack of information on the outcomes of these programs and their cost-effectiveness in achieving desired public benefits. Further research is warranted in this area to assist in the future design of policy responses to climate hazards.

5.6 Taxes and charges

5.6.1 Taxes

As discussed in section 4.6, adaptation-related taxes can be used to prompt changes in land use and development patterns through the use of price signals; and raise funds to finance preparations for, and responses to, climate hazards.

5.6.1.1 Taxes to prompt land use change

Taxes have long been seen as an efficient and equitable means of addressing a number of public policy issues. Most analyses to date have focussed on the potential for addressing environmental pollution.[260] Given that there are no known examples in Australia of taxes being used to provide incentives to landholders to alter land use patterns in response to bushfire and coastal hazards, the pros and cons of environmental taxes more generally are considered here. From a theoretical perspective, pollution taxes force polluters to internalise the externalities (spill-over costs) associated with their activities and, in doing so, can lead to a more efficient allocation of resources. These theoretical benefits, however, only arise if: the tax rate is set at a level that reflects the social cost of pollution; there are minimal transaction costs and perfect competition; and if polluters react rationally to the price signals. While the assumptions on which the theory rests are rarely satisfied, the real obstacles to effective pollution taxes in practice are usually political in nature.[261] Governments are

[260] Piguo A, *The Economics of Welfare* (Macmillan, 1920); Kolstad C, *Environmental Economics* (Oxford University Press, 1999).
[261] Olson M, *The Logic of Collective Action: Public Goods and the Theory of Groups* (Harvard University Press, 1965); Buchanan J and Tullock G, 'Polluters' profits and political response: direct controls versus

often reluctant to impose taxes on incumbent industries due to fears of lost industry competitiveness and employment that could trigger an electoral backlash. Closely related to this is the power of polluter lobby groups over political processes. Put simply, high tax rates are usually opposed by polluters, and governments respond by lowering the rate or providing exemptions to specific polluters. Another factor that can distort the design of pollution taxes is revenue objectives; rather than seeking to set the tax rate at a level that reflects the social cost of pollution, governments may design the tax to maximise revenues.[262] The process of setting appropriate pollution taxes is further complicated by the fact that there is no widely agreed method of calculating the social cost of pollution. Contingent valuation methods can be used but their validity is challenged by many within and outside the economic profession.

Any proposal to use taxes to prompt land use change to deal with climate hazards is likely to face the same difficulties. There is no agreed method of devising the appropriate tax rate; the proposals will face political opposition from affected landholders, property developers and other related groups; and governments will be tempted to distort the design of the tax to achieve other objectives, particularly revenue raising. The large numbers and concentrated nature of those affected by the tax is likely to magnify the political obstacles to their use. For example, if a tax were proposed to encourage people to move away from areas threatened by coastal hazards, the fact that the affected landholders are concentrated in close proximity to one another would make it easier for them to mount a campaign against the tax. The contentious nature of hazard taxes was evident in the project symposium: when asked whether landholders in hazard-prone areas should be subject to a hazard tax, 44% of the participants said yes, 33% said no and the remaining 22% were unsure (figure 9). A further problem for policy makers is that most landholders are likely to be relatively unresponsive to taxes (i.e. low price elasticity), meaning tax rates would have to be set relatively high to trigger significant changes in land use. For these reasons, taxes will usually be best used as a complementary measure: by combining 'realistic' taxes with other instruments, the desired policy objectives could be achieved.

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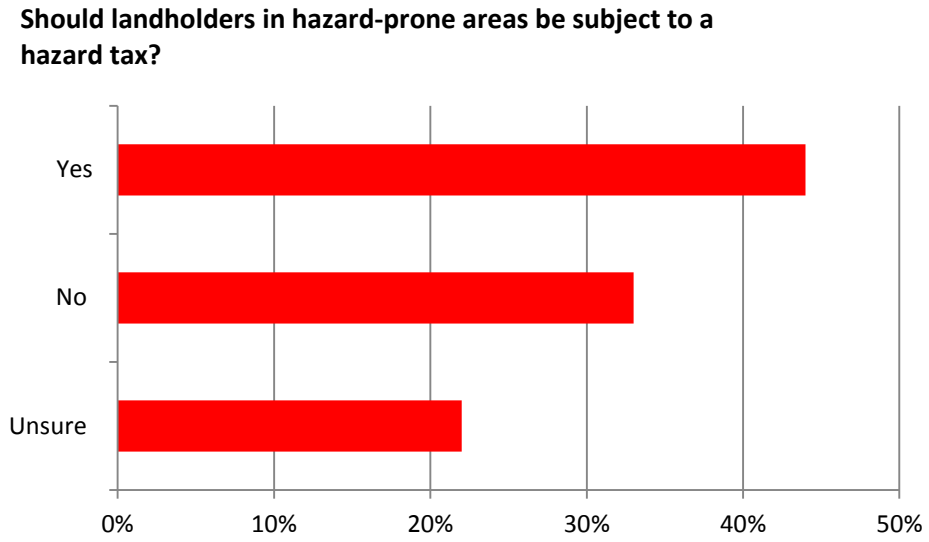
taxes' (1975) 65 *American Economic Review* 139; Svendsen G, *Public choice and environmental regulation: tradable permit systems in the United States and CO_2 taxation in Europe* (Edward Elgar, 1998); Weck-Hannemann, 'Environmental Politics' in Rowley C and Schneider F (eds), *The Encyclopaedia of Public Choice* (Kluwer Academic Publishers, 2004); Markussen P and Svendsen G, 'Industrial lobbying and the political economy of GHG trade in the European Union' (2005) 33(2) *Energy Policy* 245.

[262] Ciocirlan C and Yandle B, 'The Political Economy of Green Taxation in OECD Countries' (2003) 15(3) *European Journal of Law and Economics* 203.

Figure 9. Symposium participants' perspectives on hazard taxes



Before any new tax is introduced, a source of power for the tax must be identified. Many planning agencies, including local governments, are unlikely to have the statutory power to introduce taxes that are designed exclusively to prompt changes in land use. New legislation or legislative amendments will usually be required to facilitate the introduction of these types of taxes.

5.6.1.2 Taxes as a means of financing adaptation responses

One of the most pressing issues for planning agencies that are trying to deal with climate hazards is a lack of resources to fund policy implementation. Acute resourcing issues can also arise in the aftermath of natural disasters, as governments seek funds to finance recovery efforts. Introducing new taxes, or raising existing ones, are obvious solutions to these problems. The main benefits of taxes are that:

- unlike debt, they do not need to be repaid;
- unlike spending cuts, they do not result in a reduction in other government services; and
- unlike charges, they spread costs across the community.

The downsides of 'adaptation taxes' are that they can slow economic growth and result in an inequitable redistribution of income and wealth; why should people who are not affected by hazards be forced to fund efforts to help those who choose to live in hazard-prone areas? Taxes of this nature can also be politically difficult to introduce (the debate surrounding the Australian Government's temporary flood reconstruction levy is an example), are vulnerable to manipulation for alternative purposes, and, as with taxes to prompt land use change, planning agencies may not have the legal power to impose them unilaterally.

One way to reduce the difficulties associated with the introduction of adaptation taxes is to impose a minimal tax over an extended period. This has particular application to coastal climate hazards, where significant impacts are only likely to materialise in the medium-to-long term. The chronic, long-term nature of the threat provides policy makers with time to gradually raise revenues for response. For example, a climate adaptation tax of, say, $2000p.a. could be imposed on properties that could be threatened by coastal climate hazards in the future. The tax would serve the dual purpose of raising revenues for responses and encouraging land use change. In 50 years, the tax revenues from a single property would exceed $300,000 (real dollars),

assuming they were compounded at a 4% real interest rate each year. This approach is similar to a compulsory government insurance scheme operated at the state level: landholders whose land may be affected are required to pay an annual premium (the tax), the resources are pooled in a 'contingency fund', and the fund is then used to finance response measures (e.g. property buyouts, relocations and seawalls) when needed. Although offering advantages over other tax structures, this type of scheme is still likely to face opposition and governments and government agencies would still be tempted to use the funds for other purposes.[263] The scheme could also reduce the incentive for landholders to engage in private adaptation by creating the perception that the government will act as the 'insurer of last resort' if the coastal climate hazards materialise.

5.6.2 Charges

While reasonably common, particularly in a coastal context, there is considerable variation in the way charges are applied. In some cases, the beneficiaries of public services and structures (e.g. defensive seawalls) are subject to charges, in others they are not. In relation to coastal structures, the failure to impose charges on the beneficiaries is often attributable to historical circumstance. Charges were not widely used when many structures were first built and, as a result, it has become accepted practice that the costs of maintaining the structures will be drawn from general revenues. A lack of consideration for cost-sharing measures has also been attributed to a lack of consultation and integration in local government decision-making processes, particularly the tendency for decisions in relation to infrastructure projects such as sea walls to be developed in isolation from planning issues.[264]

The advantages of charges are that they ensure the costs of providing a hazard preparation or response service is borne by those who benefit from it. This is often regarded as fairer than spreading the cost across the community, particularly where the beneficiaries are a discrete group and do not suffer any significant social disadvantage that might affect their capacity to move away from the hazard. Imposing charges on the beneficiaries of hazard preparation and response services also sends a price signal to the community that can trigger desired land use and behavioural changes.

Despite their theoretical appeal, charges can be politically difficult to implement and enforce, especially in relation to existing structures and services.[265] Governments and planning agencies also need to weigh the merits of charges against other considerations, including the capacity of the affected community to pay the charge without causing undue hardship (i.e. for pensioners and the unemployed).[266] Another important factor in the design and implementation of charges is transaction costs: policy makers should ensure that the costs of administering and complying with the scheme are kept to a minimum and are proportionate to the revenues raised.

5.7 Liability shield instruments

Local government concern about potential exposure to legal liability for planning decisions involving climate change considerations continues to be reported as a

[263] Schwarze R and Wagner G, 'The political economy of natural disaster insurance: lessons from the failure of a proposed compulsory insurance scheme in Germany' (2007) 17 *European Environment* 403.

[264] Research interviews conducted by the authors, coastal planning officers, local government (all jurisdictions) March – August 2012.

[265] For example, there are legal restrictions on the capacity of local governments in some jurisdictions to impose charges for existing structures.

[266] Special charge schemes, such as those under the *Local Government Act 1989* (Vic) Part 8 can generally be paid in instalments over a long period. If people cannot (or do not) pay, and the house is their principal place of residence, the charge effectively becomes a charge against the property which is only recouped when the house is sold. This may mean that the scheme does not realise sufficient funds in a timely fashion to support adaptation initiatives.

significant factor shaping local government decision-making in this area, especially in relation to coastal hazards.[267] These concerns can lead to planning agencies adopting overly precautionary responses and/or devising strategies to minimise future liability exposure using site-specific indemnities, regulatory instruments (e.g. agreements on title) and information instruments (e.g. warning statements and risk acknowledgements issued to landholders), all of which can increase transaction costs. Weighing against liability concerns are the political pressures supporting new and continued development in areas susceptible to climate hazards and the threat that planning agencies will be forced to expend resources on defending planning decisions in appeal processes. Legal liability is often viewed as a long-term concern, and, for many local governments, the more immediate threat of planning appeals can be an equally, if not stronger, influence on decision-making, and favour a less precautionary approach.[268]

As noted above, clear and unequivocal framing instruments supported by detailed and prescriptive codes and guidelines can play an important role in strengthening the position of state and local government in respect of planning decisions concerning climate hazards, and thereby reduce conflict and planning appeals. However, these measures will not eliminate legal risks to planning agencies. Two main options to address both the real and the perceived risk of potential exposure to liability were noted in 4.7: requiring indemnity from developers for particular developments; and introducing a statutory exemption from liability.

5.7.1 Indemnity from Developers

There has been some interest in the use of developer indemnities as a way of managing liability risks, particularly in identified hazard zones in existing urban areas, where the general policy direction is to allow some intensification of development in line with certain risk protection standards. However, uncertainties remain as to whether these indemnities will perform their intended function. As noted above, the main deficiency associated with developer indemnities is that the developers may not exist at the time the liability arises or have sufficient resources to cover the associated costs. Questions have also been raised about the enforceability of these indemnities.

The example of Clarence City Council (see Box 19) suggests that specific provision for the use of these mechanisms may be required in state planning legislation to ensure that, should councils choose to impose such measures, they will be upheld. This could be achieved by making such a condition permissible at the discretion of the local authority. Further, although each case will differ according to the particular conditions of the site and development in question, it may be beneficial for state governments to develop guidelines on when such a condition may be appropriate, and the recommended model terms of such provisions.

[267] Research interviews conducted by the authors, local government planning officers (all jurisdictions) March - August 2012.
[268] Research interviews conducted by the authors, local government planning officers (all jurisdictions) March - August 2012.

Box 19. Clarence City Council – Use of Developer Indemnities

Clarence City Council in Tasmania made specific provision for the use of liability waivers in its 2007 planning scheme. Under the Sea Level Rise and Storm Surge Overlay, a specific decision requirement provided that "Council and other relevant bodies should be indemnified against future actions arising from the effect of sea level rise and storm surge activity where necessary".[269]

The one and only time that council attempted to implement an indemnity waiver in relation to a particular development was struck down by the Tasmanian Planning Appeals Tribunal. The condition in question was drafted in the following terms:

> That the landowner must enter into an agreement in a registrable form with the Council, either under Part 5 of the *Land Use Planning and Approvals Act 1993*, or equivalent mechanism to the satisfaction of [the] Council's General Manager Integrated Assessment which provides for: Indemnification of [the] Council against future actions arising from the effects of sea level rise and storm surge activity which may impact on the development.

The Tribunal determined that the condition was not imposed for a proper planning purpose but was imposed for a purpose "ulterior to planning, i.e. to provide the authority with protection from some anticipated legal difficulties at some undefined place and time in the future".[270] The Tribunal's decision was not appealed, so the validity of its reasoning has not been tested. However, the requirement has not been imposed again and the capacity to impose such a condition has not been included in the 2012 Amendments to the Clarence Planning Scheme.

5.7.2 Statutory exemption from liability

The statutory exemption from liability in New South Wales[271] noted in 4.7 is widely supported by practitioners in all Australian jurisdictions.[272] As one informant put it, 'all States should do what NSW has done.'[273] The New South Wales exemption provides broad protection from common law liability in negligence, nuisance or other claims in relation to actions taken and decisions made in respect of land subject to flooding, bushfire and coastal hazard risks, *provided* that local government can demonstrate compliance with the relevant manual, guideline or code of practice or otherwise demonstrate good faith. This exemption applies to both development approvals and actions relating to protective or other measures.

The application of the New South Wales exemption has been considered judicially in several cases.[274] These cases demonstrate that the scope of the exemption is broad, consistent with its objective of protecting local authorities so as to prevent over-cautious and costly responses. Typically, to fall outside of the exemption, the relevant action or inaction by the local authority will have to amount to 'something more than negligence'.[275] This could include misrepresentations, refusal to abate a nuisance, or a wanton lack of regard for the interests of other parties in the performance of relevant functions. Provided local authorities have given real and proper consideration to the

[269] City of Clarence, 'Sea Level Rise and Storm Surge Overlay', *Clarence City Council Planning Scheme* (2007) 167, cl 7.4.6(b).
[270] *Smith v Clarence City Council,* RMPAT 325/08P (24 April 2009).
[271] *Local Government Act 1993* (NSW) s 733.
[272] Research interviews conducted by the authors, local government planning officers (all jurisdictions) March - August 2012.
[273] Email from local planner, 12 November 2012, on file with authors.
[274] For example, *Mid Density Developments Pty Ltd v Rockdale Municipal Council* [1993] FCA 408; *Douglas v Bogan Shire Council* (unreported, NSWCA, 10 March 1994); *Bankstown City Council v Alamdo Holdings Pty Ltd* [2005] HCA 46; *Melaleuca Estate Pty Ltd v Port Stephen Council* (2006) 143 LGERA 319.
[275] *Bankstown City Council v Alamdo Holdings Pty Ltd* [2005] HCA 46, [51].

relevant hazards, and can demonstrate that they had due regard to those that could be affected by their actions (or inaction), s 733 is likely to apply.

Despite the popularity of s 733 amongst practitioners, New South Wales is the only jurisdiction that has a broad statutory exemption of this nature. If other jurisdictions are to follow this lead, there are some important considerations to be taken into account in implementation.

5.7.2.1 Development of Hazard Manuals

A statutory exemption provision should be accompanied by the development of hazard management manuals to set parameters around what is considered to be 'acting in good faith'. The provision of such guidelines would have additional benefits for planning agencies, including improved consistency and reduced scope for planning appeals and disputes. The availability of such guidance documents will avoid arguments based on particular circumstances about whether a local government's conduct constituted good faith, and the concern that such an exemption will protect careless decision-making.

5.7.2.2 Consider how to deal with past decisions

Statutory exemptions typically only apply in respect of conduct engaged in after the commencement of the relevant statute (or statutory amendment). Retrospective exemptions are rare and can raise questions about the acquisition of property.[276] If there is a desire to provide certainty, governments should consider how to deal with future claims in respect of past decisions.

[276] *Georgiadis v Australian & Overseas Telecommunications Corporation* [1994] HCA 6.

Table 5: Considerations in Instrument Selection and Implementation

∗ denotes instruments which have multiple functions – e.g. information and regulatory

FRAMING INSTRUMENTS					
Instrument	**Key Features**	**Examples**	**Advantages**	**Challenges**	**Implementation Considerations**
Eg, Objectives clauses in planning statutes Eg, Objectives, principles and strategy clauses in state, regional and local planning policies	Set objectives and principles to guide strategic and statutory planning decision making Outline how different regulatory and non-regulatory instruments are to be used to achieve objectives Clarify roles and responsibilities for implementation	Current practice favours use of state level planning policy translated through to local planning instruments to frame planning responses Vic - State Planning Policy Framework – Clause 13 – Environmental Risks Qld – State Planning Policy for Coastal Protection 3/11 (under review); State Planning Policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide (under review) SA – *Coast Protection Board Policy Document* and corresponding standard objectives and principles in local Development Plans	Important source of overarching direction and guidance for all decision-makers within complex governance arrangements	Policy issues remain highly contested, especially: - managing uncertainty; - roles and responsibilities; and - strategies for existing development	Use state level framing instruments to: - Express clear objectives and priorities (where relevant); - Outline how these objectives should be realised; and - Clearly delineate roles and responsibilities between state and local government Ensure that high level policy statements translate through to regulatory provisions such as codes and guidelines Local level framing instruments may be better suited to providing further supporting detail and direction

Information Instruments					
Instrument	**Key Features**	**Examples**	**Advantages**	**Challenges**	**Implementation Considerations**
Planning certificates	Official statements of the planning controls (zones and overlays) that apply to a property Generally issued at the point of sale to satisfy legal requirements for the sale of land Certificates (or similar planning property reports) can be obtained upon request Can be used to provide information on hazards to prospective purchasers of hazard-prone land	Similar arrangements for issue of planning certificates at point of sale in all jurisdictions NSW - s 149 certificates (*Environmental Planning and Assessment Act 1979*) – required to include coastal hazard category (currently under review) Victoria – s 32 statements under the *Sale of Land Act 1969* (Vic) list all applicable zones and overlays, and make specific reference to mapped bushfire prone areas.	Encourage autonomous adaptation: - Direct disclosure before or at point of sale can influence decision making - Potential hazard exposure may be reflected in property value - Incentive for property owners to maintain hazard mitigation measures Manage liability exposure: - Transparent provision of information on potential hazard exposure lowers likelihood of future liability	Likely to encounter significant community resistance regarding impact on property values Liability concerns may deter use of these instruments – authorities must take care in relation to the provision of false or misleading information	Use regulations to provide clear guidance on what information to include in planning certificates Ensure that any uncertainties associated with hazard information are properly communicated Consider requiring provision of hazard information to prospective purchasers via planning certificates prior to the point of sale Consider providing opportunities for prospective purchasers to rescind contract of sale in response to the receipt of hazard information Outline clear roles and responsibilities for the provision of this information and introduce processes to monitor and encourage compliance

Agreements on Title*	Agreement between landholder and council/state government Place positive and negative covenants on land Bind prospective owners	Eg, Vic - Wellington Shire Council and Bass Coast Shire Council – require registration of coastal hazard management plans on title	Alert prospective purchasers of hazard risks associated with the property Agreements on title bind prospective owners	May encounter resistance regarding impact on property values Reliant on agreement with landholder - this may be required as a condition of development approval; however may be otherwise difficult to achieve Relate to individual properties only; difficult to achieve consistent approach	Most appropriate where active management is required to mitigate hazards in relation to a particular development Use regulations to provide clear guidance on when an agreement on title is required and what may be covered by such agreements
Notations on Title	Notify prospective purchasers of hazard profile and related development controls Not reliant on agreement with landholder	Eg, WA – proposed in *Draft State Planning Policy 2.6* (Feb 2012) to disclose information on coastal hazards Eg, NT – if a property falls within mapped storm surge area, this will be noted on the register of administrative interests in land under the *Land Title Act* (NT)	Alert prospective purchasers of hazard risks associated with the property More consistent approach than agreements on title	May encounter resistance regarding impact on property values	Consider broader use of notations on title in relation to hazard profile of land and related development controls
Zones and overlays*	Convey information on potential hazard exposure (and related regulatory	A range of approaches are used to embed spatial hazard data in planning schemes,	Provide general level information on potential hazard exposure in relation	Managing uncertainties in the representation of hazard areas	See further discussion below in the context of regulatory instruments

	requirements) to both existing and prospective residents *Alternative:* maps of hazard areas as incorporated documents within planning scheme (see below)	however the principal approach involves hazard mapping and overlays Overlays Eg, Vic – Bushfire Management Overlay	to both new and existing development Can serve as the basis for a range of regulatory and other approaches to adaptation in these areas	Availability of down-scaled local information of a quality suitable for inclusion in planning schemes	
Regulatory Instruments - fixed					
Instrument	**Key Features**	**Examples**	**Advantages**	**Challenges**	**Implementation Considerations**
Zones and Overlays*	Identify areas prone to climate change hazards and specify the planning objectives and development controls applicable to use and development in these areas *Zones* – set land use objectives and delineate compatible land uses *Overlays* – specify types of development requiring planning approval and applicable development control standards Associated	A range of approaches is used to embed spatial hazard data in planning schemes as the basis for development controls *Zones* - eg, SA – coastal zones used to trigger development assessment processes, including referral to Coast Protection Board *Overlays* - *e*g, Vic – planning permit required for subdivision, buildings and works in areas subject to the Bushfire Management Overlay eg, Qld Coastal Plan 2011 (currently under	Important tool to prohibit, limit or control the types of land use and development in areas exposed to climate hazards Allow spatial identification of hazard-prone land and associated development controls *Zones* – most suited to implementing prohibitions and restrictions on inappropriate land use in high risk areas *Overlays* – provide a	Availability and costs associated with developing down-scaled local information of a quality suitable for inclusion in planning schemes Tendency to encourage deterministic decision making (without appropriate consideration of uncertainties) Lack of policy guidance in some jurisdictions on relating climate change information to development controls, including managing uncertainties (risk based approach to land	Consider developing further policy guidance at state level on use of these spatial instruments – eg, staggering planning response according to spatial and temporal distribution of risk and the nature of development? - eg, when is it appropriate to prohibit vulnerable land uses? - eg, to what extent can hazard risks be managed via development assessment processes

	development controls may be specified in codes and guidelines Both zones and overlays can be used to trigger procedural requirements – including nominating consent and referral authorities	review) – staggers development controls according to level of coastal hazard and nature of development – to be implemented through coastal management overlays in local planning schemes	clear, unequivocal trigger for development assessment processes	use zoning)	and through the imposition of hazard mitigation conditions? Consider alternatives to investing in high quality spatial data as a prerequisite for planning response Consider further use of localised schedules to overlays (eg, Victorian Bushfire Management Overlay) to tailor development controls to local situation
Hazard mapping and management plans	Similar function to zoning and overlays Can be used to identify hazard-prone areas and impose restrictions on the use and development of land	Used as the basis for spatial development controls in NSW in a coastal and bushfire context - eg, Coastal Zone Management Planning under the *Coastal Protection Act 1979* (NSW) - eg, Bushfire Risk Management Plans under the *Rural Fires Act 1997* (NSW)	Allows planning response to climate hazards to be considered in conjunction with other policy responses (eg, emergency management planning) Management planning may involve broader range of relevant stakeholders than traditional land use planning approaches	Similar to the above	Consider broader application given potential to integrate planning and emergency management responses

Permit requirements and approval conditions	Ensure prescribed activities are subject to regulatory oversight and allow responsible authorities to impose conditions on use and development Can be used to trigger further site-specific risk assessment processes Approval conditions can be made the subject of an agreement on title to bind prospective landholders	Planning permits are generally required for vulnerable land uses in identified hazard-prone areas Approval conditions are widely employed to require hazard mitigation activities to minimise risks, particularly in a bushfire context Eg, Vic, SA, NSW, Tas - Planning permit required to construct a dwelling or other building in bushfire prone areas - Require proponents to prepare bushfire risk assessment - Planning permits used to set conditions requiring the creation and maintenance of defendable space, building design and construction standards - Some use of agreements on title to bind current and prospective owners	Important tool to allow responsible authorities to dictate the location, nature and form of use and development so as to minimise risks Agreements on title ensure prospective landholders are also bound by the conditions	Compliance and enforcement Strong anecdotal evidence of poor monitoring and compliance of permit conditions Resource constraints in local government to effectively monitor compliance and enforce approval conditions Cost-effective? - in the context of existing development: are there clear benefits for requiring new developments to implement hazard mitigation activities (eg, floor levels, defendable space) without also requiring the same of neighbouring residents?	Ensure responsible authorities consider compliance issues in development assessment phase, eg, how defendable space requirements will be maintained over time? Require proponents to enter into agreements on title binding them and future owners to maintain hazard mitigation measures Investigate other options to put the onus on landholder to monitor and report on compliance In priority areas, ensure sufficient resources for local government monitoring and enforcement Due to compliance and enforcement concerns, avoid excessive reliance on approval conditions as a way of justifying the approval of development in areas of high hazard risk

Codes and Guidelines	Decision-makers required to have regard to or comply with codes and guidelines in development assessment processes Development assessment may not be required for certain development if undertaken in accordance with specific code Contain technical or practical detail on use and development requirements	Many examples in both coastal and bushfire context *Bushfire* - trend to more prescriptive codification of standards and conditions relating to the siting of dwellings, defendable space and building standards -eg, ACT - Planning for Bushfire Risk Mitigation General Code -eg, Vic - Victoria Planning Provisions, Clause 52.47 *Coastal* – common use of codes and guidelines - eg, NSW Sea Level Rise Policy Statement and accompanying guidelines, including *NSW Coastal Planning Guideline: Adapting to Sea Level Rise*	Promote consistent decision-making Provide further substantive guidance for decision-makers and development proponents on what is considered to be an acceptable level of risk for land use and development	Overly prescriptive codes and guidelines may limit scope to tailor decisions to local circumstances Absence of compliance monitoring for code-compliant development (exempt from the need to obtain development approval)	Strong arguments for increased prescription and careful parameters around discretion for decision makers in many circumstances: - eg, lack of financial and human capacity at local government scale to devise a coherent and effective response to climate hazards - eg, broad discretionary instruments can lead to conflict and excessive planning appeals that increase transaction costs and inconsistencies in policy responses
Agreements on title*	Agreement between landholder and council/state government Place positive and negative covenants	Agreements on title used in some jurisdictions to regulate use and development, particularly in relation to hazard mitigation activities	Bind current and future landholders to carry out or not carry out certain activities to reduce hazard risks Eg, prohibitions on	May encounter resistance regarding impact on property values Reliant on agreement with landholder - this may be required as a	Consider requiring broader use of these instruments as an information and complementary regulatory tool Most appropriate where

	on land Registered on land title -bind prospective owners	Eg, Vic – bushfire - s 173 agreements under *Planning and Environment Act 1987* used to bind landowners (in a subdivision context) to maintain bushfire mitigation measures Eg, Vic – some coastal councils require landholders undertaking residential development in hazard areas to prepare climate change management plans and register these on title Eg, SA - Land Management Agreements (under the *Development Act*, s 57) have been applied to various freehold coastal shack areas - these agreements seek to acknowledge coastal hazards and put the onus for protection on the owners	the placement of structures in hazard-prone areas; or on protective measures that could cause harm to the environment or other properties Eg, require maintenance of structures or defendable space, payments to maintain hazard works, or construction of defensive measures if hazards materialise	condition of development approval; however may be otherwise difficult to achieve Relate to individual properties only; difficult to achieve consistent approach	active management is required to mitigate hazards in relation to a particular development Use regulations to provide clear guidance on when an agreement on title is required and what may be covered by such agreements
Reserves	Land set aside for public purpose (now or in future)	Some examples of reserves to establish coastal hazard	Reserves can be used in a number of contexts:	Establishment of reserves may be costly and controversial	For new development, consider incorporating reserve requirements into development

	Uses are restricted - must advance public purposes May be created via: - Planning schemes under planning legislation - National parks/conservation reserves legislation - Special purposes legislation	management buffers Eg, SA - Principles of development control for coastal zone development (all SA local development plans) require some new development (other than small scale infill development in a predominantly urban zone) to incorporate a public coastal reserve of at least 50m width in addition to development setbacks which accommodate potential impacts of sea level rise on coastal erosion Eg, Qld, *Coastal Management and Protection Act 1995* - provides for surrender of coastal land as a condition of approval for the reconfiguration of a lot within the Coastal Management District that is either within an identified erosion prone area or within 40m of the shoreline - land must	- to provide buffers between settlements and hazards - to set aside land for future hazard management actions (eg, construction of defensive structures and the movement of settlements and infrastructure) In a coastal context: - as a buffer to allow the inland migration of coastal habitats and maintain public access to beaches In a bushfire context: - to provide an area of defendable space around settlements or subdivisions, where vegetation is managed to mitigate bushfire risk	Compensation is usually payable for compulsory acquisition Investment of public funds may only be justified in some circumstances – eg, to facilitate landward migration of high value coastal ecosystems	approvals conditions (see SA and Qld examples), where no compensation is payable Complex intersecting property law issues – eg, how to maintain reserves over time in the context of sea level rise and coastal erosion (rolling easements)

		be dedicated as a reserve			
Compulsory Insurance	Require landholders to hold insurance cover against relevant hazards prior to commencing a new use or development Impose via zoning and overlay requirements, planning regulations, permit conditions or agreements on title	No known examples in a hazard management context In a different context, third party insurance (associated with motor vehicle registrations) is compulsory, and is designed to cover compensation to crash victims where the owner or driver of a registered vehicle is at fault	Ensure governments are not called upon to cover costs of private impacts Send price signal to landholder and prospective developers/purchasers via premiums and insurance refusal	The *National Disaster Insurance Review* 2011 recommended against making home and contents insurance compulsory for a number of reasons, including: - Where there are no identifiable third party impacts, it may be difficult to justify compulsory insurance - Compliance and Enforcement concerns Gaps in insurance coverage for ocean flooding – existing policies only cover riverine flooding	It may still be appropriate to consider this instrument for specific developments in high risk areas If so, specific provision through state level instruments would be required to clarify that such a requirement is considered to be a proper planning purpose Otherwise, ensure all available information on potential hazard risks is provided and the uptake of insurance is encouraged
Non-spatial regulatory restrictions	Regulations under complementary (often subject-specific) legislation, such as coastal management and vegetation management legislation	Commonly used in two contexts: To regulate coastal protection works Eg NSW – *Coastal Protection Act 1979* – coastal protection works must not limit public beach access or pose a public safety	Can be used to encourage hazard management activities or limit associated externalities Eg, Limit impact of coastal protection works on neighbouring areas	Coastal: Restrictions on private protection works are likely to encounter considerable resistance Complex interacting property law issues	Coastal Clarify policy on regulation of coastal protection works, including roles and responsibilities of government in relation to the protection of private property Ensure protective

		threat, and must be satisfactorily maintained (provisions under review) To exempt clearing of native vegetation for bushfire mitigation from permit requirements Eg, Vic – Victoria Planning Provisions Clause 52.48-1 – 10:30/10:50 rules allow clearing of vegetation around dwellings without consent Eg, SA – *Native Vegetation Regulations 2003*, reg 5A - no consent required for clearing within asset protection zone	Eg, Encourage creation and maintenance of defendable space around dwellings in fire prone areas	Bushfire: - Implementation of vegetation clearing exemptions without consideration of environmental impacts may lead to loss of biodiversity, land and water degradation	works are not assessed in isolation – development assessment should consider the cumulative impacts of various works; the range of potential externalities; and the way in which works may contribute to an overarching adaptation strategy for an area Consider linking development assessment processes for protective works to a broader adaptation strategy or risk management plan Bushfire: Consider mechanisms to ensure environmental impacts of hazard activities are considered and minimised at strategic and statutory planning level – eg, list as relevant consideration or ensure appropriate levels of oversight from referral authorities

Regulatory Instruments – flexible					
Instrument	**Key Features**	**Examples**	**Advantages**	**Challenges**	**Implementation Considerations**
Qualified use and development rights - eg, time or event contingent approvals	Also regulate location and nature of land use and development But specifically provide powers to regulate use and development once it has lawfully commenced (eg, stop a particular land use or alter the conditions upon which it is undertaken) Used in the context of new development or re-development May be implemented through agreements on title to bind prospective landholders	Only isolated examples of jurisdictions and local government areas experimenting with flexible regulatory instruments Eg, NSW - *Coastal Planning Guideline* - in the context of considering options to reduce intensity in urban areas at risk, the guideline explicitly sanctions the use of flexible measures, including time and/or event triggered development controls, instead of prohibitions on infill and redevelopment Eg, NSW - Byron Shire Development Control Plan provides an event-based trigger for new development in areas subject to coastal erosion Eg, Vic - Glenelg Shire – a 2011 amendment to the planning scheme	Ensure future hazard impact costs are minimised, while also allowing for land to be used until the point at which the hazards materialise Effective means of delaying mitigation costs	Difficult to overcome cautious approach to the use of these instruments among practitioners - linked to perceptions around legal protection of private property: - Concern among decision makers that it will be difficult for future governments to exercise the options to require houses and other buildings to be removed without facing claims for compensation or demands for coastal protection measures - Seen to benefit current landholders while transferring risks and responsibilities to future governments - Concern among utility providers that time or event dependent development approval will make planning and provision of reticulated	Time and/or event development approvals more suitable to coastal than bushfire context due to nature of hazard Consider developing policy guidance on the use of these mechanisms (in the context of risk-based approach to land use zoning): - eg, power to regulate could be unqualified, allowing a responsible authority to intervene at any time - however more likely to be event-dependent, whereby the power is only enlivened when a predetermined trigger-event occurs

		allowed residential development in an area between Portland and Narrawong on the condition the 'dwelling is designed to enable relocation in the event future coastal processes threaten the safety of the land and appurtenant dwelling'		services (particularly sewerage) very difficult Some financial institutions appear to be reluctant to lend money on the security provided by land subject to contingent and time-limited approvals. This may be a product of the novel nature of the instruments, or it may reflect rational market judgment of the associated financial risk	
Targeted regulation of existing uses	Require some modification of existing use to minimise risks - eg, retrofit of houses, creation and maintenance of defendable space around dwelling	No known examples of regulation requiring modification of existing uses in the context of coastal or bushfire hazards Preference for the use of community education measures to inform residents in hazard-prone areas of retro-fit and other hazard mitigation options In a different context, a precedent for uncompensated regulation of existing	Clear legal capacity for state governments to impose new hazard-related regulations on existing uses without providing compensation, including that buildings be removed or modified to minimise risks Capacity for territory governments to require modifications and retro-fits to buildings and existing uses without	Prevailing social norms suggest governments will be unlikely to employ these instruments without some level of compensation or an accompanying financial incentive Increased regulation would require increased resources for compliance and enforcement – may only be justified if there is common perception of the severity of the	Consider using this option when landholders are unresponsive to information and voluntary measures Consider combining with financial incentives

		uses is the requirement to fit all swimming pools with an approved safety fence	being constitutionally obliged to provide compensation, providing landholders retain options for the use and enjoyment of the land	hazard	
Compulsory Acquisition					
Instrument	**Key Features**	**Examples**	**Advantages**	**Challenges**	**Implementation Considerations**
Statutory powers to compulsorily acquire land or designate land for acquisition	Governed by statute in all jurisdictions – governments will need to rely on statutory authority and follow specific procedures May involve mandatory upfront acquisition or designation as acquisition land for later acquisition when owner ready to sell Can be combined with voluntary instruments (eg, property purchase/lease back and property purchase/covenant/re sale schemes)	Few known examples in Australia Eg, Qld – following the 2011 floods, a program of designation of acquisition land was introduced by the *Qld Reconstruction Authority Act 2011* (Qld). Landholders are not obliged to sell the land immediately, but may only dispose of it to the Qld Reconstruction Authority or another approved entity such as local government	Compulsory acquisition has a particular application where public benefits can be clearly identified	Likely to be reserved for most extreme hazard areas due to: - costs - difficulty of justifying public investment in all but very limited circumstances	Most appropriate where there is an identifiable public benefit: eg, environmental outcomes Consider combining with voluntary instruments to lower costs Consider program of designation of acquisition land to soften direct impacts on landholders

Voluntary Instruments					
Financial Inducements	Provision of monetary incentives to modify the location and nature of land use and development so as to minimise exposure and sensitivity to hazards	No known Australian examples	Financial inducements may be an important complement to community education campaigns in existing settlements in a number of contexts: - eg, to assist landholders to establish and maintain defendable space around dwellings to mitigate bushfire risks - eg, to assist in the upgrade of buildings to minimise exposure to natural hazards Inducements could also be used to pursue the protection of environmental values (eg. to encourage rural landholders to remove barriers between their land	Financial inducements involve an investment of public funds This will be best justified where associated public benefits can be identified	Consider financial inducements in combination with community education and/or regulation of existing uses to incentivise hazard mitigation activities (eg, retro-fit) Financial inducements to encourage hazard reduction activities on private property may be more cost-effective response in a bushfire context due to associated costs (eg, clearing vegetation around dwellings as opposed to costly retro-fit and drainage modification) It may be possible to use existing incentive schemes, such as the Victorian Bush Tender scheme, to pursue the protection of environmental values in an adaptation context

			and estuaries in order to allow mangroves and saltmarsh communities to migrate inland)		
Buy-backs	Specific or general offer to acquire land in at-risk areas in order to reduce vulnerability to climate hazards Voluntary Involves formal transfer of title	Australian examples are largely in the aftermath of an extreme event Eg, Qld - *Brisbane City Council - Voluntary Home Purchase Scheme*, established after a 2005 investigation into flood risks in Brisbane, targeted residential properties in areas subject to regular flooding Eg, Vic - Following 2009 bushfires, voluntary buyback program established to acquire properties affected by the fires	Short term – facilitate the resettlement of affected landholders Longer term – reduce potential hazard exposure These instruments are most applicable - where the subject land is seen as unsuitable for other uses due to hazard exposure, and - where associated public benefits can be identified to justify public investment	These instruments may be very costly and are therefore likely to be used only in extreme situations May be difficult to ensure schemes are strategic and targeted due to issues with political acceptability In a bushfire context, land may require active management after purchase to mitigate broader landscape risks	Ensure that where buy-backs are employed, they strategically target areas of highest risk; where the transfer of land to public management will provide important public benefits
Land Swaps	Opportunity to swap land for land in another less hazardous area	Australian examples are largely in the aftermath of an extreme event Eg, Qld - Lockyer Valley – following 2011	As above	As above	As above

		floods, affected landholders were offered land in a more elevated area in exchange for their flood-prone land			
Transferable Development Rights	The right to develop land is separated from the land itself and transferred to land where development is permitted Development rights may be either sold to the owner of the recipient parcel, or transferred directly to the receiving site if both parcels of land are under common ownership Once development rights have been transferred, development on the 'sending' parcel of land is restricted, usually by a restrictive covenant or easement	Used extensively in the US to achieve environmental protection outcomes Limited practical experience in Australia Eg. SA - Mount Lofty Ranges – 1992 scheme to transfer development rights from a water protection area where existing zoning did not allow additional housing and land subdivision to areas more appropriate for urban expansion and infrastructure provision	Provide a mechanism to: - compensate landholders in hazard-prone areas whose development rights have been restricted by regulation, without requiring public investment - lower the costs of facilitating changes in land use in hazard-prone areas	Require considerable institutional and regulatory support: - eg. clearly identify sending and receiving areas and adjust zoning to create incentives to buy and sell development rights	More applicable in the US context of strong constitutional protection for private property rights and associated rights to compensation which reduce the effectiveness of land use regulation, such as zoning In Australia, the constitutional position and requirement to compensate in relation to regulation of property rights is quite different - regulation which removes development rights or expectations without compensation is generally possible in most jurisdictions

Taxes and Charges					
Instrument	**Key Features**	**Examples**	**Advantages**	**Challenges**	**Implementation Considerations**
Taxes	Compulsory exaction of money by a public authority for public purposes, not a payment for services rendered Can provide incentives to alter land use and development in response to climate hazards - eg, elevated council rates imposed on particular land uses in hazard areas - eg, reduced rates for undertaking adaptation measures Can also be used to raise funds to prepare for or respond to climate hazards	Currently no known examples in Australia of taxes (eg, rates) being used specifically to provide incentives to landholders to alter land use patterns in response to bushfire and coastal hazards However, taxes have been used to raise funds to finance hazard responses Eg, Vic - Fire Services Property Levy – is a property tax whereby all property owners are charged an additional 'levy' on their council rates to cover fire services Eg, Federal Gov. – flood reconstruction levy – 1 year, temporary, income-based reconstruction tax introduced following 2010-2011 floods in Qld and Vic, with exemptions for those	Taxes to raise funds to prepare for or respond to climate hazards have a number of advantages compared to other sources of revenue, including: - unlike debt they do not need to be repaid; - unlike spending cuts they do not reduce revenue available in other areas; -unlike charges, they spread costs across the community	Taxes to prompt land use change likely to face a number of difficulties including: - Lack of an agreed method of devising the appropriate tax rate; - likely political opposition from affected landholders; property developers and other related groups; - governments may be tempted to distort the design of the tax to achieve other objectives, particularly revenue raising; and - most landholders likely to be relatively unresponsive to taxes Taxes to raise funds to prepare for or respond to climate hazards may be perceived as inequitable as they spread the costs across the broader community, not just those who are	Investigate further use of taxes and charges as part of funding strategies for adaptation General rates and land taxes may be particularly applicable to raise revenue to cover the wider community benefits of coastal adaptation actions (such as beach nourishment which not only helps to protect private coastal property but also maintains public beach access for the wider community) In contrast, special charges are recommended to raise contributions for properties in identified hazard areas (see below)

		directly affected by the floods		directly impacted Planning agencies, including local government, may not have the legal power to unilaterally introduce taxes	
Charges	Levies to cover the costs of providing particular goods or services Can be used to recoup costs from landholders that benefit from protective measures Or to recoup costs of remediation measures provided to particular communities or landholders	Hazard-related charges more widely used in Australia, particularly in the context of coastal protection works such as sea walls All jurisdictions provide local government with the capacity to charge differential rates and levies Eg, Local Government Act 2009 (Qld), s 92(3) In NSW, there is specific provision in the *Local Government Act 1993* (NSW) relating to charges for coastal protection works (s553B)	Ensure the costs of providing a hazard preparation or response service is borne by those who benefit from it Often regarded as more equitable where the beneficiaries are a discrete group and do not suffer any significant social disadvantage that might affect their capacity to move away from the hazard Also sends a price signal that can trigger desired land use and behavioural changes	Can be politically difficult to implement, especially in relation to existing structures and services May require specific statutory powers to allow enforcement May be inappropriate depending on the capacity of the affected community to pay the charge without causing undue hardship (eg. for pensioners and the unemployed) – provisions to lessen such impacts may substantially reduce the revenue raised through charges May involve significant transaction costs - policy makers should ensure the costs of	As above

				administering and complying with the scheme are kept to a minimum and are proportionate to the revenues raised	
Liability Shield Instruments					
Instrument	**Key Features**	**Examples**	**Advantages**	**Challenges**	**Implementation Considerations**
Statutory exemption from liability	Partial or full exemption from legal liability for specified entities if they take a particular action, or fail to act in a particular way, in relation to climate hazards	NSW is the only jurisdiction to introduce such an exemption See s 733 of *Local Government Act 1993* (NSW): - provides a broad statutory exemption from liability in negligence or nuisance (or other claims, in respect of actions taken and decisions made in relation to land subject to a range of risks) for local councils - provided they can demonstrate compliance with any applicable manual, guideline or code or otherwise demonstrate	Objective is to stop people from unjustly pursuing governments or other third parties for legal compensation when hazard risks materialise Can prevent the risk (or perception of risk) of legal liability leading to perverse outcomes (eg, overly cautious planning response)	Only applies in respect of conduct engaged in *after* the enactment of the exemption – past decisions cannot retrospectively attract the protection and will be judged by reference to negligence principles	Consider developing hazard management manuals to set some parameters around what is considered to be *acting in good faith* Consider how to deal with future claims in respect of past decisions

		good faith - specifically directed at actions taken in respect to land that is liable to flooding, subject to bushfire risk or within the coastal zone			
Indemnity contracts	Local authorities may require a form of binding indemnity (and financial guarantee) from developers as an approval condition May apply in respect of any liability or costs of repair or restoration works undertaken by local government to protect the site from climate related hazards Accompanying financial guarantee would ensure that the developer has funds available to cover costs of indemnification	There is no state level provision for local government to require such an indemnity as a condition of development approval in hazard zones Some local councils have used or are considering using these measures	Force developers to internalise the costs of development risk instead of transferring onto the approving authority Can prevent the risk (or perception of risk) of legal liability leading to perverse outcomes (eg, overly cautious planning response)	Little experience in using these instruments and uncertainty as to how and whether they will be upheld Eg, An attempt by Clarence City Council to require a developer to indemnify council as a condition of development approval was not upheld upon legal challenge, as it was found to be not for a proper planning purpose	Although statutory exemption is preferred, individual indemnity contracts may be applicable in some situations, particularly where a financial guarantee is sought from the developer Consider provision in state planning legislation or instruments to ensure measures have legal validity Consider developing guidelines on when such conditions may be appropriate and the recommended model terms of such provisions

6. GOVERNANCE CONSIDERATIONS ADAPTATION PLANNING

Governance issues pervaded the analysis of legal issues throughout this study. There is a range of governance considerations that will influence instrument choice and implementation. As noted in section 3.7, the distribution of formal legal powers and responsibilities between levels of government and within government, combined with informal governance structures and implementation practices can affect preferences for certain instruments in certain circumstances; the way in which they are designed; and the success with which they are implemented. This part first examines the governance arrangements relevant to existing statutory land use planning processes, then considers the desirable process and governance features of adaptation planning more generally.

6.1 Roles and responsibilities

6.1.1 The role of the private sector

Recent statements about roles and responsibilities for adaptation have emphasised the importance of private adaptation – by individuals, households and businesses.[277] There is a growing recognition that government will have limited capacity to undertake effective adaptation across society, and debate about the appropriateness of a high level of government intervention compared with private risk management. In these recent statements, the role of government is generally limited to: adaptation to protect government activities and assets; information provision to support private adaptation; providing appropriate policy and regulatory settings, including the removal of barriers to adaptation; correcting market failures and protecting public goods; and managing the distributional impacts of climate change across the community.[278]

While the ultimate goal may be to limit the future burden of government and empower private decision-making, several of these roles for government are implicated in spatial planning. Planning frameworks need to protect importance public assets and activities, as well as considering impacts for private infrastructure. Information about future climate risks is important to guide future decisions about the purchase, use and development of land. Planning laws need to ensure that they do not offer incentives for maladaptation or constitute barriers to effective adaptation, and to strike an appropriate balance between private property rights and the protection of public values such as amenity, recreational and ecological values.

6.1.2 State or local government?

Climate change adaptation considerations are being introduced to existing, established governance regimes for land use planning that spread roles and responsibilities principally between state and local governments. State governments have the power to drive planning policy and exert considerable control over both the development of local planning schemes and development assessment processes. Given that land-use planning regimes are unlikely to be completely overhauled to create the 'ideal' policy framework for addressing adaptation issues, the central governance questions for adaptation planning broadly reflect those that apply to all land use planning issues:

[277] Productivity Commission, *Barriers to effective Climate Change Adaptation – Draft Report* (Commonwealth of Australia, 2012), 7-8.

[278] Productivity Commission, *Barriers to effective Climate Change Adaptation – Draft Report* (Commonwealth of Australia, 2012) 7; Tasmanian Climate Change Office, Tasmanian Department of Premier and Cabinet, *Adapting to Climate Change in Tasmania Issues Paper* (2012) 6-7; Council of Australian Governments Select Committee on Climate Change, *Roles and Responsibilities for Climate Change Adaptation in Australia* (Commonwealth of Australia, undated).

- what is the appropriate balance between state leadership and local implementation; and
- is there a role for the federal government in developing approaches to adaptation for land use planning?

The analysis of existing structures and instruments suggests there is a need for strong state government leadership. This can be justified on grounds consistent with the subsidiarity principle: there are cost savings from centralisation (e.g. provision of information and lower transaction costs through improved consistency and coordination of planning agencies) and improved capacity to manage the externalities associated with hazard management (e.g. biodiversity, heritage and amenity costs associated with vegetation management and the construction of defensive structures in coastal areas).

State government leadership can also help overcome practical challenges associated with the existing governance structures and planning regimes, including the following:

- the powers of local authorities to respond to climate hazards are constrained by the legal parameters set by state governments. This can cut off options and cause conflict and delays in policy processes;
- planning appeals processes can obstruct the capacity of local authorities to devise and implement local-based approaches;
- local governments often have insufficient financial and technical resources to fulfil hazard management functions; and
- current governance and planning structures can give rise to moral hazard – local governments may be tempted to take high risk strategies, including by allowing development in areas susceptible to climate hazards, on the assumption that the federal and state government will bear the risk (i.e. act as insurers of last resort). State government leadership can overcome this by curtailing the capacity of local authorities to adopt policy positions that transfer risks onto other levels of government.

State government leadership could take many different forms. The following functions are of particular importance:

- provision of quality spatial data that can be embedded in planning schemes to trigger development controls in hazard-prone areas;
- development of framing instruments that provide clear direction on desired outcomes and how to incorporate climate data into planning and development decision-making;
- development of sufficiently detailed codes and guidelines that can be incorporated into local planning schemes so as to support decision-makers; and
- provision of statutory exemptions for local and state government decision-making.

Local governments play a critical role in planning and development decision making in relation to climate change adaptation and in many jurisdictions it is local government that has taken the lead in developing adaptation planning responses. As the Australian Productivity Commission has recently noted, however, it is critical that roles and responsibilities are clarified and that local government have access to resources (financial and technical) commensurate with their expected role and responsibilities in this area.[279]

[279] Productivity Commission, *Barriers to effective Climate Change Adaptation – Draft Report* (Commonwealth of Australia, 2012) Chapter 7.

The analysis conducted for the purposes of this report suggests that further support and clarification is required for local governments in relation to:

- the development of local planning policies to achieve adaptation objectives, within parameters set by state government laws and policies;
- varying the standards and conditions upon which development assessment is based to account for local conditions; and
- compliance and enforcement of development approval conditions, which are critical to manage hazard exposure.

6.1.3 The role of the Australian Government

The formal legal role of the federal government in land use planning is limited,[280] yet it has a number of avenues through which it can influence policy development at a state and local level. The cooperative federalism approaches relevant to the adaptation context include the development of national policy through the Council of Australian Governments (COAG) and tying federal funding to the implementation of policy by state governments.[281] Common national policy positions on a number of key adaptation issues would be beneficial, including:

- setting overarching parameters for the generation of consistent spatial hazard data and its incorporation in planning and development decision making, for example via sea level rise planning benchmarks or ranges;
- general policy direction on the planning responses that are considered appropriate in different circumstances (considering spatial and temporal distribution of risk and the nature of development in question); and
- policy direction on the principles upon which cost-sharing and revenue-raising arrangements should be developed.

In recent years there have been a number of important federal policy initiatives in this area. Most notable are the establishment of the Coasts and Climate Change Council in 2009 to engage with communities and stakeholders and advise the Government on coastal adaptation issues and reform priorities;[282] the recent inquiry of the Productivity Commission into barriers to effective climate change adaptation;[283] and the COAG *Select Committee on Climate Change* policy statement released for discussion, *Roles and Responsibilities for Climate Change Adaptation in Australia*.[284] Following a recent review of capital city strategic planning systems, COAG has also agreed to a range of planning reforms, which also include climate change adaptation initiatives.[285] These developments are positive. As argued by the Coasts and Climate Change Council in

[280] See section 3.7 for further discussion.

[281] There are a number of recent precedents for this cooperative federalism approach, including the development of the National Water Initiative, a national policy framework to guide the reform of the water management sector, agreed through the Council of Australian Governments. Implementation at a state level has been driven initially by contingent federal government payments (under National Competition Policy), and later by the oversight of a federal government agency, the National Water Commission.

[282] The committee provided advice to the federal Minister in December 2011, highlighting the importance of federal leadership to drive coordinated action in a number of key coastal adaptation areas including the development of a consistent climate risk standard for planning and development; provision of science and information for decision-makers; and coastal policy and regulatory reform. See, Coasts and Climate Change Council, *Council Advice to Minister Combet*, December 2011, available at: http://www.climatechange.gov.au/en/climate-change/australias-coasts-and-climate-change/adapting/coasts-and-climate-change-council/council-advice-to-minister-dec-2011.aspx

[283] Productivity Commission, *Barriers to effective Climate Change Adaptation – Draft Report* (Commonwealth of Australia, 2012).

[284] Council of Australian Governments Select Committee on Climate Change, *Roles and Responsibilities for Climate Change Adaptation in Australia* (Commonwealth of Australia, undated).

[285] Council of Australian Governments, *Review of Capital City Strategic Planning Systems* (2011).

2011, stronger leadership from the federal government in a number of key policy areas could provide much needed support and direction for a consistent and more effective approach at a state and local level.[286]

6.1.4 Decision-making and evaluation roles

The governance arrangements for spatial planning are complex and multi-faceted, making coordination between state and local agencies an important consideration. In many situations, local government plays a key role as the consent authority for development decision making. This role can be supported by strong state leadership in setting policy parameters through framing instruments and providing clear guidance on the way in which regulatory and non-regulatory instruments should be used. Yet at the level of development decision-making, it is also important to consider governance mechanisms that provide expert, independent input. For example, in the interviews conducted for this study, local government officials have expressed strong support for:

- involving expert referral authorities (with a degree of independence from government) in both strategic and statutory decision-making; and
- processes that help to reduce the powers and discretion of elected officials in decision making.

6.1.4.1 Referral authorities

Zones and Overlays are often used to trigger procedural requirements for decision making, including identifying the relevant consent authority and the involvement of referral authorities in the development assessment process. These bodies may also be involved in strategic planning via formal requirements to consult or consider recommendations in the context of planning scheme amendments or other strategic initiatives.

In a coastal context, the range of bodies involved in development assessment functions in addition to local government differs between jurisdictions, and includes:[287]

state government departments (e.g in Queensland, the Department of Environment and Heritage Protection is the consent authority for any development in a coastal management district);

- state government ministers (e.g. in New South Wales, concurrence of the Environment Minister can be required under the *Coastal Protection Act 1979* (NSW) for the granting of consents for land use or development);
- expert-based state agencies with referral authority roles (e.g. Coast Protection Board in South Australia and the Tasmanian Planning Commission in Tasmania); and
- regional coastal and catchment boards with referral authority roles (e.g. Victorian catchment management authorities are referral authorities in areas covered by flood zones or overlays with the ability to veto or apply mandatory conditions on development approvals; and regional coastal boards are sometimes asked for comment on development applications).

In a bushfire context, the relevant fire authority is usually involved as a referral authority in development consent processes, with more or less involvement in decision-making, depending on the particularities of each jurisdiction. For example, in Victoria, the relevant fire authority has a statutory role as a referral agency under s 55 of the

[286] Coasts and Climate Change Council, *Council Advice to Minister Combet*, December 2011, available at: http://www.climatechange.gov.au/en/climate-change/australias-coasts-and-climate-change/adapting/coasts-and-climate-change-council/council-advice-to-minister-dec-2011.aspx

[287] These arrangements are all discussed in more detail jurisdiction by jurisdiction in Appendix A.

Planning and Environment Act 1987 (Vic) in areas covered by the Bushfire Management Overlay.[288] The fire authority will advise particularly on landscape-scale bushfire behaviour and water/access requirements; however they also review the Bushfire Attack Level and vegetation assessments, and will ultimately make a recommendation on the proposal that must be taken into account by local government in decision making.

In some jurisdictions, some of the development assessment roles for bushfire may be performed by accredited private certifiers, adding an additional layer of governance complexity. For example, in Tasmania, local councils are the consent authority for development within bushfire prone areas but are required to obtain the certification of the Tasmanian Fire Service or an accredited bushfire certifier if the development does not comply with the 'acceptable solutions' of *Bushfire Code.* All new subdivisions and building on new or existing lots must be accompanied by a Bushfire Hazard Management plan that outlines the means of protection from bushfires. The preparation and certification of bushfire management plans has been privatised and is now the domain of accredited certifiers.[289] Importantly, local authorities are protected from liability in respect of anything done in accordance with a bushfire hazard management plan or other plan relating to environmental or natural hazards that has been approved by an accredited person.[290]

At a strategic level, fire authorities may also be involved in decision making: for example, in Victoria, the Ministerial Direction governing strategic assessment of planning scheme amendments now specifically requires that special consideration be given to how the amendment addresses bushfire risk;[291] and, as such, the views of the relevant fire authority must be sought and taken into consideration.

There appears to be widespread support among the local government planners interviewed for this study for the involvement of more independent, expert-based state and regional level institutions, such as the SA Coast Protection Board, in development assessment decision making. In both a bushfire and coastal context, this is seen as a source of critical expertise related to the hazard in question, which may be lacking at a local government level.[292] Combined with the availability of quality spatial hazard data, the involvement of expert referral authorities in development assessment processes is seen as providing critical support for local decision making, especially in instances where there is political pressure on local government to approve development in areas of high risk. If they are supported by quality spatial data and expert support of fire or coastal authorities, local councils are also placed in a better position to defend their development decisions in any planning appeal.

In South Australia there are currently proposals afoot to considerably expand the powers of the Coast Protection Board in relation to development assessment. At present, where development is proposed on coastal land, it must be referred under s 37 of the *Development Act 1993* (SA), to the Coast Protection Board for consideration.[293] The *Development Regulations 2008* (SA) determine which applications are referred, and whether the relevant authority is subject to the direction of the Board or whether it must only have regard to the Board's response. In cases involving excavation or filling to a certain volume or coastal protection works, the Board

[288] Victorian DPCD, *Victoria Planning Provisions* cl 66.03; a permit application in an area under the Bushfire Management Overlay must be referred under s 55 of the *Planning and Environment Act 1987* (Vic) to the relevant fire authority.
[289] *Land Use Planning and Approvals Act 1993* (Tas) s 51(2)(d).
[290] *Land Use Planning and Approvals Act 1993* (Tas) s 69A.
[291] Victorian DPCD, *Ministerial Direction No. 11: Strategic Assessment of Amendments* (2011) cl 3.1.
[292] Research interviews conducted by the authors, local government planning officers (all jurisdictions) March - August 2012; e.g. in Victoria, clear articulation of a referral authority for coastal hazards is a significant gap in the governance framework.
[293] *Development Regulations 2008* (SA) reg 2.

has the power to direct the local council to refuse the development application or place conditions on its approval.[294] In most cases however, the Board's powers are advisory only.[295] The proposed changes would greatly expand the situations in which the Board could direct a local government on a development assessment decision.

While referral authorities can perform vital functions, a balance must be struck between ensuring sufficient oversight and expert involvement and managing workloads and resources efficiently. In a bushfire context, recent reforms that have increased the involvement of fire authorities in development assessment decision-making in New South Wales have led to considerable delay in the time taken to assess development applications.[296] Initial indications in Victoria suggest that the Country Fire Authority is facing similar difficulties.[297] If fire authorities are to take such a lead role in development assessment, they must be resourced accordingly. Where private certifiers are involved to take the pressure off public agencies (e.g. Tasmania and New South Wales), it is important that roles and responsibilities in relation to local government are clearly articulated, including the allocation of liability risk to accredited certifiers in relation to their functions.

Further, in a bushfire context, recent developments in Victoria and other bushfire prone jurisdictions have seen a reduced role for nature conservation agencies in development assessment processes where bushfire is a consideration. This is a product of the clear guidelines that have been provided on the extent of vegetation clearance required to achieve defendable space requirements, and the fact that these activities are exempt from approval requirements. While this approach has reduced uncertainty, the exclusion of nature conservation agencies from development assessment processes can lead to adverse environmental outcomes. In many situations, there may be scope to minimise the clearing of native vegetation without sacrificing safety by altering construction standards. However, these solutions are more costly and are likely to be opposed by development proponents in many situations. Without an advocate for nature conservation interests involved at some level in decision-making it can be difficult for decision makers to have due regard to the potential impacts of fire mitigation measures on the broader environment.

6.1.4.2 Role of Elected Councillors

Access to elected councillors for this research was limited.[298] However in a number of interviews, planning officers gave anecdotal evidence that, despite their recommendations not to approve specific developments due to concerns with natural hazard risks, the elected council body went against this advice and approved the development. Similar issues were raised about Councillors refusing to support

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[294] See *Development Regulations 2008* (SA) reg 1(2)(d); see also reg 2, Table – cl 1; the power to direct the council applies to circumstances involving excavation or filling of a certain volume, or involving coastal protection works within 100 m landward of the coast measured from mean high water mark on the sea shore at spring tide or within 1 km seaward measured from mean high water mark on the sea shore at spring tide.

[295] Relevant authority cannot consent or approve the development without having regard to the response of the prescribed body. *Development Regulations 2008* (SA) reg 1(2)(d).

[296] When NSW introduced its *Planning for Bush Fire Protection Guidelines* and associated statutory provisions in 2006, it resulted in local authorities referring all development applications on bushfire prone land to the Rural Fire Service because they did not want to be responsible for having approved a development that was ultimately affected by fire. The workload on the Service increased considerably and resulted in further legislative amendments clarifying that that local authorities, not the RFS, are principally responsible for undertaking development assessments in bushfire prone areas. However, in order to ensure the political acceptability of this return to local government responsibility, an exemption from legal liability was also enacted for acts and advice relating to bushfire-prone land done by planning authorities in good faith (*Local Government Act 1993 (*NSW) s 733).

[297] City of Greater Bendigo, *Planning and Bushfire in Bendigo* Forum, 21 March 2012.

[298] Councillors were approached to participate in an interview in most local government areas used as case studies; however there was only minimal participation among this group. The interviews that were conducted revealed a wide range of views on climate change across the political spectrum.

enforcement proceedings against coastal property owners who undertook unlawful protection works:

Whilst we can apply all of the correct legislative and statutory guidelines or directives, it can all come unstuck at the Council political level. … I am experiencing this as [elected officials] are being requested to apply certain rulings as per Council's planning scheme or best practice and they are too frightened to upset people when they are undertaking unauthorised works in the coastal areas. They want to take the gently gently approach. This is really disappointing for me and difficult for me to apply a certain direction with individual property owners when we are vague at the political level.[299]

On the other hand, in at least one jurisdiction, there was some evidence of council actually rejecting proposals that planning officers had recommended as complying with planning requirements, because of concerns about future sea level rise impacts.[300] Many interviewees expressed the view that confidence that councillors would support the judgments made by planning staff was critical to effective implementation of coastal and bushfire hazard measures.[301] Strong support at the level of elected councillors was also seen as critical to the development of effective adaptation policies at the planning scheme level.

The involvement of elected officials in development assessment processes is consistent with the fundamental principles of representative democracy and it is arguable that with representative democracy comes a degree of volatility in decision making. However, improvements in the consistency of decision making can be achieved without sacrificing democratic principles by focusing the role of elected officials on determining the parameters and criteria for decisions and delegating decision making powers to skilled planning bodies. This approach has been adopted in South Australia. Under the *Development Act 1993* (SA), local councils are generally the relevant authority responsible for the determination of development applications. Following recent reforms, local councils must delegate decision-making powers in relation to development approval to council staff or Development Assessment Panels (made up of both councillors and other independent stakeholders, with a majority of independents and an independent as the presiding member). This is specifically designed to promote consistency and avoid undue political influences on development assessment decisions. As a result of these reforms, it was reported that, in one local council, approximately 95% of development approval decisions are made by council staff and that of the 5% that go to the Development Assessment Panel, the vast majority accord with the recommendations of council staff.[302] It is however important to acknowledge that planning officers are also not immune from arbitrary influences on decision-making.

6.1.5 Responsibility for the costs of adaptation

Many adaptation options that have been discussed in this report involve potentially significant investment of public resources. This is most notable in the context of existing settlements. In these areas, accommodating climate risks (e.g. via house retrofit, improved drainage), protecting infrastructure (e.g. via soft and hard engineering solutions), and retreating from hazard-prone areas (e.g. via compulsory or voluntary land acquisition) all involve considerable upfront expense and on-going maintenance costs. Funding arrangements will be a critical consideration in relation to these

[299] Email from planning officer, 6 November 2012,on file with authors.
[300] Research interviews conducted by the authors, coastal planning officers and elected councillors, local government (all jurisdictions) March – August 2012.
[301] Research interviews conducted by the authors, local government planning officers (all jurisdictions) March - August 2012.
[302] Research interviews conducted by the authors, local government planning officers (South Australia) March - August 2012.

initiatives. The discussion above in sections 4 and 5 has highlighted a number of ways in which costs can be spread between private parties and government. In situations where it is deemed appropriate that government finance such measures, a key issue will be the fiscal imbalances inherent in the Australian system of government, where local governments have comparatively limited capacity to raise revenue. Accordingly, in many situations, state and/or federal governments will need to take the lead in financing these options.

6.2 Process considerations

The policy cycle model described in the introduction to this section includes two critical stages prior to policy selection and implementation:

- problem framing, involving the detection and assessment of the problem; and
- policy framing, involving the development and assessment of options to respond to the problem.

The processes employed at these stages will have a significant influence on which spatial planning instruments are selected and how they are used. Two particularly relevant considerations are process scope and stakeholder involvement. Adaptation planning processes should consider the full range of spatial planning instruments available for achieving adaptation objectives and how these can be used in a coordinated manner. Placing artificial constraints on the scope of policy processes – for example, by limiting considerations to issues within traditional land use planning – can lead to poor instrument choice and ineffective and inefficient outcomes. Overarching processes are required to establish the preferred adaptation pathway for individual localities (for example avoid, accommodate, protect, retreat) to be used to inform instrument choice and design. Where the processes and instruments go beyond the boundaries of traditional land use planning, policy makers should be mindful of the need for complementarity between land use planning and other regimes. These issues are explored further below.

In light of the highly contested nature of the adaptation challenge, it is also important to consider how planning processes involve affected stakeholders, particularly in the policy framing stage. More participatory processes can help to establish a social license to support implementation of adaptation responses by government and may also help to better address distributional concerns and externalities associated with adaptation planning.

6.2.1 Broad Spatial Planning Processes

The traditional focus of statutory planning regimes on the regulation of *new* development has been noted throughout this report as a limiting factor in the introduction of climate change adaptation measures. For this reason, this analysis has taken a broader view of the full range of spatial planning instruments that are available to influence the distribution and nature of land use and development, and hence its exposure and sensitivity to climate change hazards. Thus, the range of instruments considered here has also included expanded regulation of existing uses and a range of other non-regulatory measures, such as financial inducements, taxes and charges.

Not all of the instruments discussed in sections 4 and 5 can be effectively addressed and operationalised through local planning schemes and associated planning processes. For example, the use of cost-sharing measures to support adaptation initiatives would tend to be a matter not dealt with exclusively via a planning scheme. Similarly, while a planning scheme may identify areas suitable for land swap or buy back schemes, the implementation of these schemes will involve different areas and levels of government. There is a clear need for an overarching, integrated process (parallel and complementary to the land use planning process) to establish the

preferred adaptation pathway for a region and coordinate the full range of spatial planning measures required to realise these outcomes.

There are a number of initiatives underway across Australia which seek to articulate an adaptation pathway and coordinate spatial planning measures (for both existing and new development) for a particular region or local government area. Much of the effort to date has focused on coastal areas, with the support of federal funding under the Coastal Adaptation Decision Pathways Program.[303] Two recent initiatives are discussed below to help distil transferable lessons for the design and conduct of similar processes in other settings. These examples highlight the following:

- a state-wide policy framework for adaptation planning including basic underlying policy principles on cost-sharing and roles and responsibilities as a basis for planning is critical to support a consistent and effective approach to local adaptation planning;
- governments should consider creating a statutory basis for adaptation planning processes and local adaptation plans in order to formalise roles and responsibilities and provide greater certainty about implementation;
- stakeholder involvement is important but care should be exercised in determining the extent, nature and timing of consultation;
- careful consideration should be given to the most appropriate scale for these planning initiatives (regional, local, or based on geophysical compartments), and options for integrating plans across scales; and
- adaptation planning processes require a significant commitment of resources.

6.2.1.1 Tasmanian Coastal Adaptation Pathways Project

This project sought to develop future pathways for climate change adaptation in four coastal areas in Tasmania (municipalities of Clarence, Kingborough, Latrobe and Break O'Day). These areas are all low lying coastal settlements with a range of built and natural assets vulnerable to coastal climate hazards. Most also have some significant current risks.[304] The project sought to achieve a range of objectives but the most relevant aspects for the purposes of this discussion were the development of a methodology for establishing adaptation pathways and the establishment of key underlying policy principles as the basis for the planning process.

The project methodology was based upon a dual-pathway approach to coastal adaptation involving comprehensive community consultation in conjunction with state policy and planning reform. The first pathway was aimed specifically at building trust and strengthening relationships and involved participation of a range of stakeholders, including residents and other users of the project sites and was the principal focus of the project (see Figure 10, below). As part of the community pathway process, the project conducted a risk and socio-economic assessment for each location, including a preliminary evaluation of adaptation options and costs, such as beach nourishment, sea walls, groynes, dune vegetation enhancement, raising roads and houses, wetlands migration, retreat, and floating houses. These assessments then formed the basis for community consultations over various scenario 'sets' that were based on the following broad adaptation pathways:

- letting nature take its course and retreat;

[303] Commonwealth Department of Climate Change and Energy Efficiency, *Coastal Adaptation Decision Pathways projects* (June 2012) <http://www.climatechange.gov.au/government/initiatives/coastal-adaptation-decision-pathways.aspx>.

[304] SGS Economics and Planning, *Tasmanian Coastal Adaptation Pathways Project Documentation of Methodology,* (Local Government Association of Tasmania, 2012); this project was a collaboration between the Local Government Association of Tasmania, the State Government's Climate Change Office and the local councils of Clarence, Kingborough, Latrobe and Break O'Day.

- protect development while maintaining natural processes in preference to protecting property;
- protect existing development as long as practical while protecting property values in preference to natural processes; and
- protect existing and permit future development as long as possible.[305]

Not surprisingly, community consultations disclosed a strong preference for protecting private property and amenity, with far less priority given to the protection of environmental services.[306] For Lauderdale, the next step in the process was also undertaken, namely a detailed examination of the community's preferred scenario as a 'reality check', including the development of funding and governance models.[307] This reality checking proved quite revealing, despite technical work in Lauderdale having been quite advanced:

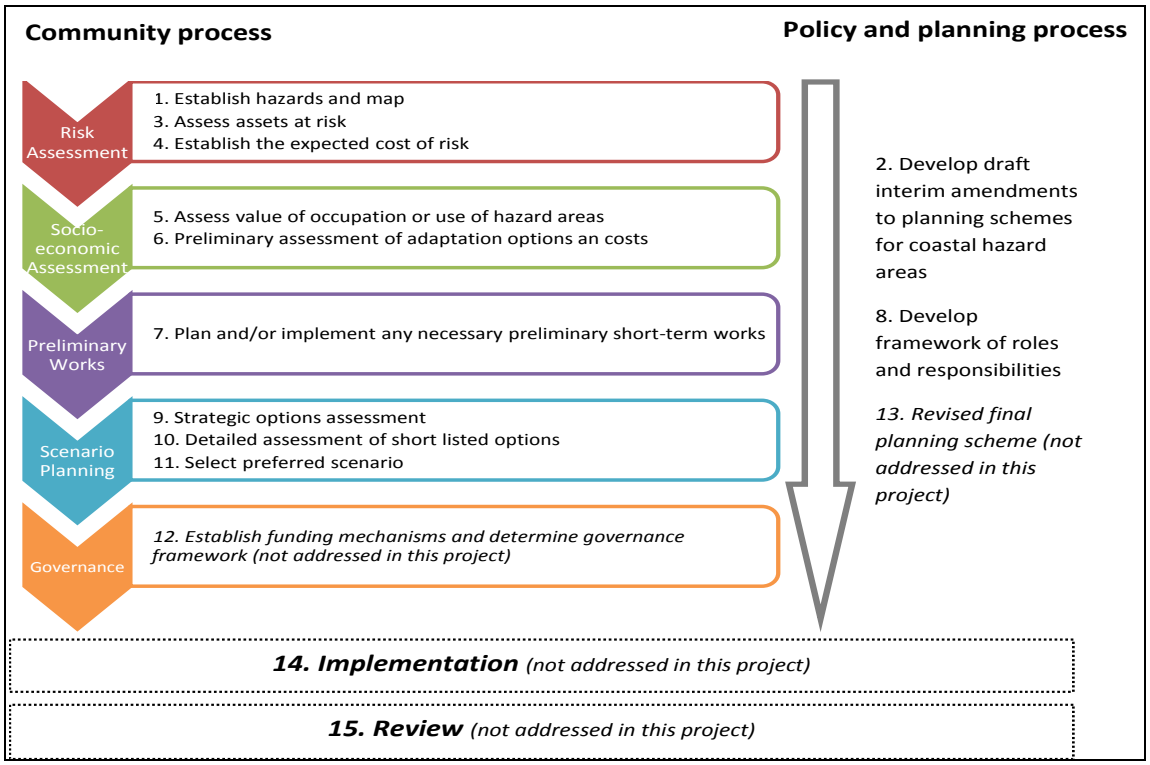
Although there had been a number of prior technical studies undertaken, the follow up study showed that the preferred short term solution of large scale beach nourishment would not be as cost effective or as environmentally benign as expected.[308]

The second pathway was clearly identified as the domain of state government and was therefore beyond the formal scope or powers of the project. It involved the development by State Government of a coastal planning framework, to define roles and responsibilities and institute overarching tools (such as state-wide inundation and erosion hazard mapping) and other approaches (such as coastal hazard planning codes and principles for funding).[309]

Progress on key issues such as funding and decision making occurred quite late in the project[310] and a key finding of the project was that 'a clear agreed framework backed by State government will be essential if the selected adaptation pathway is to be implemented effectively and consistently.'[311]

[305] SGS Economics and Planning, *Tasmanian Coastal Adaptation Pathways Project Documentation of Methodology,* (Local Government Association of Tasmania, 2012) 4.
[306] SGS Economics and Planning, *Tasmanian Coastal Adaptation Pathways Project Documentation of Methodology,* (Local Government Association of Tasmania, 2012) 8.
[307] SGS Economics, *Models for Funding and Decision-making for Coastal Adaptation Pathways* (Tasmanian Coastal Adaptation Decision Pathways Project) (Local Government Association of Tasmania, 2012).
[308] SGS Economics and Planning, *Tasmanian Coastal Adaptation Pathways Project Documentation of Methodology,* (Local Government Association of Tasmania, 2012) 13; the project focussed on costs relating to residential properties, and specifically notes that there may significant additional costs involved in relation to other infrastructure.
[309] SGS Economics and Planning, *Tasmanian Coastal Adaptation Pathways Project Documentation of Methodology,* (Local Government Association of Tasmania, 2012) 2.
[310] Tasmania is one of the few jurisdictions where there is currently no state coastal planning policy or equivalent in place; however the State Government is currently developing a comprehensive response in this area; see discussion in Appendix A, Part 1.7.1.1.
[311] SGS Economics and Planning, *Tasmanian Coastal Adaptation Pathways Project Documentation of Methodology,* (Local Government Association of Tasmania, 2012) 1.

Figure 10. TCAP Community Pathway Process



Source: SGS Economics and Planning, *Tasmanian Coastal Adaptation Pathways Project Documentation of Methodology,* (Local Government Association of Tasmania, 2012).

The project identified a clear role for local government in developing a local adaptation plan (with stakeholder consultation) along the lines of the first pathway and in leading its implementation; yet this should be set within the context of clear state policy direction and support. To this end, the project report suggested that state legislation would be required to authorise and approve the development of local adaptation plans; to formalise roles and responsibilities; and to authorise Councils as the Administering Body.[312] The importance of a state-wide Coastal Climate Adaptation Strategy which sets out strategic directions while allowing for local interests to be considered was also emphasised.[313]

A key explicit premise of the project was that there should be no subsidy to occupy hazardous locations. The project report argues the benefits of articulating and gaining acceptance of this principle upfront:

By insisting on managing risk, government is less likely to bear excessive uncontrolled costs for disaster relief. By placing the cost of adaptation works on the beneficiaries, there is also likely to be less pressure on government to protect private property 'at all costs' and to over-invest in costly protection works. This was clearly reflected in the

[312] SGS Economics, *Models for Funding and Decision-making for Coastal Adaptation Pathways* (Tasmanian Coastal Adaptation Decision Pathways Project) (Local Government Association of Tasmania, 2012) 25-27.
[313] SGS Economics, *Models for Funding and Decision-making for Coastal Adaptation Pathways* (Tasmanian Coastal Adaptation Decision Pathways Project) (Local Government Association of Tasmania, 2012) 23.

pathway discussions where some options were identified as desirable in principle but unaffordable.[314]

While community members reluctantly accepted this principle as necessary and appropriate, they raised following issues:

- Any arrangements for contributing to costs that were applied in Lauderdale should be similarly applied in other locations in Clarence and in all other coastal areas of the State;
- The same contribution arrangements should also apply for other natural hazards not just to coastal risks; and irrespective of whether or not the hazard was related to climate change;
- A plan to transition from existing to new cost-sharing arrangements was required, involving either a grace period or phasing in of costs; and
- Some form of assistance for disadvantaged households was required. [315]

These issues underscore the importance of developing consistent state-wide policy positions on cost-sharing, and roles and responsibilities as the basis for adaptation planning processes.

6.2.1.2 Townsville Coastal Hazard Adaptation Strategy

A recent coastal adaptation planning project in Townsville, Queensland, has some notable differences to the Tasmanian project described above, and raises some further process considerations for adaptation planning. Of particular relevance to this analysis is:

- the clear statutory basis provided for adaptation planning;
- the difficulties posed by an uncertain policy context (particularly given a recent change in State Government); and
- the considerable financial and professional resources required to deliver the project.

This project also involved collaboration across levels of government, in this case between the Local Government Association of Queensland, State Government and the Townsville City Council, with funding from the Commonwealth. It was undertaken as a pilot project under the Queensland *State Planning Policy for Coastal Protection 3/11* (2012), which required all coastal local government authorities to prepare a Coastal Hazard Adaptation Strategy (CHAS) to cover urban localities that are projected to be within a high coastal hazard area between the commencement of the state planning policy and the year 2100. This strategy was to be prepared and incorporated into the planning scheme within five years of the commencement of the policy.[316] The development of the CHAS was to be led by local government, with the relevant state government department in a supporting role, particularly in relation to technical assistance and data provision. In light of the Tasmanian experience documented above, a key strength of the Townsville project is its clear statutory basis. However given the recent suspension of the *State Planning Policy for Coastal Protection 3/11* by

[314] SGS Economics, *Models for Funding and Decision-making for Coastal Adaptation Pathways* (Tasmanian Coastal Adaptation Decision Pathways Project) (Local Government Association of Tasmania, 2012) 10.
[315] SGS Economics, *Models for Funding and Decision-making for Coastal Adaptation Pathways* (Tasmanian Coastal Adaptation Decision Pathways Project) (Local Government Association of Tasmania, 2012) 14.
[316] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 1.6, 1.8.

the incoming Queensland Government and the ongoing review of this policy,[317] further implementation of this process in other local government areas is uncertain.

The project was designed specifically as a pilot, intended to further develop a methodology and approach that could be successfully applied in other local government areas. The project placed considerable emphasis on generating quality hazard mapping (sea level rise and storm surge modelling based on the climate change planning benchmarks of the Queensland Coastal Plan and modelling of erosion prone areas) as the basis for the development of the strategy. Following a risk assessment process, a range of adaptation options were put forward for various localities within the municipality along the following typology:

- defend – allows maintenance and intensification of current land use;
- accommodate – involves some protection (focusing on permanent inundation from sea level rise and coastal erosion), but includes strategies to accommodate some temporary inundation (associated with storm surge events) through design standards or retrofit. This approach provides scope for re-development or intensification but according to risk mitigation standards.
- retreat – no further development allowed, active relocation of community and infrastructure, appropriate in high hazard areas where it is not feasible to protect; and
- maintain status quo – council will not take an active role in financially assisting retreat but recognises the role for government in educating existing residents and informing future purchasers. Planning scheme restrictions will be used to ensure no further intensification in high hazard areas.[318]

Following this, adaptation options have been analysed and ranked based on the following criteria:

- adaptation effectiveness (reduce frequency, duration, severity of inundation of buildings and community infrastructure);
- climate uncertainty (flexibility to respond to unexpected climate outcomes);
- social and environmental impacts (impacts on access to coastal areas for recreation, on natural coastal ecosystems, on economic/industry, on cultural heritage and landscape); and
- complexity and cost (capital cost, complexity of implementation, operating and maintenance costs).

While the analytical approach to developing adaptation options is not dissimilar to the Tasmanian approach discussed above; where the Townsville Pilot differs specifically is in the extent of community consultation incorporated. Due to short time frames and the uncertain political context for the project following a recent change of government in Queensland, a decision was made to avoid public consultation on adaptation options, and focus instead on targeted consultation with key government stakeholders. This is in clear contrast to the Tasmanian project where open and constructive community consultation on developing adaptation options, involving the representation of broader

[317] The State Planning Policy was suspended and replaced by the Qld Department of State Development, Infrastructure and Planning, *Draft Coastal Protection State Planning Regulatory Provision* (October 2012) on 8 October 2012. The draft regulatory provision does not include the requirement to prepare a Coastal Hazard Adaptation Strategy and this aspect of the state planning policy is a key issue in the current State Government review. See further discussion in Appendix A, Part 1.5.1.2.

[318] Presented by the Townsville City Council, Stakeholder Consultation Meeting, *Coastal Hazard Adaptation Strategy – Pilot Project*, Townsville, 15 June 2012.

community interests and provision of full information, was central to the project methodology.

An issue which has generated considerable concern, particularly among local government officials involved in the project, is the uncertain policy context surrounding the implementation of the strategy, particularly issues of cost-sharing and governance that were specifically included within the scope of the Tasmanian project. This policy uncertainty has been accentuated by the recent change of government in Queensland. A lack of clear policy guidance on who will lead implementation and how it will be financed has contributed to considerable concern within council about the value of the long term planning exercise and a reluctance to consult publicly on the strategy.[319] Local governments have also raised concerns about the scale of coastal adaptation planning, and the need to integrate the strategies of neighbouring local government areas to ensure they are consistent and complementary.[320] The issue of regional coordination of adaptation initiatives is currently under review.

Finally, like the Tasmanian Coastal Adaptation Pathways (TCAP) project, the Townsville project has demonstrated the considerable investment of time, financial and human resources required to undertake such a comprehensive planning exercise; particularly in relation to generating spatial hazard data. In the case of Townsville, costs were substantially reduced as the council had already undertaken extensive storm surge mapping; and the state government invested considerably in other aspects of the project. Yet, for many smaller councils, the costs involved will be prohibitive and it is critical that an appropriate funding model be developed to ensure efficiencies in data generation and planning processes. As earlier discussion has highlighted, attention should also be paid to whether the generation of quality spatial hazard data has improved decision making and whether the benefits associated with spatial hazard mapping could be realised at lower cost (see discussion at 5.3).

6.2.2 Collaborative Governance

One strategy to help address the procedural and substantive equity considerations (noted in section 2.4.3); and the complex distributional issues associated with the selection of adaptation options for a particular locality (discussed in section 3.4) is to employ collaborative, participatory governance processes in the problem-framing and policy-framing stages of adaptation policy development. These mechanisms establish a process of engagement between communities and governing institutions to work collectively to define the problem and design adaptation strategies. They offer considerable potential to mediate conflicting issues and perspectives, and are more likely to contribute to equitable and legitimate outcomes.[321] Community and stakeholder consultation has been specifically recognised at both state and federal policy levels as an important contributor to policy development on community risk tolerances for various hazards – to help determine what an acceptable level of risk may be for certain

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[319] Research interviews conducted by the authors, local council officers (Townsville City Council) June 2012.

[320] Stakeholder feedback from local and state-level planners at the 'Limp, Leap or Learn? Project Symposium', Melbourne, 25 October 2012.

[321] See discussion in Storbjörk S and Hedrén J, 'Institutional capacity-building for targeting sea-level rise in the climate adaptation of Swedish coastal zone management. Lessons from Coastby' (2011) 54 *Ocean & Coastal Management* 265; Burch S, 'Transforming barriers into enablers of action on climate change: Insights from three municipal case studies in British Columbia, Canada' (2010) 20 *Global Environmental Change* 287; Funfgeld H, 'Institutional challenges to climate risk management in cities' (2010) 2 *Current Opinion in Environmental Sustainability* 156; see also discussion of the need for new approaches to uncertainty and governance including more participatory processes in the recent risk governance literature: Klinke A and Renn O, 'Adaptive and integrative governance on risk and uncertainty' (2012) 15(3) *Journal of Risk Research* 273; Pidgeon N and Butler C, 'Risk Analysis and Climate Change' (2009) 18(5) *Environmental Politics* 670.

land uses in certain areas and to tailor development controls accordingly.[322] Processes that are more participatory can also help to confer the social licence required to implement contentious adaptation responses.

The degree of public participation in adaptation policy development can be represented along a continuum depending on the point in the policy making process at which public input is sought, and the level of influence accorded to this input. [323] Thus, in a spatial planning context, participation can range from minimal and reactive opportunities for public comment on policies, through to broader community-based planning processes which involve stakeholders directly in the development of adaptation options and the design of adaptation strategies.

Current land use planning frameworks generally incorporate a lower degree of public participation, for example, public consultation on the development of planning scheme amendments and rights to object to and appeal development approval decisions made under these planning schemes. Yet the broader anticipatory adaptation planning processes discussed above, particularly the Tasmanian Coastal Adaptation Pathways Project, have placed considerable emphasis on stakeholder involvement in the development of adaptation options for a particular area. In the Tasmanian context, an open and constructive community consultation approach was found to be important to build trust and confidence in the process.[324]

Participatory processes can be resource- and time-intensive; adding substantially to the costs associated with adaptation planning. Successful processes demand quality information inputs and effective facilitation strategies to manage inevitable conflict. Even for discrete and localised communities, the range of stakeholder interests and power variables makes consensus decision-making very difficult (both in terms of framing the problem and agreeing on responses).[325]

Further, processes should be designed to ensure that there is adequate consideration of the full range of relevant interests and values in adaptation planning processes. In the community consultation conducted for Tasmanian project described above, private property owners likely to be affected by coastal hazards were strongly represented in the discussions; whereas environmental values that were widely held by the community beyond the immediately affected area were not represented strongly.[326] This imbalance is reflected in the 'community' preferences for certain adaptation options, which focused on protecting private property and amenity, with far less priority given to the protection of environmental services. In this context, the Tasmanian project report highlighted the importance of timely provision of policy guidance identifying the various environmental values that warrant some form of protection and providing suggestions as to how these values could be protected – or their landward migration facilitated.[327]

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[322] At a federal level, see Productivity Commission, *Barriers to effective Climate Change Adaptation – Draft Report* (Commonwealth of Australia, 2012) 148. At a state level, see Tasmanian Department of Premier and Cabinet, *Guide to considering natural hazard risks in land use planning* (Draft under development, June 2012).

[323] Arnstein S, 'A Ladder of Citizen Participation' (1969) 36 *Journal of American Planning Association* 216.

[324] SGS Economics and Planning, *Tasmanian Coastal Adaptation Pathways Project Documentation of Methodology,* (Local Government Association of Tasmania, 2012) 12-14.

[325] Measham T et al, 'Adapting to climate change through local municipal planning: barriers and challenges' (2011) 16 *Mitigation and Adaptation Strategies for Global Change* 889, 894; see also, Dietz T, Ostrom E and Stern P, 'The Struggle to Govern the Commons' (2003) 302 *Science Magazine* 1907, which argues that if such conflict is well managed, it can lead to learning and broader acceptance of the need for change: 'people bring varying perspectives, interests, and fundamental philosophies to problems of environmental governance, and their conflicts, if they do not escalate to the point of dysfunction, can spark learning and change.'

[326] SGS Economics and Planning, *Tasmanian Coastal Adaptation Pathways Project Documentation of Methodology,* (Local Government Association of Tasmania, 2012) 13-14.

[327] SGS Economics and Planning, *Tasmanian Coastal Adaptation Pathways Project Documentation of Methodology,* (Local Government Association of Tasmania, 2012) 14.

Strategies for representing the 'environment' in community processes have been considered in a range of natural resource management planning processes in Australia. In a water allocation planning process, it has been critical to establish legal recognition of environmental values and a strong policy position to protect these values; provide adequate information on environmental values and how they will be affected by various resource allocation scenarios; and to allocate environmental advocates a formal voice in negotiations.[328] All of these options may have a role to play in setting parameters for adaptation planning processes.

[328] See the discussion of community-based water allocation planning processes in Foerster A, 'Developing Purposeful and Adaptive Institutions for Effective Environmental Water Governance' (2011) 25 *Journal of Water Resource Management* 4005; Olszak C and Gentle G, 'Water Planning, Principles, Practice and Evaluation' in Hussey K and Dovers S (eds), *Managing Water for Australia: The Social and Institutional Challenges* (CSIRO, 2007) 59; Lyster R, '(De)regulating the Rural Environment' (2002) 19(1) *Environmental and Planning Law Journal* 34.

7. RECOMMENDATIONS AND CONCLUSIONS

This project set out to establish the criteria and characteristics of legal frameworks for effective and efficient adaptation planning in Australian settlements, drawing on the developing experience of all jurisdictions in incorporating climate change considerations into planning frameworks for coastal and bushfire prone areas. This report has focused particularly on:

- identifying the suite of legal tools and instruments that can or do address climate change-related coastal and bushfire hazards;
- exploring how these instruments can be used to avoid and minimise risks associated with these and other climate change hazards; and
- articulating factors relevant to instrument selection, design and implementation to inform the further development of legal frameworks.

It is important to emphasise that there is no neat single-statute legal framework addressing climate change impacts on settlements in coastal and bushfire prone areas. Rather, the framework is spread over a number of interacting legal regimes which include statutory frameworks for land use planning; coastal management; native vegetation conservation; local government; public land acquisition; registration and sale of land; emergency management; and in some jurisdictions specific climate change legislation.

The arrangements vary considerably across jurisdictions, so when we talk about '*a* legal framework' for climate change adaptation planning, this is a reference to the broad range of legal tools and instruments, which operate across these regimes. Within this framework, statutory land use planning regimes provide a logical central point from which to devise and implement a spatial planning response to climate change, and many of the tools and instruments discussed are based within these regimes. Yet because statutory land use planning in Australia focuses largely on regulating *new* development, a deliberate decision was made to extend the inquiry beyond these regimes, so as to also allow consideration of the instruments which can be used to achieve adaptation objectives in the context of *existing* development. This is particularly important given the vulnerability of existing settlements across Australia to potential climate change impacts, and the specific legal and policy challenges posed in this context.

7.1 Instrument Selection, Design and Implementation

While all seven categories of spatial planning instruments discussed in Parts 4 and 5 have a role to play in the legal framework for adaptation, different instruments play distinctly different roles and will contribute in different ways to achieving adaptation objectives depending on how they are combined, designed and implemented. Some instruments may be more or less applicable in the context of different hazards; and at different points in time, depending on the way in which climate change impacts materialise. Many will benefit from implementation in conjunction with other instruments. The following conclusions and recommendations aim to build on existing arrangements to support their trajectory towards legal frameworks for more effective and efficient adaptation planning. Some specific recommendations have been made as priorities in this endeavour.

7.1.1 Clear policy guidance

The legal instruments described in this report are essentially tools to implement a certain policy outcome. Particularly in a coastal context, policy objectives remain highly contested. In a bushfire context, there are lingering uncertainties and concern in relation to the treatment of biodiversity conservation and amenity objectives. This

contestation is reflected in the highly variable use of framing instruments (such as state planning policies under planning legislation; or coastal management strategies under subject specific legislation that are incorporated into the planning regime) to set clear overarching strategic objectives and provide guidance to decision-makers on how these objectives are to be achieved. Given the governance framework for land use planning which spreads roles and responsibilities between multiple parties at a local and state level; and, in light of the very difficult policy context of pervasive uncertainties and policy trade-offs; providing clear policy direction at a state level is critical to achieve a consistent and more effective planning response to potential climate change impacts. *Available legal mechanisms for framing the planning response to climate change impacts in coastal and bushfire areas should therefore be employed to set clear objectives and outline how different regulatory and non-regulatory instruments should be used to achieve these objectives.*

7.1.2 Wider use of information instruments

Expanding and refining the use of information instruments is consistent with the high-level policy objectives of transferring responsibility onto private parties to manage risks associated with climate hazards. Information instruments also play an important role in managing risks of future liability for planning authorities. The more proactive, targeted disclosure mechanisms, such as planning certificates and notations on title, are particularly supportive of these objectives.

Current arrangements across the Australian jurisdictions differ significantly in terms of whether there is a legal requirement to disclose hazard information; the precise mechanisms available; and the level of information that must be disclosed.[329] Generally, however, disclosure is limited to providing information on relevant development controls and there has been reluctance to use these mechanisms to provide more detailed hazard information. As such, there is considerable scope to achieve greater consistency across the jurisdictions and to enhance the effectiveness of instruments currently in use so that they can more directly influence decision-making surrounding the purchase and/or ongoing management of land in identified hazard-prone areas. *Regulations regarding the disclosure of hazard information should be reviewed to take advantage of potential benefits in promoting private, autonomous adaptation.*

Planning certificates and notations on title appear to offer a number of particular advantages, in terms of the direct and targeted communication of information so as to influence decision-making; and the ability to achieve a consistent approach throughout jurisdictions. Regulations should provide clear guidance on the information that is to be provided; the communication of uncertainties associated with the information; associated roles and responsibilities; and a process to monitor and encourage compliance. In the case of planning certificates, consideration should also be given to the timing of information provision: whether information should be provided prior to the point of sale and whether prospective purchasers should be given an opportunity to rescind a contract of sale in response to the receipt of hazard information.

7.1.3 Enhancing regulatory requirements

There is a core group of regulatory instruments within the planning framework that includes zones, overlays, codes and guidelines, and approval conditions, which provides a basis for ensuring that new development (and redevelopment) avoids or minimises risks associated with potential climate change impacts. This research has identified two key policy challenges associated with the use of these instruments. The first is determining how regulatory instruments should be used given the inherent

[329] Available disclosure mechanisms for each Australian jurisdiction are outlined in Appendix A.

uncertainties and long time frames associated with climate change impacts, particularly how risk averse planning agencies should be in regulating land use and development in identified hazard-prone areas. The second is how to strike the right balance between clear, prescriptive guidance to support consistent decision-making and responding to local circumstances. These are considered in turn.

How risk averse should land use regulation be in hazard-prone areas?
All jurisdictions require further policy clarity on appropriate planning responses to the spatial and temporal distribution of risk for both bushfire and coastal hazards. Once these policy-settings are clarified, effective legal instruments are available for prohibiting or regulating activities in hazard-prone areas, should policy require it. Prohibitions and land use restrictions through zoning offer a mechanism by which to implement a more precautionary policy approach, whereas controls on development assessment contained in overlays reflect an assumption that development can proceed, providing certain standards and conditions are met. While there is a general reluctance to prohibit land use in hazard areas, approaches differ between jurisdictions and between the two hazards considered. These differences arise from the nature of each hazard; the hazard mitigation options available; and the jurisdiction's recent experience of hazard events. The research identified a strong link between the introduction of strong precautionary measures and the recent occurrence of an extreme event.

In a bushfire context, hazards have typically been managed on a site-by-site basis via technical solutions imposed through conditions on development approval, according to an underlying assumption that development should generally proceed as long as siting, construction and other conditions are met to minimise risks to an acceptable level. This historical practice is being reconsidered in some places, however, following recent extreme bushfires. Current directions evidence a growing emphasis on strategic planning to avoid locating further development (particularly sensitive land uses) in high risk areas and accordingly, a greater role for prohibitions and/or more stringent restrictions on land *use*. In contrast, coastal planning responses have arguably been more successful in planning at the strategic level to avoid locating further new development in high risk areas, such as erosion prone areas, where a technical response to hazard mitigation achieved through approval conditions is not always available or acceptable. In these situations, flexible tools such as a time- or event-dependent approval afford a less precautionary alternative to outright prohibitions on land use. They allow for the continued productive use of high-value coastal land, while conditions remain favourable, although doubts remain over the practical challenges of enforcing such measures when time periods lapse or trigger events occur.

Finally, a key concern with the heavy reliance on approval conditions to manage hazard risks is compliance and enforcement. Fixed regulation assumes that there is an enforcement mechanism standing behind regulatory measures. In practice, however, there is strong anecdotal evidence that monitoring of, and compliance with, approval conditions is low in many jurisdictions; and local governments have insufficient resources to improve this. There are also legitimate concerns about the cost-effectiveness of investing scarce resources in compliance and enforcement; particularly in situations where new development is required to meet more stringent conditions than surrounding development, and hazard mitigation measures implemented in isolation are of limited value in mitigating risk. If a use or development is only considered to be acceptable if all conditions are met and maintained over time, there are therefore real dangers in approving it. If compliance is essential for broader hazard mitigation strategies, further resources are needed. Mechanisms for shifting responsibilities back to development proponents, such as requiring regular compliance reporting, should also be considered.

Consistent with the assumptions underpinning Australian planning law, the dominant regulatory approach in dealing with climate hazards has been to use fixed regulatory instruments. There are only isolated examples of jurisdictions and local government areas that are experimenting with flexible regulatory instruments such as contingent development approvals. Flexible regulatory approaches offer a middle-ground response to risks associated with climate change, as they allow current use and enjoyment of land until such time as the hazard materialises. These instruments are likely to have most application in areas prone to coastal erosion or permanent coastal inundation, where the hazards are likely to develop incrementally over an extended period of time and the changes are likely to be largely irreversible. Even here, though, more thought needs to be given to their design and implementation. For example, requiring landholders to remove properties and relocate once the erosion escarpment reaches a certain distance from the property may need to be combined with measures to ensure that, as the foreshore recedes, public coastal reserves are also allowed to migrate; and continued public access to a dry beach is provided. Flexible instruments are less applicable to the bushfire planning context, where the hazard is an extreme event, the timing, recurrence and extent of which depends on numerous variables, and which is difficult to accurately predict.

The wider the use of flexible regulatory instruments, the lower the obstacles to their success are likely to be. Over time, financial institutions should grow more familiar with them, and be more comfortable about financing developments that are designed and priced with an end-point in mind. As more 'bounded approvals' are granted, consent authorities are also more likely to hold firm on their enforcement when the date or trigger event occurs, as the precedent for non-enforcement becomes more costly. *We therefore conclude that planning frameworks around the country should embrace the use of flexible regulatory instruments – at least for coastal hazards - as the best mechanism by which to allow for the spatial and temporal uncertainties associated with future climate change.*

Limiting local discretion in relation to development of hazard-prone land

This research has identified strong support from local government planners for limiting the discretion afforded them in regulating development and activities in hazard-prone areas. Many responsible authorities at the local level lack the financial and human capacity to devise long-term strategies for dealing with climate hazards and broad discretionary instruments can also lead to conflict and excessive planning appeals that increase transaction costs, and inconsistencies in policy responses. Regulatory instruments, including codes and guidelines, which provide decision-makers with detailed direction and clear parameters for decision-making are a critical part of the regulatory framework. The more prescriptive the instrument; the more it will support consistent decision-making. Nonetheless, there will be situations where standard rules and conditions require some variation to respond to particular local conditions, a good example of the balance among these competing demands is the Bushfire Management Overlay in Victoria. It is essential that the circumstances in which controls may be varied according to local circumstances be clearly specified and circumscribed.

7.1.4 Instrument choice for adapting existing settlements

In already-developed hazard-prone areas, a range of instruments is available to further adaptation objectives, including to regulate, alter, or curtail existing uses. Voluntary instruments such as financial inducements, buy backs and land swaps offer particular advantages for managing climate risks in existing settlements. They offer greater opportunity for community buy-in, and can allow for flexibility in their on-going use of land until hazards become imminent. For example, incentive schemes could be targeted to high-risk bushfire areas to encourage retro-fit of houses and establishment of defendable space. In practice, however, there are few examples where community education has been combined with financial inducements to realise adaptation

objectives in a hazard management context. Similarly, the more interventionist strategies of buy back or land swap are rarely employed, except in situations following extreme events, such as the 2009 Victorian bushfires and the 2011 Queensland floods. If climate change impacts materialise as predicted, the range of voluntary instruments may need to play a greater role in supporting anticipatory adaptation in high risk existing settlements.

Where landholders are unresponsive to education and voluntary measures, the options available to policy makers are largely confined to compulsory acquisition instruments and regulations that modify existing use rights. The bluntest instrument is obviously compulsory acquisition. Compulsory acquisition will be most applicable where a clearly identifiable public policy benefit is associated with the resumption of hazard-prone land, such as establishing a coastal conservation reserve to facilitate the landward migration of important coastal ecosystems and continued public access to the foreshore.

Despite the clear legal power to introduce regulations which seek to modify existing use rights without providing compensation, no examples of such regulation have been identified in a hazard management context. Instead, the approach to climate change adaptation for existing settlements has, to date, been largely dominated by community-education style information measures; underpinned by broader emergency management activities such as ensuring access and evacuation routes and establishing buffer zones. This partly reflects social and political norms concerning the protection of existing uses and private property rights, which are likely to make any regulatory response controversial. It is also a function of concern over the distributional impacts of new requirements, especially where the might impose costly retrofit or modification options on economically disadvantaged groups. Where regulatory responses are considered necessary, these could be combined with financial incentives as a staged response to enhance effectiveness: financial assistance to implement hazard mitigation measures could be supported by a background regulatory threat.

Finally, there is considerable scope for taxes and charges to play a greater role within legal and policy frameworks. Taxes and charges can prompt changes in land use and development patterns via price signals and can provide a funding mechanism for the cost of other adaptation options. Taxes have been used to raise funds to prepare for and respond to natural hazards, particularly in the wake of extreme events. There are also examples of charges being used by local government to recoup costs associated with hazard mitigation measures, particularly in relation to coastal protection works. Such measures specifically target the direct beneficiaries of hazard mitigation measures, and can also send a price signal to the community that can trigger desired land use and behavioural changes. Despite their advantages, there are no known examples in Australia of taxes being used specifically to provide incentives to landholders to alter land use patterns to address bushfire and coastal (or indeed other natural) hazards *ex ante*. Moreover, it may be politically difficult to introduce charges in relation to existing structures and services, and the designers of such instruments should ensure that the costs of administering and complying with the scheme are kept to a minimum and are proportionate to the revenues raised.

7.1.5 Statutory provision for broader adaptation planning

This research has highlighted that while the regulatory and information tools associated with existing land use planning frameworks are a vital part of a legal response to climate change impacts, there is a clear need for an overarching, integrated planning process to establish the preferred adaptation pathway for a region and coordinate the

range of different spatial planning measures required to realise these outcomes for both new and existing development. Such a process is beyond the scope of local planning schemes. Rather, it would operate parallel to and complementary with, the land use planning process.

Consideration should thus be given to establishing a statutory basis for adaptation planning to authorise and approve the development of local adaptation plans; to formalise roles and responsibilities; and to identify the relevant administering body to coordinate implementation of the plan. Essential to such a process is a state-wide policy framework including basic underlying policy principles on cost-sharing and roles and responsibilities for implementation; and direction on the extent, nature and timing of stakeholder involvement.

7.1.6 Liability Shields

Local governments continue to identify the risk of potential legal liability and costs associated with defending a legal challenge as significant barriers to adaptation decision-making. As noted above, clear and unequivocal framing instruments supported by detailed and prescriptive codes and guidelines to support decision-makers in taking climate change considerations into account, can play an important role in strengthening the position of state and local government in respect of planning decisions in relation to climate hazards, and thereby reduce conflict and planning appeals. Yet these measures will not eliminate legal risks to councils. Despite the potential liability of local government having been limited by legislative tort reform, concerns remain about the risk of exposure to costly litigation. There are two main options to address both the real and the perceived risk of potential exposure to liability: requiring indemnity from developers for particular developments; and introducing a statutory exemption from liability. These are not spatial planning instruments *per se*, but are included here as an integral component of a legal framework for supporting government efforts in implementing the full range of available instruments. *There is a strong case for uniform liability shield instruments in each state and territory, preferably in the form of a statutory immunity. A broadly applicable statutory immunity is likely to be more efficient than individual indemnity contracts and will also cover risks associated with hazard prevention and response measures. Section 733 of the Local Government Act 1993 (NSW) provides a template for this reform. In more limited circumstances, local government should also have the legal right in prescribed circumstances to require indemnities from developers to whom they have granted development consent in a potentially hazard-prone area.*

7.2 Governance arrangements

7.2.1 Roles and responsibilities

Governance arrangements which spread roles and responsibilities between different levels of government according to their formal legal powers; capacities and strengths are an important precondition to effective and efficient adaptation planning. Issues relating to roles and responsibilities have been raised on numerous occasions throughout the study and this discussion has been synthesised in Part 6. The table below presents the conclusions and recommendations in relation to roles and responsibilities.

Table 6: Roles and responsibilities for adaptation planning

Spatial planning function and associated planning instruments	Roles and Responsibilities
Provision of spatial hazard data.	Federal and state governments to provide, and e clear guidance for methods, parameters, and fo outputs. Likely to be commissioned from re organisation or agency, such as University re institutes, BoM, CSIRO or Geoscience Australia.
Provision of clear policy direction on how to incorporate climate change data into planning and development decision-making and how to devise planning responses according to the spatial and temporal distribution of risk and the nature of development.	Federal government to provide high level strategi direction. State governments to ensure statutory instruments express clear objectives and priorit outline how these should be realised, link appropriate regulatory instruments.
Development of standard regulatory provisions, including codes and guidelines that can be incorporated into local planning schemes to support planning authorities in making robust decisions that will achieve stated objectives; and to promote consistency.	State government has clear legal power responsibility.
Provision of statutory liability shields for local and state government decision-making.	State government has clear legislative powe responsibility.
Provision of policy direction and statutory basis for broader adaptation plans that integrate measures for new and existing development.	State governments to consider legislating to au and approve the development of local adaptation to formalise roles and responsibilities; and to iden relevant administering body to coordinate impleme of the plan. Federal and state governments to establish clea direction on the principles upon which cost-shar revenue-raising arrangements should be develo relation to adaptation options for existing developr Local government (individually or in regional gro to lead the development (and implementation) adaptation plans.
Development of local planning policies giving effect to the State policy direction and legislative framework.	Local governments to lead, under process accred state governments.
Development Assessment	The current role played by local government sh further supported by an increased role for spe statutory authorities as referral authorities. Consider governance arrangements which de-p development decision-making, such as del decision-making to council staff or independent pa
Compliance and enforcement of development approval conditions that are critical to manage hazard exposure.	Local government to lead, with increased government resourcing.

7.2.2 Process considerations

In developing appropriate local adaptation pathways within broader State planning frameworks, the process by which problems and policy options are framed and tested with affected communities is critically important. This is especially critical for adaptation planning involving existing communities where there are complex procedural and substantive equity considerations and distributional issues associated with the selection of adaptation options. Several recent action-research initiatives funded under the Australian Government's Adaptation Pathways Program are contributing significantly to our understanding of the elements of an effective, efficient and equitable adaptation planning process. Collaborative, participatory governance mechanisms establish a process of engagement between communities and governing institutions to work collectively. Processes at the more inclusive and consultative end of the collaboration continuum have not enjoyed widespread use in traditional planning processes focussed on future development directions. The wider the engagement, however, the more likely the process is to contribute to equitable, legitimate, and defensible long-term outcomes.

Participatory processes are resource- and time-intensive. They also require mechanisms by which to explicitly represent all stakeholders including environmental values. The cost of conducting such processes for every coastal locality around the country may ultimately prove to be prohibitive, but enduring adaptation solutions will require far higher levels of engagement than are currently in place.

7.3 Gaps and Future Research Directions

This project sought to contribute to an acknowledged gap in the climate change adaptation research by exploring the particular role played by law in driving climate change adaptation planning; and by using empirically-based legal research as a basis for developing recommendations for the further development of legal frameworks to support climate change adaptation in a land use planning context. The empirical work has been particularly valuable in ensuring that the considerations and recommendations presented in the report are of practical relevance for planning practitioners and respond to the barriers encountered by practitioners in their application of existing legal frameworks. Yet given the ambitious scope of this project - covering both coastal and bushfire hazards in all Australian jurisdictions - the level of engagement with each case study location through the empirical work has been limited. Further, in many of the case study areas, climate change considerations have only recently been introduced to the legal and policy frameworks and there has been limited experience in their implementation. This is particularly the case for some of the more novel instruments, such as flexible planning approvals which have rarely been employed to date.

Considerable value could be added to this research by re-engaging with a select group of case studies to explore in more detail the ongoing development of legal frameworks and their implementation in a particular case study context. Such research could aim to develop a richer range of scenarios for the application of each instrument (or combinations of instruments) over time in the particular context of the case study area, and the particular legal context of the applicable jurisdiction. For example, in situations where the use of event-dependent approvals (flexible regulatory instruments) may be applicable; further consideration could be given to how these approvals would interact with property law regimes governing the migration of the shoreline; and what measures may be available to ensure that important public interest values such as public access to a dry beach and maintenance of shoreline habitats are protected. Such an approach would be particularly valuable if it could be coordinated to contribute to a broader adaptation planning process, along the lines of the processes discussed in part 6.2, which integrates options for both new and existing development.

The project has also cast light on the need for a more robust exploration of how legal and policy frameworks for adaptation planning can better provide for public interest and environmental values. The broad adaptation pathways discussed in this report for coastal and bushfire prone areas will have significant implications for public interest and environmental values in many situations. In a bushfire context, the central policy trade-off is between protection of life and property, and native vegetation conservation and amenity values. In a coastal context, a central issue is how to provide for the landward migration of foreshore habitats and ensure continued public access to coastal reserves and beaches as sea levels rise. A secondary concern is how to limit encroachment of retreating coastal settlements on adjacent inland areas of high conservation value. Current directions in developing legal and policy frameworks place comparatively little emphasis on these issues relative to the emphasis placed on the protection of private property and infrastructure. Specifically, there appears to have been only minimal attention given to understanding how adaptation objectives in a biodiversity context can be integrated with adaptation objectives in a settlement planning context. Some such issues have been highlighted in this report, where they are relevant to the selection, design and implementation of spatial planning instruments; however there has been limited capacity to explore the implications of particular approaches to adaptation from a public interest and environmental perspective; and recommend mechanisms to better provide for these values in adaptation planning processes.

A third direction for future research is the value of spatial hazard information as a basis for informing the regulatory and planning framework. The significant investment by state and local governments in obtaining detailed spatial modelling to support the development of policy responses to climate hazards has been outlined at different times in this report and in Appendix A. An outstanding research question is whether the generation of this data has improved decision-making, and whether the benefits associated with spatial hazard mapping could be realised at lower cost. The depth of the uncertainties associated with climate change raise issues about the value of investing large amounts of scarce public resources in mapping that is incapable of capturing the full profile of climate hazards.

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Findlay v Surf Coast Shire Council [2011] VCAT 1919

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ICM Agriculture Pty Ltd v Commonwealth [2009] HCA 51

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APPENDIX A: PLANNING LAW FRAMEWORK FOR COASTAL CLIMATE HAZARDS AND BUSHFIRE

Anita Foerster, Andrew Macintosh, Jan McDonald

This appendix maps the current regulatory framework for planning and risk management in relation to bushfire and coastal hazards in each Australian jurisdiction. A detailed understanding of the role that law currently plays in planning for and managing risks associated with climate change is an important basis for the development of recommendations for legal frameworks to support effective climate change adaptation planning. In this way, the material in this appendix forms the basis for the discussion and recommendations developed in the main body of the report.

Most of the discussion here centres on land use planning law. Legal frameworks for land use planning are an important tool to minimise climate related risks to settlements and infrastructure, and are the central focus of this research. However, it is also necessary to consider how the planning law regime interacts with other bodies of legislation such as coastal management and emergency management legislation and quasi-legal rules such as building codes. For example, in some states much of the development of coastal climate change policy has been undertaken under the planning frameworks established by specific coastal management legislation, which is then incorporated into the broader land use planning law regime. Similarly, effective mitigation of many climate change risks demands an integration of planning and building regulation measures,[330] and some building regulation measures are also discussed, particularly in the context of bushfire hazard mitigation.

Legal frameworks for land use planning, as currently framed and employed, are essentially *forward looking* and focus particularly on measures which are available to shape the *future* use, development and protection of land. Given the extensive areas of existing development now subject to climate change risks, there is clearly a need to introduce a more flexible approach to planning systems (in conjunction with other legal tools) that can also accommodate the need to adapt existing settlements. Where relevant, this discussion also outlines some of the approaches and associated legal considerations applicable to managing risks in these areas.

For each jurisdiction, a brief overview of the legal framework and governance arrangements for planning is presented, together with a more detailed discussion of the particular arrangements for both coastal climate hazards and bushfire, focusing specifically on the following areas:

Legal Architecture: An identification and ordering of overarching legislation, state and local planning instruments, and any relevant guidelines and practice notes, which together give legal effect to climate adaptation policies and provide the machinery for adaptation planning and risk management.

Substantive Provisions: An overview of the risk protection standards and decision-making parameters which provide substantive direction on what is considered to be an acceptable level of risk for planning and management decisions in relation to coastal hazards and bushfire. Where relevant, laws relating to the disclosure of hazard information are also discussed.

Governance/Procedural Provisions: A brief outline of any relevant features of the governance arrangements, or the planning and decision-making processes employed to consider risk and develop adaptation options.

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[330] See discussion in Productivity Commission, *Barriers to effective Climate Change Adaptation – Draft Report* (Commonwealth of Australia, 2012) Chapter 8; Teague B, McLeod R and Pascoe S, *2009 Victorian Bushfires Royal Commission: Final Report* (Victorian Government, Volume 2, 2010) Chapter 6.

Existing Development: An identification of planning and other measures used to address risks in existing settlements; or which may limit adaptation in existing settlements.

It should be noted that this area of law and policy is very dynamic and remains highly contested. All efforts have been made to ensure this discussion is up to date (as of 1 December 2012); however in a number of jurisdictions, including Queensland and New South Wales, key provisions are under review and major changes proposed. For this reason, it would be prudent to check the currency of the summary presented here before relying upon it as source of current law and policy.

1.1 Overview of legal and governance arrangements

1.1.1 Planning Law

Within the Australian federation, land-use planning is largely the responsibility of the states and territories. The Commonwealth plays only a minor role, which is largely confined to the Australian Capital Territory (ACT) and Commonwealth areas.[331] Although formally a state issue, state governments have delegated responsibility for many strategic and statutory planning issues to local councils.

Legal frameworks for land use planning and terminology employed differ markedly across the country,[332] and this is well-illustrated by the comparison of planning regimes for coastal hazards and bushfire presented here.

Generally speaking however, state planning legislation provides for the development of a hierarchy of regulatory planning instruments from a whole of state to a local scale, which together operate to regulate the use, development and protection of land.

Under the procedural framework established by the legislation, these instruments control the nature of development that can be undertaken on land; determine whether development approval is required; and, if so, the standards that must be applied and the considerations that must be taken into account in the approval process.

State governments exert considerable control over these processes via state planning instruments, which provide both an opportunity to determine much of the content of local planning schemes and the conduct of development assessment functions. Examples include state planning policies (which may be required to be taken into account when making or amending local planning instruments and when assessing development applications); state regulatory provisions (such as codes and regulations) and standard planning scheme provisions (which may include standardised zones, overlays and associated development controls).

At a local level, the overarching local planning instrument is the local planning scheme. Planning schemes are prepared by local government and set the regulatory and policy context for land use planning, albeit in line with the state planning instruments described above. State planning ministers generally have the power to amend planning schemes and are responsible for approving planning schemes drafted by local councils. The key function through which local governments exert discretion is in the spatial application of development controls within their jurisdiction, and the variation of these controls to account for local circumstances.

In many instances, local government are the consent authority for development assessment, although this role is also played by relevant State agencies or Ministers, who can have exclusive approval powers in relation to particular types of development applications. State agencies or Ministers also often play a role in decision-making as a referral authority, either providing advice or direction to the consent authority on the determination of the development application. The arrangements differ in the territories: in the Northern Territory local government has only a minimal advisory role in land use planning, and in the ACT the functions usually undertaken by local government are conducted by the territory government.

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[331] However, in a statutory planning context, the Commonwealth can be more directly involved in development assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth), where a matter of national environmental significance (such as federally listed threatened species) is involved.

[332] Gibbs M and Tony H, *Coastal Climate Change Risk: Legal and Policy Responses in Australia* (Commonwealth of Australia, 2011) 1, 14; See also discussion in Productivity Commission, *Performance Benchmarking of Australian Business Regulation: Planning, Zoning and Development Assessments: Research Report* (Commonwealth of Australia, 2011), available at <http://www.pc.gov.au/projects/study/regulationbenchmarking/planning/report>.

The other major institutions involved in planning processes are appeal bodies, which include both courts and tribunals. The functions of planning appeal bodies are generally confined to merits review (i.e. on matters of substance) and judicial review (i.e. on matters of law) of the decisions of consent authorities and other administrative decision makers, although the jurisdiction of these bodies varies considerably between the states and territories. Where merits review is available, the presence of appeal bodies can significantly alter the functioning of the planning process and the influence of consent authorities on planning outcomes.

Naturally, there is a wide range of policy objectives reflected in planning instruments to guide the future use and development of land, and these have long included the management of risks associated with natural hazards. Land use planning has considerable potential to both reduce the likelihood of natural hazards impacting on settlements and infrastructure, and to reduce the potential consequences should these events occur.[333] As such, these planning instruments offer well-suited tools to address risks of increased frequency, and severity and changed distribution of natural hazards as a result of climate change.

As the discussion here illustrates, climate change adaptation policies have been given effect to in the different state planning systems in various ways. Generally however, climate change risk policies are matters that are considered when planning schemes are developed or updated to ensure planning schemes are consistent with these policies; and matters that are taken into account by decision-makers when assessing development proposals.

1.1.2 Existing Development

As noted above, land use planning is essentially a forward looking mechanism, with limited capacity to address the climate change hazards facing existing settlements and infrastructure. In this context, broader adaptation planning processes which consider threats to existing settlements and the range of options available to manage these threats are important. In this overview, some consideration is given to relevant planning processes; and also to the range of regulatory or non-regulatory instruments which address coastal and bushfire hazards for existing development.

Employing planning measures to address climate related risks in existing settlements is constrained by the strong protection accorded to existing use rights in all Australian planning regimes. This recognises an entitlement to continue to use land for a particular purpose that was lawful prior to the introduction of planning regulations that prohibit the use. All state and territory planning systems contain provisions that protect existing use rights, including guarantees of compensation for certain actions that affect these rights. As a matter of law, the protections afforded to landholders under state and territory property and planning statutes are not absolute and they can be altered or removed entirely by parliament. However, such measures may not be politically feasible given strong community values and expectations regarding private property rights.

1.1.3 Planning Disputes and Legal Liability

The discussion in this appendix (and the project report) also makes some, albeit limited, reference to the various state and territory regimes relating to planning disputes and potential legal liability for planning decisions made concerning climate change impacts, particularly because concern about potential legal liability has been identified

[333] March A and Henry S, 'A better future from imagining the worst: land use planning and training response to natural disaster' (2007) 22(3) *The Australian Journal of Emergency Management* 17; March A, 'A Risk-Reduction Argument for Planning' (2007) 33(2) *Planning News* 11.

as a barrier to the implementation of planning measures to address climate change impacts.[334]

Far more detailed investigation of liability issues is available elsewhere,[335] however for current purposes, it is important to understand the different types of legal action that may potentially be brought against a government body in a planning context. These fall roughly into three categories: [336]

Administrative planning disputes: Persons aggrieved by an administrative decision of a planning body, such as the decision to grant or refuse a permit, or review of planning scheme amendments, may seek either merits review of the decision (in which case the court reviews the substance of the decision); or judicial review (in which case the court reviews the procedural basis for the decision). These rights typically extend to objectors and third parties, as well as permit applicants.

Torts-based actions: a planning body such as local council could potentially be found liable in negligence or nuisance, and if so would be required by a court to remedy the harm endured, which may involve payment of compensation. For example, negligence may be attributed where there has been a decision to approve a development when the risk of harm is foreseeable, or where there has been a failure to include protective standards in planning instruments. A specific statutory exemption to limit the potential liability of local government has been introduced in NSW;[337] and most states and territories have legislated to limit the liability of governmental bodies in civil litigation more generally, so that a governmental body would not generally be liable for an act of omission unless it can be shown that it was manifestly unreasonable.[338]

Claims for compensation: All states and territories have statutes that guarantee the provision of 'just terms' compensation where interests in land are acquired by government agencies, and some state regimes create a statutory right to compensation where land is set aside under planning regulations for a public purpose;[339] and where changes in planning provisions adversely affect the value of the land.[340] Litigation may also occur in this context.

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[334] Baker and McKenzie, *Local Council Risk of Liability in the face of Climate Change – Resolving Uncertainties: A Report for the Australian Local Government Association* (2011).

[335] Baker and McKenzie, *Local Council Risk of Liability in the face of Climate Change – Resolving Uncertainties: A Report for the Australian Local Government Association* (2011). See also, England P, 'Heating up: Climate change law and the evolving responsibilities of local government' (2008) 13 *Local Government Law Journal* 209; McDonald J, 'A risky climate for decision-making: The liability of development authorities for climate change impacts' (2007) 24 *Environmental and Planning Law Journal* 405.

[336] For a detailed discussion, see Baker and Mackenzie, *Local Council Risk of Liability in the face of climate change – Resolving Uncertainties, a report for the Australian Local Government Association* (2011).

[337] For example, the *Local Government Act 1993* (NSW) s 733 contains a specific exemption which protects local councils from liability in relation to acts and omissions concerning floods and coastal hazards, provided they were done in good faith in the performance of council's statutory functions.

[338] *Civil Law (Wrongs) Act 2002* (ACT) s 110; *Civil Liability Act 2002* (NSW) s 41; *Civil Liability Act 2003* (QLD) s 35; *Civil Liability Act 2002* (Tas) s 38; *Civil Liability Act 2002* (WA) s 5W; *Wrongs Act 1958* (Vic) s 83. There is no similar provision in either South Australia or the Northern Territory; however there is a general but weaker defence at common law. For a discussion of these defences in the context of potential grounds for legal liabilities for governmental bodies, see Baker and McKenzie, *Local Council Risk of Liability in the face of Climate Change – Resolving Uncertainties: A Report for the Australian Local Government Association* (2011).

[339] For example, Tasmania and Western Australia.

[340] The relevant provisions of the *Sustainable Planning Act 2009* (Qld) are covered in section 5.1.

1.2 Australian Capital Territory (ACT)

Planning responsibilities in the ACT are split between the National Capital Authority and ACT Government. The National Capital Authority was established under the *Australian Capital Territory (Planning and Land Management) Act 1988* (Cth) and, under that Act, is required to prepare and administer a National Capital Plan. The Plan sets the land use and development framework for the territory through general policies and principles. Within specified Designated Areas, the Plan also lays down more detailed conditions concerning planning, design and development in the same way that a standard planning scheme does in most other Australian jurisdictions.

In addition to establishing the basis for the National Capital Plan, the *Australian Capital Territory (Planning and Land Management) Act 1988* (Cth) also requires the ACT Government to make laws for the establishment of a planning authority and to confer functions on the authority that include the preparation and administration of a Territory Plan concerning land use and development. Compliance with this statutory requirement is currently achieved through the *Planning and Development Act 2007* (ACT), which established the ACT Planning and Land Authority (ACTPLA) and requires ACTPLA to create, maintain and administer the Territory Plan in accordance with the legislation.

Outside of the Designated Areas under the National Capital Plan, the Territory Plan is the primary urban planning instrument governing day-to-day land use and development decisions in the territory. Like most planning schemes, the Territory Plan regulates land use and development through a zoning map (called the Territory plan map), and details strategic directions for the overall territory, planning objectives and development requirements for zones and specific codes for development (which identify planning, design and environmental controls for differing land uses, development types, zones, and precincts). The major restriction on its scope and design is that the Territory Plan must not be inconsistent with the National Capital Plan.

The Territory Plan adopts a hierarchical approach to planning that reflects scale. Structure Plans contain the land use policies and objectives at the district level. Concept plans and precinct codes sets down objectives and planning rules for suburbs. Site specific requirements are applied through development applications and approvals. Development tables for each zone in the Territory Plan specify whether specific proposals are 'exempt development', 'prohibited development' or 'assessable development' and, for assessable development, the assessment track that applies to development (code assessment, merit assessment or impact assessment).

Development applications are assessed against codes, which specify the planning, design and environmental controls for different precincts, zones, land uses and development types. There are three relevant types of code: precinct codes (typically covering a suburb), development codes (which apply to specific zones and development types) and general codes (that apply to development types and specific planning and design issues).

1.2.1 ACT – Bushfire

1.2.1.1 Legal Architecture

Bushfire issues are mainly dealt with in the Territory Plan through the *Planning for Bushfire Risk Mitigation General Code*,[341] which informs planning and development in the ACT and is taken into account by the ACTPLA when determining development applications. The Code complements the ACT Emergency Services Authority's *Strategic Bushfire Management Plan*, a strategic document outlining measures for the Prevention, Preparedness, Response and Recovery from bushfires in the ACT.

[341] ACT Planning and Land Authority, *Planning for Bushfire Risk Mitigation General Code* (2008). The Code is linked to the Residential Subdivision Development Code.

1.2.1.2 Substantive Provisions

Identification of hazard areas

The spatial application of development controls relating to bushfire in the Act is delineated via Bushfire Hazard Maps, prepared under the Strategic Bushfire Management Plan for the ACT,[342] which show the level of risk to residential areas (classified as, primary, secondary and lee risk levels).[343]

Fire management zones, intended to guide prevention and preparedness activities, have also been mapped. The zoning covers the whole ACT regardless of land tenure; strategically allocates land to zones so as to reflect the risk of bushfires starting, spreading and causing damage, and considers the principle purpose for land use and proximity to natural or build assets and appropriate strategies for bushfire control operations.[344] Zones include for example: ember zones;[345] inner asset protection zones;[346] and outer asset protection zones.[347]

In the wake of the 2003 Canberra fires, regulations were made under the *Building Act 2004* (ACT) declaring Bushfire Prone Areas. Currently, none of Canberra's urban area is included within a Bushfire Prone Area. All lands outside of the defined urban area of Canberra were declared bushfire prone on 1 September 2004.[348]

Strategic Considerations and Development Controls

Bushfire issues are mainly dealt with in the Territory Plan through the *Planning for Bushfire Risk Mitigation General Code*.[349] The Code has two objects:

- to ensure that bushfire risk is appropriately assessed and considered during the planning, development and construction in the ACT; and
- to balance bushfire risk mitigation with upholding Canberra's planning tradition of a city within a productive landscape, framed by hills and with generous open space provision for amenity, recreation and urban area separation.

To realise these objectives, the Code is guided by two broad principles:

1. Shared responsibility – the notion that the government and the public share the responsibility of taking appropriate action to manage the risks associated with bushfires;
2. Prevention – the taking of responsible and adequate planning measures to minimise the risks of bushfires affecting people and property.

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[342] ACT Emergency Services Authority, *Strategic Bushfire Management Plan for the ACT* (Version 2, 2009) prepared in accordance with the *Emergencies Act 2004* (ACT).
[343] ACT Emergency Services Authority, *Strategic Bushfire Management Plan for the ACT* (Version 2, 2009) Schedule E details the mapping which supports the Strategic Bushfire Management Plan.
[344] ACT Emergency Services Authority, *Strategic Bushfire Management Plan for the ACT* (Version 2, 2009) Schedule E, 19-21.
[345] This includes areas of leased land that contain rural and urban structures and assets that may be subject to impact by bushfires, principally through ember attack and potentially as a result of radiant heat and direct flame contact from bushfires.
[346] These consist of strips of land adjacent to vulnerable assets, where fuel hazard is to be reduced to comparatively low levels. This will reduce the level of ember attack, direct flame contact and radiant heat impact on adjacent assets, and provide defensible space to allow fire fighters and residents to reduce the impact of bushfires with increased safety under some conditions.
[347] These are strips of land adjacent to some inner asset protection zones, where fuel hazard is to be reduced to comparatively low levels to further reduce bushfire intensity and the risk of ember attack to adjacent houses and assets.
[348] ACT Planning and Land Authority, *Planning for Bushfire Risk Mitigation General Code* (2008) 3.
[349] ACT Planning and Land Authority, *Planning for Bushfire Risk Mitigation General Code* (2008).

The Code adopts different approaches to the management of bushfire risks depending on the nature and location of the development, with the most precautionary development controls applying to new urban areas.

Existing urban areas[350]

For existing urban areas, the Code merely recommends that bushfires be considered in redevelopments and extensions. For properties within 100 m of the primary, and 50 m of the secondary risk classification (as provided by bushfire hazard maps), it is recommended that bushfire risk mitigation measures be considered as part of development applications for redevelopments or extensions. These mitigation measures are explicitly stated to be voluntary. However, the Code also states that, 'depending on the type of development (for example residential accommodation for institutional uses) and its location within the existing urban area, a Bushfire Risk Assessment may be required by the Authority as part of the planning or development application process'.[351] Where a risk assessment is required, mandatory mitigation measures can be imposed as a condition of approval.

New urban areas[352]

Prior to the release and development of new urban areas, three steps will generally be required:

- preparation of a Structure Plan, which sets broad principles and policies for the district or area;
- preparation of a Concept Plan, which sets the planning framework and requirements for the area; and
- preparation of an Estate Development Plan, which details the subdivision design and is lodged as a development application.

Under the Code, a bushfire risk assessment is required at the Structure Planning and/or Concept Planning stage. These assessments are undertaken using the *Australian Standard for Risk Management* (AS/NZS 4360) and *Australian Standard for Building in Bushfire Areas* (AS 3959), and are based on the process in New South Wales.[353] A further risk assessment is also usually undertaken at the Estate Development Plan stage to refine site specific requirements imposed under the Concept Plan. The requirements contained in Estate Development Plans are usually imposed on developments through the terms of the lease or conditions of the final development approval.

Typically, the level of detail in the bushfire provisions is inversely related to the planning level: general provisions are included at the Structure Plan stage, more detail is incorporated at the Concept Plan stage, and highly detailed requirements are included in Estate Development Plans (and development approvals). Examples of this can be seen in the Structure and Concept Plans currently included in the Territory Plan.

Where a Bushfire Risk Assessment is incorporated into a Structure or Concept Plan, the assessment and its recommendations are required to be endorsed by ACTPLA, the Emergency Services Authority (ESA) and other relevant agencies. If the Bushfire Risk Assessment is part of the Estate Development Plan, the assessment and its recommendations are referred to the ESA for comment, prior to ACTPLA's decision on the application. ACTPLA will usually only grant a development approval if it has been approved by the ESA.

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[350] See ACT Planning and Land Authority, *Planning for Bushfire Risk Mitigation General Code* (2008) 9-10.
[351] ACT Planning and Land Authority, *Planning for Bushfire Risk Mitigation General Code* (2008) 10.
[352] See ACT Planning and Land Authority, *Planning for Bushfire Risk Mitigation General Code* (2008) 5-8.
[353] As outlined in NSW Rural Fire Service, *Planning for Bushfire Protection* (2001).

The types of requirements imposed on new developments through Concept Plans and Estate Development Plans general involve the use of three asset protection zones: outer, inner and home asset. The outer asset protection zone is usually non-urban land, where fuel reduction measures are required to reduce risk. The inner asset protection zone is at the perimeter of the development may consist of a road reserve or parkland. Here, fuel loads are required to be kept to low levels to create a defensible space. The home asset protection zone starts at the edge of individual properties and, within this area, buildings can be required to be built to higher fire safety standards and fire-wise landscaping conditions can be imposed.

Development outside urban areas[354]

All new class 1, 2 and 3 buildings within Bushfire Prone Areas are required to meet the provisions of the Building Code of Australia and the *Australian Standard for Building in Bushfire Areas* (AS 3959). Under the building code and standard, a bushfire risk assessment is required to be undertaken and it also recommends that all non-class 1, 2 and 3 buildings and the surrounds to any buildings should be built and maintained in a 'fire-wise manner'. The risk assessment and its recommendations, and any mitigation measures for the landscape, are required to be lodged with the development application for the relevant class 1, 2 or 3 building. After approval is granted, the building code requires that the assessment, approval conditions and other materials be provided to a building certifier for building approval.

1.2.1.3 Governance/Procedural Provisions

As noted above, the Emergency Services Authority plays a key role in development assessment for new urban areas. Otherwise the planning functions are largely carried out by the ACTPLA.

[354] See ACT Planning and Land Authority, *Planning for Bushfire Risk Mitigation General Code* (2008) 9.

1.3 New South Wales (NSW)

The primary land use planning statute in NSW is the *Environmental Planning and Assessment Act 1979* (EPA Act). Under the EPA Act, planning policies and regulations are established and implemented through two main types of environmental planning instruments (EPIs): local environmental plans (LEPs) and state environment planning policies (SEPPs).[355] LEPs are the equivalent of Victorian municipal planning schemes and include zoning maps (often called planning maps). SEPPs contain state-level planning requirements in relation to specific matters and often designate the Planning Minister as the consent authority in relation to the determination of development applications concerning these issues.

Since 2005, the EPA Act has contained provisions to encourage the standardisation of EPIs, similar to the Victorian system.[356] This process works through the making of 'standard instruments', which prescribe the mandatory and optional form and content of LEPs and SEPPs. The most relevant standard instrument in the current context is that concerning the preparation of LEPs – *Standard Instrument (Local Environmental Plans) Order 2006* (Standard LEP). While intended to promote standardisation, the LEPs in force at the time of the making of this standard instrument will remain in force until they are repealed as part of a staged review and repeal program provided for under s 33B of the Act. At the time of writing, this program was still ongoing.

In addition to EPIs, the EPA Act allows for the making of development control plans (DCPs).[357] Amongst other things, DCPs can make more detailed provisions for development to help achieve the objectives of an EPI, impose additional advertising and notification requirements concerning development applications, and specify additional criteria for consideration for development applications. An EPI can also require a DCP to be undertaken before particular kinds of development are undertaken. While DCPs are not legally binding, consent authorities are required to consider them when determining development applications.

As in Victoria, the strategic and statutory planning powers of local councils in NSW are tightly constrained. Local councils do not prepare LEPs or LEP amendments. The role of councils in strategic planning is usually to prepare planning proposals (for example for the amendment of an LEP), although this task can be assigned to the Director-General of the Planning Department, a planning assessment panel, a joint regional planning panel or another designated planning authority. For an LEP or LEP amendment to be made, a provisional planning proposal must first be prepared by the designated planning authority then approved by the Planning Minister (called a 'gateway determination').[358] Following the gateway determination, the proposal must be finalised by the planning authority, after which it is transferred to the Director-General (who is responsible for the formal drafting of all LEP and LEP amendments) and approved by the Minister.[359] In addition, even where an LEP is made, it can be overridden by provisions of a SEPP and by approvals given in relation to 'State significant development' and 'State significant infrastructure'.[360] The Minister can also issue directions to local councils in relation to the preparation of planning proposals concerning EPIs.

Local councils will usually be the consent authority in relation to development applications. However, as with its strategic functions, this statutory consent role can be assigned to the Minister, the Planning Assessment Commission, a joint regional

[355] *Environmental Planning and Assessment Act 1979* (NSW) Part 3.
[356] *Environmental Planning and Assessment Act 1979* (NSW) Part 3, Division 1, especially ss 33A and 33B.
[357] *Environmental Planning and Assessment Act 1979* (NSW) Part 3, Division 6.
[358] *Environmental Planning and Assessment Act 1979* (NSW) s 56.
[359] New LEPs must also comply with the standard instrument for LEPs.
[360] Although of lesser significance, the Minister can direct local councils to make, amend or revoke DCPs.

planning panel or another public authority by the Act, regulations or an EPI.[361] The Minister can also appoint a planning administrator, planning assessment panel or joint regional planning panel to perform the consent authority functions of a council in certain circumstances,[362] and the Planning Assessment Commission is the consent authority for applications concerning State significant development and State significant infrastructure.[363]

A further restriction on the consent authority powers of local councils is that, in performing these functions, they are required to consult with, or obtain the concurrence of, other government bodies in considering particular types of development applications.[364] The most relevant of these bodies in relation to coastal climate risks and bushfire are the Environment Minister, NSW Coastal Panel and the Commissioner of the Rural Fire Service.

There is no climate change specific legislation in NSW.

Liability

The *Local Government Act 1993* (NSW) includes a statutory exemption from liability, that provides councils with comprehensive protection from liability in negligence or nuisance (or other claims, in respect of actions taken and decisions made in relation to land subject to a range of risks), provided they can demonstrate compliance with the relevant manual, guideline or code or otherwise demonstrate good faith.[365] This is specifically directed at actions taken in respect to land that is liable to flooding, subject to bushfire risk or within the coastal zone.

1.3.1 NSW - Coastal Climate Hazards

1.3.1.1 Legal Architecture

Like Victoria, NSW has specific coastal management legislation: *Coastal Protection Act 1979* (CP Act), which operates together with the EPA Act to regulate coastal climate hazards within the planning regime.

There are five main instruments:

NSW Coastal Policy (1997) - contains the strategic framework for the management of the coastal zone. In preparing a draft local environmental plan (LEP), councils are required to include provisions that give effect to and are consistent with the Coastal Policy; [366] and it is listed as a relevant matter to be taken into account by a consent authority in development assessment.[367]

State Environmental Planning Policy no 71 – Coastal Protection (SEPP 71) - is a state planning policy made under the EPA Act, intended to facilitate the implementation of the Coastal Policy. It requires councils to consider the impact of coastal processes and

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[361] *Environmental Planning and Assessment Act 1979* (NSW) s 4 - definitions. For example, under the SEPP (Major Development) certain proposed developments within the coastal zone are projects to which Part 3A of the EPA Act applies. This establishes a specific development assessment process and appoints the Minister for Planning as the decision maker. The types of development include landfills, mining, subdivision and construction of tall buildings. As a consequence, the kind of development likely to have the greatest impact on the NSW coastal environment will be decided by the Minister for Planning; see discussion in Lipman Z and Stokes R, 'That sinking feeling: A legal assessment of the coastal planning system in New South Wales' (2011) 28 *Environmental and Planning Law Journal* 182, 185.

[362] *Environmental Planning and Assessment Act 1979* (NSW) s 118.

[363] *Environmental Planning and Assessment Act 1979* (NSW) Part 4, Division 4.1.

[364] *Environmental Planning and Assessment Act 1979* (NSW) s 79B and s 79BA.

[365] *Local Government Act 1993* (NSW) s 733.

[366] See Local Planning Direction 2.2 (Coastal Protection), issued under s 117(2) of the EPA Act, 1 July 2009.

[367] *Environmental Planning and Assessment Act 1979* (NSW) s 79C(1) which includes as a recent amendment any relevant coastal management plan (see *Coastal Protection and Other Legislation Amendment Act 2010* (NSW)).

coastal hazards when preparing LEPs and assessing development in NSW coastal zone.[368]

Standard LEP - an LEP that applies to the coastal zone must include clause 5.5 of the standard provisions, which contains compulsory matters for consideration by consent authorities in relation to development in the coastal zone and restrictions on the powers of consent authorities to consent to development in the coastal zone. Development consent on land that is wholly or partly within the NSW coastal zone must not be given unless consideration has been given to the effect of the impact of coastal processes and hazards on the proposed development.

NSW Sea Level Rise Policy Statement – outlines a number of actions that will be taken by state government to support local councils and communities to adapt to rising sea levels. It includes planning benchmarks for sea level rise.[369]

Sea Level Rise Planning Guideline - complements the above instruments by providing more detailed guidance on how planning and consent authorities should incorporate coastal climate hazards into planning and development consent processes within coastal areas.[370]

1.3.1.2 Substantive Provisions

Identification of hazard areas

The coastal climate change planning provisions generally regulate the use and development of land in the NSW 'coastal zone,' as defined by the CP Act.[371] More recent planning guidelines refer to 'coastal areas,' defined broadly to cover all land fronting tidal waters including the coastline, beaches, coastal lakes, bays and estuaries and tidal sections of coastal rivers. This includes other low lying land surrounding these areas that may be subject to coastal processes in the future as a consequence of sea level rise.[372]

For the purposes of identifying areas prone to coastal hazards (erosion and flooding) for use in LEPs, DCPs, or Coastal Zone Management Plans (prepared under the CP Act) three risk categories are used in NSW:

Risk category 1 – the land is, or is likely to be, adversely affected by the coastal hazard at the present time (a current coastal hazard);

Risk Category 2 – the land is not, and is not likely to be, adversely affected by the coastal hazard at the present time, but is likely to be adversely affected by the coastal hazard in the year 2050 (a 2050 coastal hazard); and

[368] NSW Department of Planning and Infrastructure*, State Environmental Planning Policy no 71 – Coastal Protection* (2002) reg 7-8.
[369] NSW Department of Environment, Climate Change and Water, *NSW Sea Level Rise Policy Statement* (2009).
[370] NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010).
[371] Generally, under the CP Act, the coastal zone is defined as the coastal waters of the state (i.e. to 3 nautical miles of the coast) and the area 1 km landward of the coast or 1 km landward from bays, estuaries, coastal lakes, lagoons and recognised mangroves on coastal rivers or the tidal limit of coastal rivers (other than in Sydney where the zone is narrower). See *Coastal Protection Act 1979* (NSW) s 4, s 4A. The exact boundaries of the coastal zone are marked on coastal zone maps approved by the Environment Minister.
[372] For example, NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 1.

Risk Category 3 – the land is not, and is not likely to be, adversely affected by the coastal hazard at the present time or in the year 2050, but is likely to be adversely affected by the coastal hazard in the year 2100 (a 2100 coastal hazard). [373]

SLR planning benchmarks were introduced in 2009, and specify an increase above 1990 mean sea levels of 40 cm by 2050 and 90 cm by 2100, with provision for periodic review as new information becomes available.[374]

The *NSW Sea Level Rise Planning Guideline* provides that councils are to assess and map coastal hazard risks and incorporate this information into strategic and statutory planning. This assessment is to take into account the NSW SLR planning benchmarks noted above.[375] This guideline recognises the need for an ongoing program of assessment and review of existing studies against these new parameters, and provides that:

- coastal risk studies for open sandy coastlines, estuaries and coastal lakes should identify existing hazard lines as well as future hazard lines based on SLR from 2050 and 2100; and
- modelling of the impact of SLR to 2050 and 2100 is to be included where relevant in flood studies (which generally depict the 1 in 100 average recurrence interval (ARI)[376] and the probable maximum flood (PMF) lines on maps).[377]

The NSW Government has committed to provide financial assistance for local councils to undertake coastal flooding and coastal hazard assessments, with priority to be given to areas with the greatest current and future risk from flooding and coastal hazards.[378]

Strategic Considerations and Development Controls

At an overarching level, the *NSW Coastal Policy* establishes the strategic framework for the management of the coastal zone. In relation to coastal climate hazards and planning, the strategy recommends a precautionary approach to the assessment of natural hazard issues, including climate change and sea level rise; includes an objective to recognise and consider 'the potential effects of climate change in the planning and management of coastal development;' and states that 'appropriate planning mechanisms will be considered for incorporating sea level change scenarios set by the Inter-governmental Panel on Climate Change.'

While the details on coastal climate hazards are relatively vague, the Coastal Policy establishes a framework where the emphasis is on the protection and restoration of coastal ecosystems, minimising impacts of development on environmentally sensitive areas, maintaining and enhancing public access to foreshores, minimising risks to human safety, and giving priority to the impacts of natural processes and hazards in planning processes.

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[373] *Coastal Protection Regulation 2011* (NSW) Part 4: Categorisation of coastal risks to land; the assignment of land in the coastal zone to a risk category can be made through a Coastal Zone Management Plan, and the Environment Minister can also make stand-alone risk category determinations; see also discussion of hazard assessment and evaluation in NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 4-7.

[374] NSW Department of Environment, Climate Change and Water, *NSW Sea Level Rise Policy Statement* (2009) 3-4.

[375] NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 4-7.

[376] The 100 year ARI is equivalent to the 1% annual exceedance probability (AEP) which represents a 1% chance of such a flood occurring in any given year.

[377] NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 6-7.

[378] NSW Department of Environment, Climate Change and Water, *NSW Sea Level Rise Policy Statement* (2009) 4.

Although the Coastal Policy is not a legislative instrument, LEPs must 'include provisions that give effect to and are consistent with' it.[379] When determining a development application, consent authorities are also required to consider the policy.[380]

The *SEPP 71* was introduced to facilitate the implementation of the Coastal Policy. As a result, its aims reflect many of the goals and objects of the Coastal Policy. In relation to coastal hazards and land use planning, the SEPP:

provides a list of additional matters that must be considered in the preparation of LEPs and in the determination of development applications, including the 'likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and coastal hazards;'[381]

requires the concurrence of the Director-General to be obtained for development within 100m below mean high water mark of the sea, a bay or an estuary;[382]

prevents consent authorities from consenting to a development application in the coastal zone if it would impede or diminish public access to coastal foreshores.[383]

Under the *Standard LEP*, an LEP that applies to the coastal zone must include clause 5.5, which contains compulsory matters for consideration by consent authorities in relation to development in the coastal zone and restrictions on the powers of consent authorities to consent to development in the coastal zone. Both the considerations and restrictions reflect the Coastal Policy. For example, the mandatory considerations include:

public access to coastal foreshores, 'with a view to' maintaining and improving public access;

the effect of coastal processes and coastal hazards and potential impacts, including sea level rise on the proposed development, and arising from the proposed development.

The restrictions on consents prohibit consent authorities from granting consent unless they are satisfied that the proposed development, will not, among other things, be significantly affected by coastal hazards, have a significant impact on coastal hazards, or increase the risk of coastal hazards in relation to any other land.[384]

SLR Policy Statement

This policy statement, introduced in 2009, outlined a number of actions that will be taken by the State Government to support local councils and communities adapt to rising sea levels. Of most significance for the developing legal framework for coastal climate change impacts are the following measures:

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[379] See NSW Department of Planning and Infrastructure, *Local Planning Direction 2.2: Coastal Protection* (2009), issued under s 117(2) of the EPA Act.

[380] *Environmental Planning and Assessment Act 1979* (NSW) s 79C(1) which includes, following a recent amendment, any relevant coastal management plan (see *Coastal Protection and Other Legislation Amendment Act 2010* (NSW)).

[381] NSW Department of Planning and Infrastructure*, State Environmental Planning Policy no 71 – Coastal Protection* (2002) Part 2; this includes reg 8(j) the likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and coastal hazards.

[382] NSW Department of Planning and Infrastructure*, State Environmental Planning Policy no 71 – Coastal Protection* (2002) Part 3.

[383] NSW Department of Planning and Infrastructure*, State Environmental Planning Policy no 71 – Coastal Protection* (2002) Part 4, reg 14; similarly, consent must not be given if the development would result in the disposal of effluent by means of a non-reticulated system if it would have a negative effect on the water quality of the sea or any nearby beach, or an estuary, a coastal lake, a coastal creek or other similar body of water, or a rock platform (reg 15); or the development is likely to discharge untreated stormwater into the sea, a beach, or an estuary, a coastal lake, a coastal creek or other similar body of water, or onto a rock platform (reg 16).

[384] Otherwise, similar restrictions relate to ensuring public beach access and to the impacts of effluent and stormwater disposal.

Provision of Sea Level Rise planning benchmarks as part of an adaptive risk-based approach to managing climate change impacts

Given the potentially significant risks from sea level rise and the fact that the accuracy of sea level rise projections will improve over time, the policy states that planning and investment decisions should consider sea level rise projections over timeframes consistent with expected life of the asset.

Accordingly, a two tiered planning benchmark for SLR is provided: an increase above 1990 mean sea levels of 40 cm by 2050 and 90 cm by 2100. These benchmarks will be reviewed periodically, with the next review likely to coincide with the release of the IPCC's fifth assessment report.[385]

These benchmarks are required to be used in coastal and flood hazard assessments and in the preparation of LEPs. They are also intended to be used in the consideration of development applications in the coastal zone and in the design and siting of public infrastructure.

Policy to encourage appropriate development on land projected to be at risk from sea level rise

The policy notes that the planning benchmarks are not intended to stop all development that is projected to be affected by sea level rise. They are meant to ensure that development 'recognises and can appropriately accommodate the projected impacts of sea level rise on coastal hazards and flooding over time, through appropriate site planning, design and development control'.

It also states that the risks to properties from coastal climate hazards 'rest with the property owners' and the government does not have any specific obligations to reduce the impacts of coastal hazards on private property. Property owners may seek approval from their local council for coastal protection works. Private landowners will not normally be permitted to construct works on public land to protect their property.[386]

SLR Planning Guideline

The SLR Planning Guideline is the most recent expression of government policy in this area and complements the other legislative and policy instruments by providing more detailed material on how planning and consent authorities are supposed to incorporate coastal climate hazards into planning and development consent processes.

In relation to *hazard assessment and evaluation*, the guidelines note the importance of providing the public with timely information on coastal risks so that informed land use planning and development decision-making occurs. To this end, it notes that planning certificates, which are generally issued at the time of property purchase, under s 149(2) of the EPA Act, must include reference to coastal risks, where a council has adopted a policy that imposes development restrictions on the specified parcel of land. The use of others mechanisms to inform landowners and the broader community coastal risks are also recommended.[387]

In relation to *strategic and statutory planning*, the guidelines adopt two key principles:

Principle 3: avoid intensifying land use in coastal risk areas through appropriate strategic and land use planning. Intensification is particularly discouraged in 'greenfield' sites, where coastal climate hazards cannot be effectively mitigated. Where possible,

[385] NSW Department of Environment, Climate Change and Water, *NSW Sea Level Rise Policy Statement* (2009) 3-4.
[386] NSW Department of Environment, Climate Change and Water, *NSW Sea Level Rise Policy Statement* (2009) 4-5.
[387] NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 7.

new urban development and coastal subdivisions should be located outside coastal risk areas (for the 2100 SLR projection);[388]

Principle 4: consider options to reduce land use intensity in coastal risk areas where feasible. Rather than prohibiting infill or redevelopment in existing areas, councils are encouraged to consider measures that would allow ongoing sustainable occupation of coastal areas, until such times as coastal risks threaten life and property', including time and/or trigger limited development consent conditions.[389]

The guidelines discuss how environmental planning instruments under the EPA Act can be used to implement these coastal planning principles, including through the use of zones, development standards and specific coastal clauses (such as clause 5.5 of the Standard LEP) which may contain development controls for specifically mapped areas, regardless of the underlying zone. There is some capacity for councils to vary these standards and controls to reflect local circumstances.[390] DCPs are identified as a particularly useful mechanism to implement controls and standards for development assessment related to a specifically mapped area, such as a coastal risk area.[391]

Finally, the development assessment process provides a further opportunity to ensure that future coastal development does not increase exposure to coastal risks.[392] In relation to *development consent processes*, the Guidelines require development proposals to satisfy a set of planning criteria for proposed development in coastal risk areas, and include a report addressing coastal risks applicable to the site.[393] When assessing a development application within a coastal area, the consent authority is to assess the level of risk of the proposal, including consideration of the probability of an event occurring and the likely severity of impacts.[394]

Disclosure Laws

Under s 149 of the EPA Act, any person is entitled to apply to a local council for a certificate that details the planning restrictions that apply to a parcel of land within the relevant municipality. Under the standard contract for the sale of land, a vendor has a duty of disclosure which includes attaching a s149 certificate detailing the applicable planning controls. In relation to coastal hazards, relevant information required in s 149 certificates includes:[395]

whether the land is in the coastal zone and is subject to SEPP 71;

whether the land is subject to any other relevant coastal SEPPs or DCPs;

whether development on the land requires the concurrence of the Environment Minister by virtue of the operation of ss 38 or 39 of the CP Act;

whether an order has been issued to remove, alter or repair a structure, or stop work, on the land under Part 4D of the CP Act;

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[388] NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 9-11.
[389] NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 9-10.
[390] NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 10-11.
[391] NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 12.
[392] Two specific principles are included in the guideline: Principle 5: minimise the exposure of development to coastal risks, and Principle 6: implement appropriate management responses and adaptation strategies with consideration for the environmental, social and economic impacts of each option.
[393] NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 13-15.
[394] NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 16-17.
[395] The information which must be included in a planning certificate is detailed in the *Environmental Planning and Assessment Regulation 2000* (NSW) Schedule 4.

whether the council has been notified of the placement of emergency coastal protection works on the land under s 55X of the CP Act and, if so, whether the council is satisfied the works have been removed and the land restored in accordance with the Act;

the details of the coastal risk category that applies to the land and the date of the relevant risk category determination (if any); [396]

whether the owner (or any previous owner) of the land has consented in writing to the land being subject to annual coastal protect works charges under section 496B of the *Local Government Act 1993* (NSW); and

whether the land is subject to any policy adopted by the council or another public authority (where the authority has notified the council for the purpose of inclusion in s 149 certificates) that restricts development on the land because of the risk of tidal inundation, subsidence, or any other coastal hazard (other than flooding); and

whether development on the land is subject to flood-related development controls.

1.3.1.3 Governance/Procedural Provisions

In addition to the general governance arrangements for land use planning discussed above, it is important to note the following arrangements that apply for coastal areas:

Within the coastal zone, the concurrence of the Environment Minister can be required under the CP Act for the granting of consents for land use or development;[397]

SEPP 71 also requires the concurrence of the Director-General to be obtained for development within 100m below mean high water mark of the sea, a bay or an estuary;[398]

Recent amendments to the CP Act have also established the NSW Coastal Panel, to provide expert advice to the Minister and council on coastal management issues.[399] The Coastal Panel will be the consent authority for long term coastal protection works where the council does not have a coastal zone management plan in place.[400]

1.3.1.4 Existing Development

The NSW coastal planning framework contains a number of measures which address coastal climate risks for existing settlements:

Coastal Protection – strategic planning

The *NSW Coastal Planning Guideline* notes that considering the effects of coastal protection works on land use capability is an important strategic planning consideration in the context of coastal hazards. Due to the potential impacts of structural protection works on coastal processes and the environment, the policy expresses a preference for soft engineering options such as beach nourishment and re-establishing barrier dune systems, and notes the importance of considering long term maintenance and management of any such works.[401]

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[396] These provisions are currently under review and there is a current proposal to remove the requirement to include information on coastal hazards in planning certificates, see discussion in Project Report, Box 7; see also NSW Environment and Heritage, *Stage 1 coastal reforms overview* (2012) <http://www.environment.nsw.gov.au/coasts/stage1coastreforms.htm> and NSW Environment and Heritage, *Stage 1 Coastal Reforms: questions and answers* (2012) <http://www.environment.nsw.gov.au/coasts/stage1CoastRefQaA.htm> (accessed 6/12/2012).

[397] *Coastal Protection Act 1995* (NSW) Part 3, see ss 38 and 39.

[398] NSW Department of Planning and Infrastructure*, State Environmental Planning Policy no 71 – Coastal Protection* (2002) Part 3.

[399] *Coastal Protection Act 1995* (NSW) Part 2A.

[400] *State Environmental Planning Policy (Infrastructure)* (2007) reg 129A.

[401] NSW Department of Planning and Infrastructure, *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (2010) 8-9.

Coastal Protection - Financial Assistance and Support

One of the key commitments of the *SLR Policy Statement* (2009) is that the State Government will provide guidance to local councils to support their sea level rise adaptation planning. In addition to financing coastal flooding and coastal hazard assessments, the policy also states that the government will provide guidance and assistance to local councils on reducing the risks to private and public property from coastal hazards but that this 'is unlikely to extend to protecting or purchasing all properties at risk from coastal hazards and sea level rise'. In distributing funding for coastal protection, priority will be given to public safety and protecting valuable publicly-owned assets. Assisting landholders to protect private land will be a secondary issue.[402]

The State government also commits to continue to provide emergency management support to coastal communities during and following storm and flood events, including to communities affected by SLR. It also clarifies that will financial assistance may be provided for emergency and disaster relief, but 'compensation will not be provided for any impact on property titles due to erosion or sea level rise'.[403]

Coastal Protection Act – Emergency and Permanent Protection Works[404]

The CP Act provides for the making of coastal zone management plans (CZMPs) by local councils.[405] CZMPs identify actions required in the relevant coastal zone to address priority management issues, including emergency actions that may be carried out during periods of beach erosion. The significance of the emergency action provisions of CZMPs is that they can regulate emergency coastal protection works that are taken to defend properties from erosion events.

Where beach erosion is occurring or imminent, or it is reasonably foreseeable that beach erosion will affect a building, recent amendments to the CP Act allow landholders to undertake emergency coastal protection works, provided they are certified by the local council or the Director-General and carried out and maintained in accordance with any applicable provisions of a CZMP. These works can only remain for a maximum period of 12 months, after which they must be removed or approved as a permanent structure under Part 4 of the EPA Act. [406]

In considering a development application for permanent coastal protection works, the CP Act requires the consent authority to be satisfied that:

- the works will not unreasonably limit public access to, or use of, a beach or headland, or pose a threat to public safety;[407] and

[402] NSW Department of Environment, Climate Change and Water, *NSW Sea Level Rise Policy Statement* (2009) 4-5.
[403] NSW Department of Environment, Climate Change and Water, *NSW Sea Level Rise Policy Statement* (2009) 6.
[404] These provisions are currently under review with reforms proposed by the current government.
[405] *Coastal Protection Act 1995* (NSW) Part 4A.
[406] *Coastal Protection Act 1995* (NSW) Part 4C; these amendments were introduced via the *Coastal Protection and Other Legislation Amendment Act 2010* (NSW).
[407] *Coastal Protection Act 1995* (NSW) s 55M (1)(a)

- satisfactory arrangements have been made for maintenance of the works and restoration of any beach, or land adjacent to a beach, if there is an increase in erosion caused by the works.[408] This allows the consent authority to secure funding for the carrying out of any such restoration and maintenance, either by legally binding obligations imposed on the landholder or by payment to the relevant council of an annual charge for coastal protection services (see below).[409]

Where there is no CZMP in place, the new NSW Coastal Panel will be the consent authority for such development.[410]

Coastal Protection Service Charge Levy

Recent amendments to the *Local Government Act 1993* (NSW) establish that local councils have the power to impose a charge for the repair and maintenance of coastal protection works under s 496B, but only if the owner of the land (or a previous owner) consents to the land being subject to the charge (unless the owner or occupier, or a previous owner or occupier, contributed to the upgrade or expansion of existing coastal protection works after the commencement of s 553B of the LG Act (i.e. 1 January 2011)).

Regulation of Land Acquisition

Similar to other jurisdictions, NSW planning legislation provides for the acquisition of land by agreement or by compulsory process under the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW), by the Minister administering the Act.[411]

1.3.2 NSW - Bushfire

1.3.2.1 Legal Architecture

Two principal pieces of legislation form the legal framework for the consideration of bushfire hazard in land use planning in NSW: the EPA Act and the *Rural Fires Act 1997* (RF Act). The RF Act provides a process for the designation of land as 'bush fire prone land,' which triggers further strategic planning and development application processes under the EPA Act. Similar to other jurisdictions, this is complemented by building regulations, referencing the *Australian Standard for Building in Bushfire Areas* (AS 3959-2009).

1.3.2.2 Substantive Provisions

Identification of hazard areas

Under the RF Act, bush fire risk management plans can be prepared by the Commissioner of the Rural Fire Service (RFS Commissioner) or a Bush Fire Management Committee and approved by the Bush Fire Co-ordinating Committee.[412] The EPA Act requires that if a bush fire risk management plan applies to land within the jurisdiction of a local council, the council must ask the RFS Commissioner to designate land within the area to be 'bush fire prone land' and record the designated area on a 'bush fire prone land map'.[413] A bushfire prone area is land that can support a bushfire or is likely to be subject to bushfire attack, and the maps identify bushfire hazards and associated buffer zones within local government areas. In practice, local councils prepare draft bush fire prone land maps in accordance with guidelines issued by the RFS Commissioner (*Guideline – Bush Fire Prone Land Mapping* (2006)). The draft maps are then submitted to the RFS Commissioner for final approval.

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[408] *Coastal Protection Act 1995* (NSW) s 55M (1)(b).
[409] *Coastal Protection Act 1995* (NSW) s 55M(2).
[410] *State Environmental Planning Policy (Infrastructure)* (2007) reg 129A.
[411] *Environmental Planning and Assessment Regulation 2000* (NSW) s 9.
[412] *Rural Fires Act 1997* (NSW) Part 3, Division 3, 4, and 5.
[413] *Environmental Planning and Assessment Regulation 2000* (NSW) s 146.

Strategic Considerations and Development Controls

Once land has been designated as bush fire prone, it triggers further strategic planning and development application processes.

In relation to strategic assessment, the main requirements stem from *Local Planning Direction 4.4*,[414] which provides that, where an LEP is prepared that affects bush fire prone land, the local council must:

- consult with the RFS Commissioner and have regard to the Commissioner's comments;
- have regard to the document, *Planning for Bush Fire Protection*, issued by the Rural Fire Service;
- introduce controls that avoid placing inappropriate developments in hazardous areas; and

where development is proposed:

- provide an Asset Protection Zone (APZ) incorporating an Inner Protection Area (bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ within the property) and an Outer Protection Area (managed for hazard reduction and located on the bushland side of the perimeter road);
- for infill development where an appropriate APZ cannot be achieved, provide for an appropriate performance standard in consultation with the Rural Fire Service;
- if the LEP will permit development involving a 'special fire protection purpose' (e.g. a school, child care centre, hospital, hotel, retirement village, student or staff accommodation), the APZ requirements must be complied with;
- contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks and adequate water supply for fire-fighting purposes;
- minimise the perimeter of the area of land interfacing the hazard which may be developed; and
- introduce controls on the placement of combustible materials in the Inner Protection Area.

The Direction provides that a draft LEP can only be inconsistent with its terms if the RFS Commissioner provides written advice that the Rural Fire Services does not object to the non-compliance.

In relation to development applications concerning bush fire prone land, the following requirements apply:

- s 79BA of the EPA Act
- Under the EPA Act, development consent cannot be granted for development on bush fire prone land (development other than a residential or rural-residential subdivision or development for a special fire protection purpose) unless:
- the consent authority is satisfied the development conforms to the requirements and specifications in *Planning for Bush Fire Protection*;

[414] See NSW Department of Planning and Infrastructure, *Local Planning Direction 4.4: Planning for Bushfire Protection* (2009).

- the consent authority has received a certificate from a certified bushfire consultant that states that the development conforms with the requirements and specifications in *Planning for Bush Fire Protection*; or
- the consent authority has consulted with the RFS Commissioner concerning measures to be taken with respect to the development to protect persons, property and the environment from danger that may arise from a bush fire.[415]

Development applications concerning bush fire prone land are required to be accompanied by a 'Bush Fire Assessment Report', which demonstrates compliance with the requirements and specifications in *Planning for Bush Fire Protection*.[416]

The consent authority is only required to consult with the NSW Rural Fire Service (RFS) under section 79BA when a proposed residential dwelling (i.e. infill) does not comply with the 'acceptable solutions' of *Planning for Bush Fire Protection 2006*.

Bush fire safety authorities and integrated development

Before subdividing bush fire prone land for a residential or rural-residential development, or undertaking development of bush fire prone land for a 'special fire protection purpose' (e.g. a school, child care centre, hospital, hotel, retirement village), the proponent must obtain a bush fire safety authority from the RFS Commissioner.[417] These types of development applications are treated as 'integrated development' under the EPA Act, meaning the consent authority must consider the terms of the bush fire safety authority prior to granting consent and cannot issue a development approval if the RFS Commissioner refuses approval. As with applications dealt with under s 79BA, applications for bush fire safety authorities must be accompanied by a Bush Fire Assessment Report, which addresses compliance with the *Planning for Bush Fire Protection*.[418]

Exempt development and complying development

Section 79BA of the EPA Act does not apply to exempt development. As a consequence, exempt development on bush fire prone land is not required to comply with the general requirements and specifications of *Planning for Bush Fire Protection*. However, particular types of exempt development on bush fire prone land is required to adhere to the Building Code of Australia's requirements in relation to bushfire, including the Australian Standard for Building in Bushfire Areas (AS 3959-2009), which are modified by Appendix 3 of *Planning for Bush Fire Protection*. In addition, under the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*, exempt development on bush fire prone land that is within 5 m of a dwelling must be constructed of non-combustible material.

Like exempt development, complying development is not subject to s 79BA of the EPA Act but certain types of complying development must meet the bush fire protection provisions of the Building Code of Australia. The *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* also requires complying development covered by its General Housing Code and Rural Housing Code to meet a number of requirements, including:

- that it conforms to the specifications and requirements of *Planning for Bush Fire Protection*, including the modification of the Building Code of Australia contained in Appendix 3;
- that the part of the land where the development is carried out is not in bush fire attack level-40 (BAL-40) or the flame zone (BAL-FZ);

[415] *Environmental Planning and Assessment Regulation 2000* (NSW) s 79BA.
[416] *Rural Fires Regulation 2008* (NSW) cl 44.
[417] *Rural Fires Act 1997* (NSW) s 100B.
[418] *Rural Fires Act 1997* (NSW) s 100B.

- that the lot has direct access to a public road or a road vested in or maintained by the council;
- that reticulated water supply is connected to the lot and a fire hydrant is located less than 60 m from the development; and
- mains electricity is connected to the lot.

If an LEP provides that the subdivision of bush fire prone land for a residential or rural-residential development, or undertaking development of bush fire prone land for a 'special fire protection purpose', is complying development, it will be overridden by s 100B of the RF Act. The effect of this is that the development will be integrated development and still require development consent under the EPA Act and a bush fire safety authority under the RF Act.

Change of building uses and alterations of buildings

Where a development application concerns a change of use of an existing building, reg 93 of the EPA Regulations requires the consent authority to consider whether the fire protection and structural capacity of the building will be appropriate to the building's proposed use and prohibits the grant of consent unless the consent authority is satisfied the building will comply with the applicable Category 1 fire safety provisions under the Building Code of Australia.

Similarly, reg 94 requires that, where a development application concerns the rebuilding or alteration of an existing building, and the development plus any work undertaken in the preceding three years represents more than half the total volume of the building or the measures contained in the building are believed to be inadequate to protect people in a fire or to restrict the spread of fire, the consent authority is required to consider whether it would be appropriate to require the existing building to be brought into total or partial conformity with the Building Code of Australia.

Planning for Bush Fire Protection

Planning for Bush Fire Protection is an important document within the bushfire planning framework. Amongst other things it contains:

- planning principles that are supposed to be addressed in LEPs, including provision of access roads, provision for the establishment of adequate Asset Protection Zones (APZ), specified minimum residential lot depths to accommodate APZs, development restrictions to minimise the interface with the primary hazard, and controls on inappropriate developments in hazardous areas and the placement of combustible materials in APZs;
- the methodology for calculating APZs, which is based on vegetation type, slope and assumed construction levels;
- guidelines on bush fire protection measures, including APZs, construction standards, access standards, water supply requirements, and landscaping considerations;
- guidelines on the application of the Building Code of Australia and the Australian Standard for Building in Bushfire Areas (AS 3959-2009) to development in NSW; and
- details of what Bush Fire Assessment Reports must contain when accompanying a development application concerning bush fire prone land.

Disclosure Laws

As with coastal hazards, planning certificates issued under s 149 of the EPA Act must state whether or not the subject land is bushfire prone land. They are also required to include information concerning any policy adopted by the council or another public authority (where the authority has notified the council for the purpose of inclusion in s 149 certificates) that restricts development on the land because of the risk of bushfire.[419]

1.3.2.3 Governance/Procedural Provisions

As outlined above, the key decision-making roles within the planning framework are played by local councils and the RFS. Local councils will be the consent authority for a range of smaller scale residential development within bushfire prone areas (under s 79BA of the EPA Act) and are only required to consult with the RFS when a proposed residential development does not comply with the 'acceptable solutions' of *Planning for Bush Fire Protection 2006*. However where development involves a residential or rural-residential subdivision or development for a special fire protection purpose (e.g. a school, child care centre, hospital, hotel, retirement village), the RFS is directly involved and must issue a Bush Fire Safety Authority under s 100B of the RF Act.

The current distribution of roles and responsibilities between local government and the RFS seeks to strike the right balance between ensuing sufficient oversight and expert involvement from the RFS and managing workloads and resources. When New South Wales introduced its *Planning for Bush Fire Protection Guidelines* and associated statutory provisions in 2006, it resulted in local authorities referring all development applications on bushfire prone land to the RFS because they did not want to be responsible for having approved a development that was ultimately affected by fire. The workload on the RFS was immense – for example there were 4500 referrals of new development applications just in the six months from July-December 2009. Legislative amendments have now clarified that local authorities, not the RFS, are principally responsible for undertaking development assessments in bushfire prone areas. But in order to ensure the political acceptability of this return to local government responsibility, an exemption from legal liability was also enacted for acts and advice relating to bush fire prone land done by planning authorities in good faith.[420]

[419] *Environmental Planning and Assessment Regulation 2000* (NSW) Schedule 4.
[420] *Local Government Act 1993* (NSW) s 733.

1.4 Northern Territory (NT)

The *Planning Act* (NT) governs land use planning in the NT. Since 2007, a single consolidated planning scheme has been in place for the whole of the territory: *Northern Territory Planning Scheme* (NTPS). There is no specific requirement to consider climate change in either the overarching planning legislation or the planning scheme, however the planning scheme references a number of risk protection standards for land subject to flooding and storm surge[421] which incorporate the potential impacts of climate change. The provisions related to storm surge are discussed in more detail below.

There is neither specific climate change legislation nor coastal management legislation in the NT. A previous *NT Coastal Management Policy* dating to 1985 appears to be defunct but has not been replaced.[422]

A whole of government non-statutory climate change adaptation strategy has recently been prepared by the NT government, but is expected to be a high level policy document and, at the time of writing, has not been finalised.

1.4.1 Northern Territory - Coastal Climate Hazards

1.4.1.1 Legal Architecture

As noted above, the NTPS makes particular provision for the coastal climate hazard of storm surge in conjunction with its provisions for riverine flooding. In identified hazard zones, development controls limit the permitted uses of land and where development is allowed require compliance with certain design standards to minimise associated risks. In general, these development controls are not mandatory and do not contain outright prohibitions, but rather require decision-makers to *avoid* certain uses or provide that certain conditions *should* be achieved.

There is no provision made in the Planning Scheme (or otherwise in NT Government planning or coastal policy) in relation to coastal erosion, yet this is a current issue in a number of established urban areas covered by the Planning Scheme.

1.4.1.2 Substantive Provisions

In the overarching planning principles governing the interpretation of the NTPS and determinations of a consent authority, specific reference is made to the need to 'consider flood and storm surge levels associated with floods and cyclones to minimise risk to life and property.'[423]

Identification of hazard areas

The NTPS relies on a delineation of primary and secondary storm surge areas. The primary storm surge area is defined as the coastal area with a 1% Annual Exceedance Probability (AEP) of inundation by storm surge. Secondary areas have a 0.1% AEP of storm surge inundation.[424] Storm surge mapping has been incorporated into the planning scheme since 1994, but was substantially updated in 2006 to take into account the predicted impacts of climate change. Hazard areas have been mapped based on a SLR of 0.8 m by 2100 and to take into account increased frequency and

[421] Northern Territory Government, *Northern Territory Planning Scheme* (2007) cl 6.14, Part 3(g) - Storm surge is defined in the NTPS as 'the elevation in sea level which accompanies the movement of a cyclone particularly near, or over, a coastline, attributed to a cyclone's intensity and wind stress build-up.'

[422] Gibbs M and Tony H, *Coastal Climate Change Risk: Legal and Policy Responses in Australia* (Commonwealth of Australia, 2011) 28.

[423] Northern Territory Government, *Northern Territory Planning Scheme* Part 2: Planning Principles and Framework, cl 4.1.

[424] Northern Territory Government, *Northern Territory Planning Scheme* cl 6.14. In relation to flood, defined flood areas are also delineated based upon a default defined flood event of 1% AEP.

intensity of cyclones. These hazard maps are publicly available. [425] Further information can be obtained on the potential depth of inundation associated with a storm surge event at a particular property, and this is indeed required for compliance with certain development controls.

Strategic considerations and development controls

Clause 6.14 of the NTPS addresses land subject to flood and storm surge, with the stated purpose to 'reduce risk to people, damage to property and costs to the general community caused by flooding and storm surge.' The provisions seek to avoid new residential development in identified storm surge areas, but allow redevelopment and intensification in existing developed areas subject to certain design-based development controls.

First, any zoned land within a primary storm surge area is to be developed only with consent,[426] and should be limited to uses such as open space, recreation, non-essential public facilities (wastewater treatment works excepted) and short-stay tourist camping/ caravan areas.[427] Within the secondary storm surge area development should be confined to those uses permitted in the primary area as well as industrial and commercial land uses.[428] Residential uses, strategic and community services (such as power generation, defence installations, schools, hospitals, public shelters and major transport links) should be avoided in both the primary and secondary storm surge areas.[429] This clause does not however apply for extensions to existing dwellings, nor to commercial and industrial uses that would not otherwise require consent.[430]

Second, where development is permitted in a hazard zone, design-based development controls are employed to minimise risk exposure. These include provision for the minimum floor level of habitable rooms to be 300 m above the flood level for the site (referencing the Building Code of Australia), and a requirement to avoid the use of fill to achieve the required floor levels.[431]

The Planning scheme contains a number of specific area plans, some of which also contain development controls designed to minimise risks associated with storm surge: for example, the Darwin City Waterfront Planning Principles and Area Plan requires consideration of storm surge levels by including a marina and sea wall with an

[425] See Northern Territory Department of Lands, Planning and the Environment (Land Services) (NTDLPE) *Storm Tide* <http://lands.nt.gov.au/planning/natural-hazards/storm-surge> (accessed 16/12/2012); NTDLPE, *Storm Tide Mapping* <http://lands.nt.gov.au/planning/natural-hazards/storm-surge/storm-surge-mapping> (accessed 16/12/2012); NTDLPE, *Storm Tide Mapping and Me* <http://lands.nt.gov.au/planning/natural-hazards/storm-surge/storm-surge-mapping-and-me> (accessed 16/12/2012).

[426] Northern Territory Government, *Northern Territory Planning Scheme* Part 4, cl 6.14.

[427] Northern Territory Government, *Northern Territory Planning Scheme* Part 6, cl 6.14.

[428] Northern Territory Government, *Northern Territory Planning Scheme* Part 7, cl 6.14.

[429] Northern Territory Government, *Northern Territory Planning Scheme* Part 8, cl 6.14.

[430] Northern Territory Government, *Northern Territory Planning Scheme* Part 2, cl 6.14.

[431] Northern Territory Government, *Northern Territory Planning Scheme* Part 5, cl 6.14. Although a strict reading of this provision suggests that these development controls apply only to the DFA and not to storm surge areas, the provision is implemented so as to also apply to storm surge areas. This is confirmed by an information pamphlet available at <http://lands.nt.gov.au/planning/natural-hazards/storm-surge/storm-surge-mapping-and-me>, which states that building or redeveloping land in a storm surge area is permitted, subject to development controls. 'Any new development must meet all necessary development requirements and be designed to ensure personal safety is preserved, buildings are protected and impact on neighbouring properties is minimised. In residential buildings, the finished floor level of any new habitable rooms will need to be 300mm above the identified primary storm surge level. Habitable rooms are rooms used for domestic activities such as bedrooms and living rooms but excluding bathrooms, laundries, water closets and other spaces of a specialised nature occupied neither frequently nor for extended periods (Building Code of Australia).'

minimum height of 5.5 m Australian Height Datum (AHD), and the siting of the lowest floors within a development at 6.5 m AHD.[432]

Interaction with Building Regulations

A note is made in the margin to clause 6.14 of the Planning Scheme, that suggests the preferred construction approach for flood proofing buildings, including a preference for using piers or split level construction with habitable rooms located on the upper storey, and for partial flood proofing, using construction materials and/or methods that exclude floodwater from the building or resist deterioration during inundation events thereby limiting damage costs.

Risks to life and property posed by cyclones are addressed through implementation of the Building Code of Australia. Generally speaking, since Cyclone Tracey, new buildings built in the NT have been built to code and should be able to withstand the wind loads from a low level Category 4 cyclone with minimal structural damage.[433]

Disclosure Laws

There are no specific regulations requiring a vendor to disclosure information on natural hazard exposure under NT law. However, the *Land Title Act* (NT) provides for a register of administrative interests in land to be kept additional to the formal land register.[434] The Record of Administrative Interests provides details on the rights, obligations and restrictions pertaining to a particular property, including in relation to planning zones, planning applications and determinations. If a property falls within a mapped storm surge hazard area, this will be included on the administrative title; and this information is publicly accessible via a land search. There are proposals, yet to be approved, to include information on other hazards such as riverine flooding and bushfire.

1.4.1.3 Governance/Procedural Provisions

In the NT, land use planning is primarily a matter for the territory government, and local government has a minimal role to play.

The NT Planning Department is responsible for the development and administration of the Planning Scheme, with a side role played by the Department of Natural Resources, the Environment, the Arts and Sport in relation to the generation of some climate related hazard information.

If consent is required for the use or development of land an application is made to the consent authority (which may be the Development Consent Authority or otherwise the relevant Minister depending on the location). The Development Consent Authority is a panel of five members appointed by the Minister, including a member nominated by the relevant local authority.[435] The Consent Authority will refer a development application to the appropriate service authorities (which may be the local council in relation to stormwater management for example) and also to the Council if it occurs within a local government area.[436] These advisory functions are the primary mechanisms through which local government can influence development assessment.

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[432] Northern Territory Government, *Northern Territory Planning Scheme* cl 14.1.1.

[433] NT Department of Lands and Planning, as it then was, *Is your home safe in a cyclone?* (2011) <http://www.pfes.nt.gov.au/Emergency-Service/Public-safety-advice/~/media/Files/Forms_Licences_Permits_Publications/Emergency/Factsheets/cyclonemaintenance.ashx> (accessed 16/12/2012).

[434] *Land Title Act* (NT) s 38.

[435] *Planning Act* (NT) Part 8; a local authority may nominate a member of the Development Consent Authority.

[436] Northern Territory Government, *Northern Territory Planning Scheme* User Guide: Part 1, iii; *Planning Act* (NT) s 48.

1.4.1.4 Existing Development

Applying the above standards for redevelopment or intensification in existing urban areas will only improve the resilience of housing stock in storm surge zones in a slow and piecemeal fashion, as this mechanism relies on a development application to trigger the development controls.

The lack of provision for coastal erosion in the Planning Scheme/or otherwise in coastal management policy by the NT Government is a notable gap given the existing established urban areas that are potentially exposed to erosion within the jurisdiction of the Planning Scheme. This may reflect the fact that to date coastal erosion is directly affecting council coastal reserves with no direct impacts on adjoining private property to date.

1.4.2 Northern Territory - Bushfire

Bushfire is not considered in an NT context by this report due to the relatively low level of risk posed to urban settlements.

1.5 Queensland (Qld)

The *Sustainable Planning Act 2009* (Qld) (SPA) regulates land use planning in Qld, and provides for the development of state planning instruments, such as state planning policies and standard planning scheme provisions,[437] and the preparation of local planning instruments such as planning schemes.[438] Similar to other states, State planning instruments prevail over local planning instruments to the point of any inconsistency, and new planning schemes must comply with the standard planning scheme provisions.[439] The SPA makes minor specific reference to climate change in the context of providing the key purposes and definitions of the Act, yet these references focus on mitigation rather than adaptation.[440] Risk management policies, in relation to coastal climate hazards and bushfire, are however contained in state planning policies,[441] and are increasingly also reflected in local planning instruments.

There is no climate change specific legislation in Qld.

Similar to other states and territories, planning and building are separately regulated, and there is a general prohibition on regulating building work (that is covered by the *Building Act 1975*) through planning schemes.[442]

1.5.1 Queensland - Coastal Climate Hazards

1.5.1.1 Legal Architecture

Like NSW, SA and Victoria, Qld has specific coastal management legislation: *Coastal Protection and Management Act 1995* (Qld) (CPMA), which provides an additional

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[437] *Sustainable Planning Act 2009* (Qld) Chapter 2; state planning instruments include state planning regulatory provisions, regional plans, state planning policies and standard planning scheme provisions.

[438] *Sustainable Planning Act 2009* (Qld) Chapter 3; other local planning instruments include temporary local planning instruments and planning scheme policies.

[439] *Sustainable Planning Act 2009* (Qld) s 19(1) state planning regulatory provisions; s 26(3) regional plans; s 43 state planning policies; s 53 standard planning provisions.

[440] For example, s 5 provides that advancing the purposes of the Act is to include ensuring decision-making processes take account of short- and long-term environmental effects of development at local, regional, State and wider levels, including, for example, the effects of development on climate change (s 5(1)(a)(ii)); s 11 provides that for the purposes of defining terms used in the concept of ecologically sustainable development, 'the cultural, economic, physical and social wellbeing of people and communities is maintained if…potential adverse impacts on climate change are taken into account for development, and sought to be addressed through sustainable development.' (s 11(c)(iv)).

[441] See for example, Qld Department of Infrastructure and Planning, *South East Qld Regional Plan 2009-2031* (2009) 44-45.

[442] *Sustainable Planning Act 2009* (Qld) s 86.

layer of land use planning regulation and targeted governance arrangements for the Qld coastal zone.[443] It is through this coastal planning mechanism that development controls to address coastal climate hazards have been introduced to the broader planning regime.[444]

The CPMA provides for the development of a State Coastal Management Plan for the coastal zone.[445] This plan is treated as a state planning policy under the SPA, which requires that it be considered and reflected in local planning instruments whenever they are made or revised, and until that time, be taken into account by decision-makers such as assessment managers in the assessment of development applications in the coastal zone.[446]

Following a major review of the *State Coastal Management Plan 1991*, the *Queensland Coastal Plan 2011* came into force in February 2012.[447] The new plan has two parts:

State Policy for Coastal Management, which is directed at natural resource management decisions made by land managers about land on the coast, such as coastal reserves, beaches and esplanades (which are not assessable activities under the SPA); and

State Planning Policy for Coastal Protection (SPPCP), which states the principles, policies and assessment criteria to be applied by State and local government officials when they exercise their powers under the SPA in relation to the coastal zone.

However, at the time of writing, following a recent change of government in Qld, the regulatory component of the plan (SPPCP) was under review, and has been suspended and replaced with a temporary regulatory provision pending the outcome of the review. [448] Despite the uncertainty surrounding its future, the following discussion nonetheless focuses on the regulatory framework introduced by the SPPCP in 2012. This remains of comparative interest, given the rigorous approach taken to coastal climate hazards in the policy. Following this discussion, the implications of the new temporary regulatory provision are also outlined.

1.5.1.2 Substantive Provisions

One of the major reforms achieved by the 2011 Coastal Plan was the revision of principles and policies for land use planning and coastal hazards to introduce a more precautionary, long term approach to the anticipated impacts of climate change in the

[443] The coastal zone is defined to include Queensland's coastal waters (extending three nautical miles out to sea), coastal islands and land below 10 m Australian Height Datum or within 5 km of the coastline, whichever is greater (*Coastal Protection and Management Act 1995* (Qld) s 18A).

[444] For a short history of coastal planning in Queensland, see Bell J, 'Planning for climate change and sea level rise - Queensland's new Coastal Plan' (2012) 29 *Environmental and Planning Law Journal* 61.

[445] *Coastal Protection and Management Act 1995* (Qld) Chapter 2, see particularly s 21, 'Content of the Coastal Plan'. The plan must describe how the coastal zone is to be managed. In preparing the plan, the Minister must consider public access to the foreshore and the effect of climate change on coastal management. The Coastal Plan may include one or more of the following: a coastal state planning instrument, a map showing coastal resource information or requirements abut coastal resources and land management in the coastal zone.

[446] *Sustainable Planning Act 2009* (Qld) s 88 provides that State Planning Policies (SPPs) must be considered and reflected in local planning instruments whenever they are made or revised. Until then, assessment managers must look to the specific terms of the SPPCP, including any relevant development assessment codes, whenever they assess development applications to which the SPPCP applies.

[447] A major review of the first *State Coastal Management Plan 2001* was conducted in 2008-9 leading to a new *Queensland Coastal Plan 2011*; see, Queensland Government Department of Environment and Resource Management, *Report on the Review of the State Coastal Management Plan* (2009) <http://www.ehp.qld.gov.au/register/p02796aa.pdf > (accessed 13/07/2012).

[448] Qld Department of State Development, Infrastructure and Planning, *Draft Coastal Protection State Planning Regulatory Provision* (October 2012).

coastal zone.[449] In identified coastal hazard areas, the SPPCP sought to prevent new development and adopted a generally cautious approach to intensifying existing development. To this end, it introduced prescriptive development controls, focusing particularly on high hazard areas, which included the prohibition of certain types of development.[450] It also provided for the development of Coastal Hazard Adaptation Strategies (CHAS) by local government authorities to cover urban localities expected to be in the identified hazard area by 2100,[451] a mechanism which provided scope for local authorities to tailor adaptation approaches for existing settlements.

Identification of hazard areas

The SPPCP regulated land use in the coastal zone,[452] and provided specifically for the identification of coastal hazard areas with reference to the potential impacts of climate change.

The definition of coastal hazard used in the SPP had three elements: areas prone to coastal erosion, storm tide inundation or permanent inundation as a result of sea level rise.[453] Coastal hazard areas were to be identified in accordance with the methodology set out in the accompanying guideline,[454] taking into account a projected sea level rise of 0.8 m by 2100 and an increase in the maximum cyclone intensity of 10%.[455] These figures replaced the previously used sea level rise figure of 0.30 m by 2050. The new base line referenced the IPCC Fourth Assessment Report, and was to be reviewed when either a new assessment report by the IPCC was released or an Australia-wide agreed policy was developed.[456]

Storm tide inundation mapping was to be based on a defined storm tide event of 1% Average Recurrence Interval (ARI). Areas were either classified as high or medium hazard areas to reflect differing wave impacts and velocity of flows and therefore likely damage to property and threat to public safety.[457] The areas delineated as high hazard were expected to be inundated to a depth of 1m or more during a defined event. In the medium hazard area, the projected depth of inundation was less than 1m.[458]

The Identification of hazard areas was integrated with the existing delineation of coastal management districts and erosion prone areas under the CPMA.[459] Coastal

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[449] England P, 'Precaution creeps in – The Qld Coastal Plan 2011' (2011) 26 (8) *Australian Environment Review* 216; Bell J, 'Planning for climate change and sea level rise - Queensland's new Coastal Plan' (2012) 29 *Environmental and Planning Law Journal* 61.

[450] For example, development in an erosion prone area in a coastal management district is not permitted unless it is coastal dependent development, temporary or readily relocatable, essential infrastructure, or redevelopment that does not increase exposure to coastal hazard impacts, Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) 44, cl 2.1-2.3.

[451] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) 42, cl 1.6-1.8.

[452] See *Sustainable Planning Act 2009* (Qld).

[453] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) Glossary, 98. This definition is different to the definition of a coastal hazard in the *Coastal Protection and Management Act 1995* (Qld), which references erosion of the foreshore or tidal inundation.

[454] Qld Department of Environment and Resource Management, *Queensland Coastal Plan: Coastal Hazards Guideline* (2012). The guideline is extrinsic material to the SPPCP.

[455] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) 44, cl 2.1.1.

[456] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) 42, cl 2.1.2.

[457] Qld Department of Environment and Resource Management, *Queensland Coastal Plan: Coastal Hazards Guideline* (2012) 16.

[458] Qld Department of Environment and Resource Management, *Queensland Coastal Plan: Coastal Hazard Area Maps Fact Sheet*, available at <http://www.ehp.qld.gov.au/factsheets/pdf/environment/en29.pdf> (accessed 13/07/2012).

[459] See *Coastal Protection and Management Act 1995* (Qld), Part 3, Division 1: Coastal Management Districts; Part 4: Erosion Prone Areas; under Part 3, Division 3, a coastal building line may also be

management districts include identified erosion prone areas and areas of high ecological significance adjacent to the coast, such as coastal wetlands. Erosion prone areas are determined by a formula which considers short term erosion from storm events, long term erosion from sediment supply deficit and channel migration and erosion risk form sea level rise (either simple inundation of low-lying land or the morphological response of the coast where onshore sediments are permanently moved offshore).

The introduction of the Queensland Coastal Plan (QCP) was accompanied by a comprehensive state-led mapping of coastal hazard areas across the state to support decision making.[460] Property scale and area based maps are now publicly available on government websites, showing both areas of permanent inundation (as a result of coastal erosion and sea level rise) and areas of temporary inundation (as a result of storm tide inundation).[461]

Strategic considerations and development controls

At a strategic level, the SPPCP contained two key objectives which address coastal land use planning and coastal climate hazards:

- land-use planning in the coastal zone was to avoid or minimise community exposure to the risk of adverse coastal hazard impacts;[462] and
- communities and development should be protected from adverse coastal hazard impacts taking into account the projected effects of climate change and allowing for the natural fluctuation of the foreshore and foreshore ecosystems to continue.[463]

This was to be achieved by consolidating urban development in existing urban localities[464] and avoiding allocating new areas for urban purposes within a coastal hazard area.[465]

For the difficult issue of managing risks to existing settlements, the SPPCP provided for the development of Coastal Hazard Adaptation Strategies for urban localities that were projected to be within a high coastal hazard area between the commencement of the SPPCP and the year 2100. A CHAS was to be developed for these areas whether or not intensification of development was proposed. Each CHAS was to be based on an assessment of hazard mitigation options (including retreat, avoidance and defence) and a cost benefit analysis to determine the most cost effective works or actions, taking into account long term social, financial and environmental factors.[466] Local authorities were to prepare the CHAS and incorporate it into the planning scheme within five years

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declared for a coastal management district. All of these classifications continue to be relied upon in the new SPPCP.

[460] Qld Department of Environment and Resource Management, *Queensland Coastal Plan: Coastal Hazard Area Maps Fact Sheet* <http://www.ehp.qld.gov.au/factsheets/pdf/environment/en29.pdf> (accessed 13/07/2012).

[461] Qld Department of Environment and Resource Management, *Coastal Hazards Maps* (2011) <http://www.ehp.qld.gov.au/coastal/management/maps/index.html> (accessed 13/07/2012).

[462] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) 42. Other objectives include to maximise the conservation of coastal resources and to preferentially allocate land on the coast for coastal-dependent development.

[463] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) 44.

[464] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012), see cl 1.1-1.2.

[465] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 1.4.

[466] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 1.6, 1.8.

of the commencement of the SPPCP.[467] A guideline for the preparation of the CHAS was prepared and a pilot project undertaken in Townsville.[468]

The SPPCP provided a range of development controls for the hazard zone, depending on whether development was within or outside an existing urban locality and whether the land was subject to high or medium coastal hazard impacts.[469] It did not apply to all development in the coastal zone, but focused restrictions on the high hazard zone and on types of development which would increase the population on the coast, such as subdivisions, rezoning, and large developments.[470] As such, replacing an existing single residence with a new single residence was not prevented by the SPPCP.

Development outside existing urban localities

In general, land outside an existing urban locality and within a coastal hazard area should *not* be allocated for urban purposes. However, clause 2.2.1 provided that development in a coastal hazard area may be acceptable if it was:

- coastal-dependent development;
- development that was temporary, readily re-locatable or able to be abandoned;
- essential community infrastructure that could not feasibly be located elsewhere; or
- re-development that did not increase the risk to people and property from exposure to adverse coastal hazard impacts.[471]

Urban locality was defined very broadly and includes any land designated as an urban footprint or rural living area in an applicable regional plan. [472]

Development within an existing urban locality

Development of the type envisaged in clause 2.2.1 was also acceptable within an existing urban locality. However, any other development would only be allowed in *high coastal hazard impact areas* if:

- it was development consistent with a relevant adaptation strategy (CHAS);[473] or
- if an adaptation strategy had not yet been incorporated into a local planning instrument, the proposed development:
- did not increase the intensity of development on the premises; or
- included a risk assessment showing how adverse coastal hazard impacts could be mitigated *and* a relevant development application was made within three years of the commencement of the SPPCP (or five years if the preparation of

[467] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 1.8.
[468] Qld Department of Environment and Resource Management, *Queensland Coastal Plan: Guideline for preparing Coastal Hazard Adaptation Strategies* (2012). The guideline is extrinsic material to the SPPCP.
[469] These policies are restated in the form of a development assessment code in Annexure 2 to the SPPCP, which provides the overall outcomes, performance outcomes and specific outcomes that represent compliance with the SPPCP.
[470] See discussion in Bell J, 'Planning for climate change and sea level rise - Queensland's new Coastal Plan' (2012) 29 *Environmental and Planning Law Journal* 61, 66.
[471] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 2.2.1.
[472] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) 103.
[473] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 2.5.1.

an adaptation strategy was substantially underway when the SPPCP commenced).[474]

Similarly, any other development in a *medium coastal hazard impact area* was not allowed to increase the intensity of development on the site; or alternatively was required to demonstrate through a risk assessment how adverse coastal hazard impacts from a defined storm tide event were to be avoided.[475]

Development within a *greenfield area* was required to be located outside the high coastal hazard area.[476]

In *erosion prone areas*, as provided for in the CPMA,[477] any permanent development other than that envisaged by clause 2.2.1 was specifically prohibited.[478] Special provisions applied to clause 2.2.1 type development if it occurred within an erosion prone area.[479]

Exceptions and Qualifications

There were a number of exceptions and qualifications built into the SPPCP which limited its application in particular circumstances. For example:

- *Development serving an overriding public interest:* A particular development would not need to fully achieve the policy outcomes stated in the SPPCP, if it was impossible to locate the development where the conflict was avoided; and the overall social, economic and environmental benefits of the development outweighed any detrimental effect upon the natural values of the site and adjacent areas as well as any conflicts with the policy outcomes of the SPPCP.[480]
- *Development commitments:* Land already subject to a development commitment needed only to comply with the SPPCP to the maximum extent practicable. Development commitment was defined to include any preliminary approval or development permit valid on the commencement of the SPPCP; development located within a state development area; or development consistent with a designation of land for community infrastructure under the SPA.[481]

Further relevant provisions of the CPMA

The CPMA also provides specifically for the surrender of coastal land as a condition for development approval for the reconfiguration of a lot, which is situated either wholly or partly within the Costal Management District. The land in question must be either within an erosion prone area or within 40 m of the shoreline, and the surrender must be approved by the Minister responsible for the CPMA.[482] No compensation is payable for

[474] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 2.5.2.
[475] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 2.5.4.
[476] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 2.5.3.
[477] Erosion prone areas are areas within the coastal zone are subject to particular development requirements, *Coastal Protection Management Act 1995* (Qld) s 4 and Part 4.
[478] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 2.3.1.
[479] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 2.3.2 – 2.3.7.
[480] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) Annexure 5, 97.
[481] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) Part D, 55; Glossary, 101.
[482] *Coastal Protection Management Act 1995* (Qld) Part 6, Division 3.

the land surrendered,[483] and there are no rights to appeal such a condition.[484] The land must be dedicated as a reserve for coastal management under the *Land Act 1994*.[485]

Disclosure Laws

Under Part 6, Division 4 of the SPA, a person may apply for a planning and development certificate. There are three types of certificate; each provides a different level of information. Limited certificates are used for most general conveyancing matters, and include a base level of information on the relevant planning scheme provisions or any state or local designations applying to the premises.[486] However, in contrast to arrangements in NSW and Victoria, there is no legal requirement for a vendor to include the certificate as part of a contract of sale. There is also no requirement to include information on potential exposure to hazards beyond any information that is reflected in a formal document, policy, plan or decision.

1.5.1.3 Governance/Procedural Provisions

Planning Schemes

Under the SPA, local government authorities have a key role in developing planning schemes that reflect state planning policies such as the SPPCP. A statutory review of local planning schemes is to occur every 10 years, at which point local government may decide to prepare a new scheme, amend the existing scheme or leave the existing scheme unchanged. [487] When a planning scheme is being prepared or revised, it is reviewed to confirm that it adequately reflects applicable state planning instruments, such as the SPPCP.[488] Public consultation is required when planning schemes are made or amended.[489] Coastal councils in Qld are currently in the process of reviewing and/or preparing new planning schemes, in many cases following amalgamation of local government areas in recent years. This process was largely underway when the Qld Coastal Plan came into force in February 2012, meaning that its provisions will be varyingly reflected in different planning schemes.

Coastal Hazard Adaptation Strategy

As noted above, the SPPCP also required local government to prepare a CHAS for urban localities within the high hazard zone that was to be incorporated into the planning scheme. The SPPCP itself provided little guidance as to the process for preparing a CHAS,[490] and an additional guideline was prepared to supplement the SPP by providing minimum requirements and best practice guidelines.[491] The guideline notes that local authorities were to take the lead in preparing the CHAS, with the relevant state government department in a supporting role, particularly in relation to technical assistance and data provision. External expertise for the preparation of cost benefit analysis for example, was also anticipated.[492]

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[483] *Coastal Protection Management Act 1995* (Qld) s 115(1).
[484] *Coastal Protection Management Act 1995* (Qld) s 155(2).
[485] *Coastal Protection Management Act 1995* (Qld) s 115B.
[486] *Sustainable Planning Act 2009* (Qld) s 738.
[487] *Sustainable Planning Act 2009* (Qld) s 91, 92.
[488] *Sustainable Planning Act 2009* (Qld) s 117; Growth Management Qld, Growth Management Qld, *Statutory Guideline 02/09: Making and Amending Local Planning Instruments* (2011) 10-23.
[489] *Sustainable Planning Act 2009* (Qld) Chapter 3, Part 5.
[490] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 1.6-1.7.
[491] This is based largely on the Australian and New Zealand Risk Management Standards (AS/NZS ISO 31000:2009).
[492] Qld Department of Environment and Resource Management, *Queensland Coastal Plan: Guideline for preparing Coastal Hazard Adaptation Strategies* (2012) 8; the guideline is extrinsic material to the SPPCP.

The guideline provided that a CHAS must:

- spatially identify areas at risk, preferable through local scale mapping;
- identify current and known future assets at risk and assess their vulnerability to coastal hazard impacts to the year 2100;
- identify potential adaptation options;
- consult the community about potential adaptation options;[493]
- undertake a cost-benefit analysis of adaptation options;
- select preferred adaptation options;
- develop an implementation program and a financial plan;
- engage in community consultation on the draft adaptation strategy;[494] and
- develop a process for reviewing and updating the draft strategy.

Decision-making roles and responsibilities

For any development in the coastal management district, as delineated under the CPMA, it is not local government, but the relevant state government agency responsible for the CPMA (currently, Department of Environment and Heritage Protection, formerly Department of Environment and Resource Management) which plays the role of assessment manager. These governance arrangements differ from arrangements in Victoria and South Australia, where Catchment Management Authorities and the SA Coast Protection Board respectively, act as referral authorities (with less direct influence on decision-making yet a degree of independence from government).

1.5.1.4 Existing Development

As noted above, the SPPCP focused largely on new development in the high hazard zone, and did not apply to existing development, other than to place some limits on redevelopment in existing urban areas. Otherwise, adaptation options for existing urban areas were to be approached through the development of a CHAS outlined above.

Coastal Protection Work

In relation to coastal protection works, the SPPCP provided that such works would be approved where they were consistent with a Shoreline Erosion Management Plan (prepared under the CPMA); where they were necessary to protect coastal development that was allowable under the SPPCP (such as coastal dependent or re-locatable development); or where there was a demonstrated need to protect existing permanent structures from coastal erosion, and abandonment or relocation was not feasible.[495] However, the policy expressed a preference for beach nourishment over erosion control structures wherever feasible;[496] and required any erosion control

[493] Although public consultation is not a statutory requirement under the SPP, it is included as best practice in the guideline, with the note that a CHAS needs to be incorporated into the planning scheme and consultation is required when planning schemes are made or amended under the SPA.
[494] As above, although public consultation is not a statutory requirement under the SPP, it is included as best practice in the guideline with the note that a CHAS needs to be incorporated into the planning scheme and consultation is required when planning schemes are made or amended under the SPA.
[495] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 2.4.1.
[496] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 2.4.2.

structures to be located on private land as afar as possible and to consider the associated risk of erosion to neighbouring areas.[497]

Protection of existing uses/development rights

Although all states have provisions for compensation for the acquisition of land for public purposes, Qld is the only jurisdiction that affords a legal right to compensation for any diminution of development rights as a result of amendments to a planning scheme. This has been identified as a barrier to local governments introducing stricter controls on development in hazard prone areas.[498]

Under the SPA, the owner of an interest in land is entitled to be paid reasonable compensation by a local government if: a change in a planning scheme reduces the value of the interest; an owner's request to have the superseded planning scheme provisions applied is declined; and assessment under the new planning scheme leads to a refusal or more burdensome conditions being applied.[499] Strict time frames apply however, and a compensation claim may only be made if an owner has requested the development application be assessed under the superseded policy within one year of the new planning scheme taking effect.[500]

Additionally, the Act provides for two instances in which no compensation will be payable. While the scope of these exemptions is unclear and in certain cases untested, both may serve as partial shields to local government exposure to liability in relation to hazard mitigation development controls.

First, no compensation will be payable if a change in the planning scheme is made to include a mandatory part of the standard planning scheme provisions,[501] or if the change has the same effect as another statutory instrument in relation to which compo is not payable.[502] This covers all state planning instruments including state planning regulatory provisions and state planning policies. However as Macdonald has previously argued, 'unless these planning instruments contain a clear prohibition on development… there is scope for debate and litigation about whether a change to a local planning scheme was made directly as a result of and to ensure compliance with the statutory instrument.'[503] It is questionable whether the SPPCP is sufficiently clear to support a local government in claiming such an exemption.

Secondly, compensation will not be payable if the changes made to the planning scheme affect development that would have led to serious risk to persons or property from natural processes (including flooding, land slippage, or erosion) or would have caused serious environmental harm, had it been allowed under the previous planning scheme, to the extent that the risk or environmental harm could not have been significantly reduced via conditions attached to a development approval.[504] The scope and operation of this exemption has not been judicially tested.

1.5.1.5 Draft Coastal Protection State Planning Regulatory Provision (October 2012)

The development industry and local government reacted to the introduction of the Qld Coastal Plan with considerable concern over the potential economic impacts of tighter restrictions on coastal development and the capacity of local government to implement

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[497] Qld Department of Environment and Resource Management, *Queensland Coastal Plan – State Planning Policy 3/11: Coastal Protection* (2012) cl 2.4.3.
[498] McDonald J with England P, *Adaptation in land use planning and human settlements: Managing and allocating natural hazard risks – Project Report* (2011) 22.
[499] *Sustainable Planning Act 2009* (Qld) s 704.
[500] *Sustainable Planning Act 2009* (Qld) ss 95, 704.
[501] *Sustainable Planning Act 2009* (Qld) ss 706(1)(b)-(c).
[502] *Sustainable Planning Act 2009* (Qld) ss 706)(1)(a).
[503] McDonald J with England P, *Adaptation in land use planning and human settlements: Managing and allocating natural hazard risks – Project Report* (2011) 24.
[504] *Sustainable Planning Act 2009* (Qld) s 706(1).

the SPPCP.[505] Following a change of government in March 2012, a full review of the Queensland Coastal Plan was commenced to ensure the policy, particularly the SPP, was supportive of the new Government's commitment to grow the Queensland economy. On 8 October 2012, the *Draft Coastal Protection State Planning Regulatory Provision* (Draft SPRP) was introduced, which took effect immediately for up to 12 months, and suspended the operation of the SPPCP (as well as relevant coastal planning provisions in regional plans, such as Part 1.2 of the *Far North Qld Regional Plan*).

The provisions of the Draft SPRP are based on state coastal management planning policies that were in place prior to the introduction of the SPPCP. At a general level, while the overarching objectives are not dissimilar to the SPPCP, the Draft SPRP is far less detailed and prescriptive in its approach, providing far greater discretion to local government decision-makers.

The Draft SPRP is divided into two parts. Part 1 provides policy direction for strategic planning (local plan making and amending planning schemes; regional plan making; designating land for community infrastructure). Part 2 deals with development assessment.

Part 1 – Strategic Objectives

High level statements of policy are provided to guide planning decisions in the following areas:

- *Land use planning*: Similar to the suspended SPPCP, the Draft SPRP expresses a preference for containing urban growth in established urban areas, promoting the consolidation and separation of urban areas from the coast.
- *Coastal hazards*: When allocating new areas for urban land use on the coast, an evaluation of the level of risk to life and property from coastal hazards is required. This is to be based on coastal hazard mapping (that was prepared as the basis for the suspended SPPCP) and is to take into account any impacts from potential sea level rise. However the planning benchmarks relating to the projected impacts of climate change which were included in the SPP have not been specifically included. Coastal planning must address coastal hazards through a hierarchy of approaches: avoiding the location of new development in hazard areas; planned retreat from vulnerable areas; accommodate hazards to allow continued occupation of near coastal areas; and finally protection of settlements and infrastructure.
- *Coastal-dependant land uses*: Similar to the suspended SPPCP, the Draft SPRP states a preference for the allocation of coastal land to coastal dependent land uses.
- *Areas of high ecological significance*: The Draft SPRP significantly weakens the environmental protection measures of the suspended SPP. It refers only to the protection of areas of High Ecological Significance and not areas of general ecological significance as provided for by the SPPCP. In effect, this reduces the area to which the Draft SPRP applies. There is also now scope for the Minister to allow urban development in areas of high ecological significance where there is an overriding social and economic need.

Further, the requirement for local governments to prepare a Coastal Hazards Adaptation Strategy has not been carried over to the Draft SPRP.

[505] See for example, Property Council of Australia, *Queensland Coastal Plan* (2012) <http://www.propertyoz.com.au/Article/NewsDetail.aspx?p=16&id=6037> (accessed 31/10/2012).

Development Assessment

Compared to the suspended SPPCP, the Draft SPRP has limited application. It only applies to impact assessable development in a coastal management district, where as SPP applied to a much wider range of development scenarios including building work, material change of use, reconfiguring a lot and operational work within the coastal management district as well as certain material change of use, reconfiguring a lot and operational works in the coastal zone but outside of the coastal management district.

Further, the suspended SPP contained a development assessment code which included detailed Performance Outcomes and Acceptable Outcomes whereas the Draft SPRP contains only broad provisions in relation to development assessment.

1.5.2 Queensland - Bushfire

1.5.2.1 Legal Architecture

Similar to the coastal protection policy described above, there is a specific State Planning Instrument which addresses bushfire risk in Qld: *State Planning Policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (SPP 1/03). The policy has effect when development applications are assessed, when planning schemes are made or amended and when land is designated for community infrastructure.[506] The SPP is to be appropriately reflected in planning schemes to ensure that the State's interests in natural disaster mitigation are interpreted in the local context when planning for future development and making decisions on development applications.[507] In situations where a planning scheme does not appropriately reflect the SPP, the assessment manger must have regard to the SPP when assessing development under the SPA.[508]

The SPP 1/03 took effect in 2003, and, at the time of writing, was under review. Following the Royal Commission into the 2011 Queensland floods, which focused much attention on land use planning measures to mitigate natural hazard risks, significant reform is expected.

Interaction with Building Regulations

Like other states and territories, Qld has adopted the *Australian Standard for the construction of buildings in bushfire prone areas* (AS 3959 – 2009).[509] The residential building standard applies to new homes or outbuildings of any construction type; rebuilding of homes or outbuildings; repairs to part of a building or outbuilding such as garage, shed or fireplace and additions to home and outbuildings within six m of a dwelling.[510]

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[506] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) cl 2.1.

[507] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) cl 3.3.

[508] Qld Government Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) cl 3.2.

[509] Qld Department of Community Safety (Rural Fire Service) *Building in Bushfire Prone Areas* (2009) <http://www.ruralfire.qld.gov.au/Bushfire%20Planning/Building%20in%20Bushfire%20Prone%20Areas/> (accessed 12/07/2012).

[510] Council of Standards Australia, *Australian Standard 3959–2009: Construction of buildings in bushfire prone areas* (2009). In the most extreme fire risk areas, measures required for new homes will include: a concrete slab; exterior walls must be constructed of non-combustible materials such as brick veneer or concrete; non-combustible material on the roof, veranda or deck; sealed wall and roof joints to guard against ember attacks; shutters made from aluminium or other non-combustible material, or toughened glass for windows; door frames made from fire resistant timber, with a weather strip at the base; metal rather than plastic external trimmings such as vents, guttering and down pipes.

1.5.2.2 Substantive Provisions

The SPP 1/03 dates to 2003, and hence reflects a more tentative and cautious approach to the consideration of climate change impacts in the context of natural hazard management than the recent coastal protection policy. It does however acknowledge the potentially significant impact of climate change on the nature and extent of natural hazards, including bushfire, and provides that, consistent with the precautionary principle, this should be considered in natural hazard management.[511]

Importantly however, in relation to the identification of bushfire hazard areas, the Guideline to the SPP notes that changes to vegetation communities and fuel characteristics as a result of climate change are 'difficult to predict and … likely to occur very gradually over a long time frame… For these reasons it is not practicable to consider the impacts of climate change in bushfire hazard assessment studies at present.'[512]

Identification of hazard areas

SPP 1/03 requires the identification of natural hazard management areas for bushfire, flood and landslide, within which minimising risks to the community should be a key consideration in the assessment of development applications and the preparation of planning schemes.[513] The delineation of these areas in the planning scheme triggers the development outcomes and assessment requirements discussed below.

For bushfire, default hazard mapping identifying medium and high hazard areas produced by the Qld Fire and Rescue Service is available to local governments.[514] Alternatively, local governments may conduct a bushfire hazard assessment consistent with the methodology provided by the SPP, or an alternative methodology approved by the Rural Fire Service.[515]

The SPP methodology involves quantitative assessment of key determinants of the severity of bushfire hazard (vegetation communities, slope and aspect) in addition to a qualitative review of known bushfire behaviour, resulting in an identification of high and medium hazard areas.[516] It also requires the identification of a safety buffer of land adjacent to identified hazard areas.[517] For high hazard areas, a buffer of 100 m is required; for medium hazard areas, 50 m is required.[518]

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[511] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) cl 4.6.

[512] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy Guideline: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) Appendix 3: Undertaking Natural Hazard Assessment – Bushfire, cl A3.7.

[513] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) cl 5.1.

[514] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy Guideline: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) 9; the Bushfire Risk Analysis maps produced by the Qld Fire and Rescue Service are to serve as default mapping. As part of the review of the SPP, this mapping is to be revised very soon and include some measure of climate change impacts. The QFRS is a division of the Qld Department of Community Safety. For mapping dated to 2008 see <http://www.ruralfire.qld.gov.au/Bushfire%20Planning/>.

[515] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) cl A3.3.

[516] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) A3.8-A3.11.

[517] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) A3.12.

[518] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) A3.24.

Strategic considerations and development controls

SPP 1/03 provides a number of key policy outcomes to guide both development assessment and the making and amending of a planning scheme. These are generally high level statements of policy, and leave considerable discretion to decisions makers to determine the approach taken to natural hazard risks. In comparison to the Victorian bushfire planning provisions detailed above, the policy statements are not particularly well supported by codified development controls to support decision makers to realise these policy outcomes in practice.

Development Assessment

In identified bushfire hazard areas, the SPP applies to material changes of use and associated reconfigurations of a lot which increase the number of people living or working in the area; or which involve institutional uses where evacuating people may be difficult (eg hospitals).[519] It also applies to a range of community infrastructure that provides vital community services, such as police and emergency services, hospitals and transport networks.[520]

The policy states that development to which this SPP applies must be compatible with the nature of the natural hazard.[521] For bushfire, this involves determining compliance with the following specific outcomes:

Development must maintain the safety of people and property by:

- avoiding areas of High or Medium bushfire hazard; or
- mitigating the risk through allotment design and building siting; firebreaks that provide adequate setback and access for emergency vehicles; provision of adequate road access for fire-fighting and emergency vehicles; and provision of adequate and accessible water supply for fire fighting purposes.[522]

Some further detail is provided in the *Guideline to the SPP* which outlines development assessment codes for inclusion in planning schemes, including acceptable solutions for meeting the policy outcomes. These include prescribed setbacks from hazardous vegetation of 1.5 times the predominant mature canopy tree height or 10 m (whichever is greater) for lots greater than 2500 m^2, or a requirement to maximise setbacks from hazardous vegetation for smaller lot sizes.[523]

Two broad exceptions apply to these requirements: where the development proposal is a 'development commitment' or where there is an overriding need for the development in the public interest and no other site is suitable and reasonably available for the proposal.[524] A 'development commitment' is defined broadly by the SPP to include a

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Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) Annexure 1: Development to which this policy applies, A1.1. In addition the policy applies to such development that would involve the manufacture or storage of hazardous materials in bulk, or building work involving physical alterations to a watercourse through practices such as filling; or other work on potentially unstable slopes.

[520] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) cl A1.2.

[521] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) 6, Outcome 1.

[522] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) Annexure 4, A4.2.

[523] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy Guideline: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) 60 - 62.

[524] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) cl 6.3.

development with a valid preliminary approval and development that is code assessable or otherwise consistent with the requirements of the relevant planning scheme.[525]

Further, the SPP provides that although the two exceptions above do not need to be compatible with the nature of the natural hazard, such development must nonetheless minimise as far as practicable the adverse impacts from natural hazards; and must not result in an unacceptable risk for people or property.[526] Unacceptable risk is defined broadly in the glossary to mean 'a situation where people or property are exposed to a predictable hazard event that may result in serious injury, loss of life, failure of community infrastructure, or property damage that would make a dwelling unfit for habitation.'[527] Despite this broad and all-encompassing definition, the guidance provided in Annexure 5 for the minimum requirements for determining unacceptable risk for the purposes of meeting this policy outcome provides merely that adequate road access for fire fighting and other emergency vehicles and safe evacuation; and adequate and accessible water supply for fire fighting purposes must be achieved.[528] There is no provision for siting of buildings or setbacks from vegetation.

Finally, the SPP provides that wherever practicable, community infrastructure to which the SPP applies is located and designed to function effectively during and immediately after natural hazard events commensurate with a specified level of risk.[529]

Planning Schemes

Planning schemes are to achieve the above outcomes by identifying natural hazard management areas and applying appropriate planning strategies and development assessment measures.[530] The aim is to employ strategic planning measures so as not to increase the number of people living or working in natural hazard management areas and to avoid the establishment or intensification of other uses or works that are likely to increase the adverse impacts of the hazard. In particular, uses such as residential development should be discouraged unless the planning scheme includes clear requirements or standards aimed at ensuring that appropriate levels of safety will be achieved.[531]

Ideally, natural hazard areas should be mapped as overlays and planning schemes are to include a code designed to achieve development outcomes; and must ensure that development to which the SPP applies is assessable or self-assessable against the planning scheme code. The planning scheme must also specify the information expected to be submitted with development applications subject to the code.[532]

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[525] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) Glossary, s 9.1

[526] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) Outcome 2.

[527] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) Glossary, s 9.1.

[528] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) Annexure 5, A5.2.

[529] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) 8, Outcome 3.

[530] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) cl 7.1.

[531] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy Guideline: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) 22.

[532] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) 9, Outcome 6, cl 7.6, 7.7.

Policy Guidance for balancing trade-offs

The SPP acknowledges the potential trade-offs that may be involved in minimising adverse impacts of bushfire and other natural hazards, and states that 'achieving the outcomes of this SPP is not an automatic justification for a development proposal being inconsistent with policies on amenity, conservation or other matters.'[533] The *Guideline to the SPP* also provides that if development is situated within a designated area of nature conservation value under the *Nature Conservation Act 1992* (Qld) or the planning scheme, the proposed development may be inappropriate because of the need to clear vegetation for firebreaks. However if the development proposal is a 'development commitment' (and therefore not able to be refused under the SPA), the risk from the bushfire hazard should be mitigated in ways that minimise the adverse impacts on the nature conservation values. [534]

1.5.2.3 Governance/Procedural Provisions

As noted above, under the SPA, local government authorities have a key role in developing planning schemes that reflect the SPP. When assessing development in the role of assessment manager, local government must have regard to the SPP, should not approve development applications that do not meet the outcomes of the SPP, and should impose conditions on development approvals to minimise risk from natural hazards.[535] In contrast to arrangements in the southern states, there is no formalised role as a referral authority for the relevant fire authority.

Various state government departments also have a role in ensuring that planning schemes reflect the SPP. The lead role of reviewing draft planning schemes and advising on the implementation of the SPP is given to the Department of Community Safety (formerly Emergency Services). The Department of State Development, Infrastructure and Planning (formerly Department of Local Government and Planning) also plays a coordinating role.[536]

1.5.2.4 Existing Development

For existing settlements in bushfire prone areas, planning reforms are of limited importance, and there are limited options available for risk mitigation. In Qld, the QFRS takes the lead on awareness and education campaigns to inform residents of risks and mitigation strategies. Compared to the southern Australian jurisdictions where local governments employ fire prevention officers to coordinate risk mitigation activities on council-managed and private land, there is relatively little institutional capacity in local government to address bushfire risk in existing communities.

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[533] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) cl 3.2.

[534] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy Guideline: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) 60.

[535] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy Guideline: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) 24, Roles and Responsibilities.

[536] Qld Department of Local Government and Planning and Department of Emergency Services, *State Planning Policy Guideline: Mitigating the Adverse Impacts of Flood, Bushfire and Land Slide* (2003) 24: Roles and Responsibilities.

1.6 South Australia (SA)

Land use planning is regulated (together with building work)[537] under the *Development Act 1993* (SA) and associated *Development Regulations 2008* (SA), via a tiered system of state and/or regional planning policies and local planning instruments.

At the state/regional level, the *South Australian Planning Strategy* (which is made up of a 30 year plan for Greater Adelaide and six regional plans) sets high level strategic direction for development across the State.[538] The Act clearly states that the Planning Strategy is an expression of policy and does not affect rights or liabilities. It is not to be taken into account directly for the purposes of development assessment.[539] Policies addressing the risks of climate change have been adopted at this level. For example, the *30 year plan for greater Adelaide* places considerable emphasis on the role of the urban form in both climate change mitigation and adaptation, and includes specific targets and policies to this effect, including in relation to coastal hazards and bushfire.[540]

The local planning instrument, against which development is assessed, is called the *development plan*. These various plans are applied to local government areas and 'out of council' areas. They may be amended by the Council or by the planning Minister. All amendments are subject to Ministerial approval. The development plans must be aligned with the volume of the Planning Strategy that applies to the relevant region.[541] This alignment is achieved via the development plan amendment process,[542] and provides an avenue for the translation of overarching state government policy into local plans to guide local development outcomes.

Consistent with initiatives in other states, South Australia (SA) has also introduced a standard format structure and provisions for development plans, to which local councils can add local content;[543] and local development plans are in the process of being reviewed against these provisions. These include zone provisions, objectives and principles of development control for coastal areas and hazards including bushfire, the substance of which is discussed in more detail below.[544]

Development approval contains a number of consents: a development plan consent is assessed against the planning policies contained in the Development Plan (development designated as 'complying' development receives automatic approval subject to meeting any relevant conditions in the Development Plan or Development Regulations); Building Rules Consent is assessed against the technical requirements of the Building Rules, contained largely in the Building Code of Australia and any relevant South Australian variations; and if the development proposes the division of land, a Land Division Consent must also be obtained.

Development plans control development using zones, maps and policies, which provide the criteria against which development applications will be assessed in any

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[537] Regulation of building is covered by Part 6 of the Act. Development is defined in s 4 to include building work.
[538] *Development Act 1993* (SA) s 22.
[539] *Development Act 1993* (SA) ss 22(8), 22(9).
[540] SA Government Department of Planning and Local Government, *The 30 year plan for greater Adelaide: a volume of the South Australian Planning Strategy* (2010) 138-141.
[541] *Development Act 1993* (SA) Part 3, Division 2; see for example, s 23(3).
[542] *Development Act 1993* (SA) s 24, especially s 24(1)(h).
[543] SA Department of Planning and Local Government, *South Australian Planning Policy Library* (Version 6, 2011).
[544] For example, see the description of standard provisions provided in SA Department of Planning, Transport and Infrastructure, *Port Adelaide Enfield Council, Development Plan* (2012) 8; Zone Provisions – provide certainty and direction about where certain forms of development should be located; Objectives – specific planning policies that determine what land use are encouraged or discouraged in the zone and detailed guidance on the scale and design of the development; Principles of Development Control – provide lists of complying and non-complying development.

particular area. Where a development is not classed as *complying* or *non-complying*, it will be assessed on its merits against the provisions of the relevant Development Plan.[545]

In most cases, the local council is the relevant authority responsible for the determination of development applications; however, for larger and more complex developments, the Development Assessment Commission (an independent statutory body established under the Act)[546] is the relevant authority.[547] An important difference in the South Australian planning system is that local councils delegate decision-making powers in relation to development approval to council staff, and, as of recent reforms, to Development Assessment Panels (made up of both councillors and other independent stakeholders). This measure seeks to avoid the politicisation of planning decisions.

Arrangements for referring applications concerning coastal hazards and bushfire risk to State level bodies for advice or direction are similar to other jurisdictions and are discussed below.

Other relevant legislation

Similar to Victoria, SA has targeted climate change legislation: *Climate Change and Greenhouse Emissions Reduction Act 2007* (SA). While its focus is predominantly on climate change mitigation, the Act does reference adaptation in its objectives,[548] and commits the Minister to develop policies that will assist in 'promoting or implementing measures to facilitate adaptation to circumstances that will inevitably be caused by climate change.'[549] Under the umbrella of the Act, the SA Government has released a Climate Change Adaptation Framework, under which both regional and sectoral approaches to climate change adaptation planning are being developed.[550]

1.6.1 South Australia - Coastal Climate Hazards

1.6.1.1 Legal Architecture

SA was the first Australian state to introduce coastal climate change adaptation policies to its land use planning system, via the coastal management regime introduced by the *Coast Protection Act 1972* (SA) (CPA). The CPA established a specific statutory body, the Coast Protection Board, as steward of the SA coastal zone,[551] and a framework for the development of coastal management plans for the coast protection districts of the state.[552] Policies developed by the Board under the CPA have been given effect in the planning system through their inclusion in the regional volumes of the state's planning strategy and in local development plans.

The foundations for the current coastal climate change policy were laid in 1991, when the Coast Protection Board developed a policy on coastal protection and new coastal

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[545] *Development Regulations 2008* (SA) Schedule 4 outlines what will be considered complying development for the purposes of a development plan.
[546] *Development Act 1993* (SA) ss 10, 11.
[547] *Development Act 1993* (SA) s 34.
[548] *Climate Change and Greenhouse Emissions Reduction Act 2007* (SA) s 3(1)(h) – to support measures to facilitate adaptation to circumstances that will inevitably be caused by climate change, including by supporting measures that will improve the ability of the community, species and ecosystems to deal with the effects of climate change.
[549] *Development Act 1993* (SA) s 14(1)(a)(ii). There is also provision for the minister to enter into a sector agreement under the Act with any person, entity, industry or business group on a voluntary basis for the purpose of recognising, promoting, or facilitating strategies to meet any target set under this Act (s 16).
[550] Government of South Australia, *Adapting to Climate Change in South Australia* <http://www.sa.gov.au/subject/Water,+energy+and+environment/Climate+change/Adapting+to+climate+change/Adapting+to+climate+change+in+South+Australia> (accessed 20/07/2012).
[551] *Coast Protection Act 1972* (SA) Part 2. The functions of the Coastal Protection Board are listed in s 14.
[552] *Coast Protection Act 1972* (SA) ss 19, 20.

development under the CPA which incorporated climate change considerations.[553] This was endorsed by the State government and incorporated into the State planning regime in 1994, via a ministerial amendment to development plans.[554] These provisions now form part of the standard planning provisions.[555] A new *Coast Protection Board Policy Document* was introduced in 2004, and revised most recently in May 2012.[556] This document largely restates the standards and development controls introduced in 1991, within a broader policy framework for coastal zone management.[557]

1.6.1.2 Substantive Provisions

Identification of hazard areas

For the purposes of planning and development assessment, *coastal land* is defined by regulation under the Development Act.[558] Coast is also defined under the CPA.[559]

The planning benchmarks provided in the *Coast Protection Board Policy Document* and adopted in Development Plans account for climate change as follows:

Sea level rise – a planning benchmark of 0.3 m sea level rise by 2050 and 1 m sea level rise by 2100 is prescribed.[560] The policy recognises the uncertainty associated with sea level rise projections in the longer term, and for this reason sets minimum standards in relation to the 2050 benchmark, however also requires that there be reasonably practical means of meeting the further 2100 requirement (see further discussion of planning controls below). These benchmarks were based on the median projections of the available IPCC report at the time the policy was developed in 1991, and have not been updated since this time.

Coastal flooding - the policy adopts a 100 year ARI for coastal flooding events. It refers to flooding caused either directly by storm tide or due to a combination of storm water backed up by tide, and notes that it will therefore sometimes be appropriate to consider

[553] Coast Protection Board South Australia, *Policy on Coast Protection and New Coastal Development* (1991). This policy specifically targeted development in areas at risk of coastal flooding or erosion. It did not tackle broader coastal planning issues such as nodal v strip development, which were covered in Coastal Management Plans and subsequently integrated into relevant Development Plans.

[554] This was achieved through a Minister's Supplementary Development Plan to give policies state-wide effect, and subsequently through local Supplementary Development Plans to establish local details such as setback requirements and building heights in eroding or flood prone areas; 1991 policy description; see also 2012 policy description – the standards were written into the development plan via the Minister's Regional Coastal Areas Policies Amendment 1994. They have gradually been incorporated in local development plans as these have been regularly reviewed, see SA Department of Planning and Local Government, *South Australian Planning Policy Library* (Version 6, 2011) 30-34.

[555] SA Department of Planning and Local Government, *South Australian Planning Policy Library* (Version 6, 2011) 30-34.

[556] Coast Protection Board South Australia, *Coast Protection Board Policy Document: Revised 22 May 2012* (2012).

[557] Coast Protection Board South Australia, *Coast Protection Board Policy Document: Revised 22 May 2012* (2012); particularly Chapter 1: Development, Chapter 2: Hazards, and Appendix 1: Flooding and Erosion Guidelines and Risk Assessment Criteria.

[558] *Development Regulations 2008* (SA) Schedule 8, cl 1(1); coastal land means 'land situated in a zone or area defined in the relevant Development Plan where the name of the zone or area includes the word 'Coast' or 'Coastal', or which indicates or suggests in some other way that the zone or area is situated on the coast.' Alternatively if the above does not apply, coastal land is taken to be land that is situated in an area that, in the opinion of the relevant authority, comprises a township or an urban area and that is within 100 m of the coast measured mean high water mark on the sea shore at spring tide; or land that is situated in an area that, in the opinion of the relevant authority, comprises rural land and that is within 500 m landward of the coast from mean high water mark on the sea shore at spring tide; or, if there is no zone or area, between the land and the coast, an area 3 nautical miles seaward of mean high water mark on the sea shore at spring tide.

[559] The *Coast Protection Act 1972* (SA) s 4 uses a substantially similar definition for the purposes of the functions of the CPB and the coastal management planning processes. Regulations under the CPA declare areas that are to be taken as part of the coast for each coastal management district.

[560] Coast Protection Board South Australia, *Coast Protection Board Policy Document: Revised 22 May 2012* (2012) Appendix 1, 47.

the coincidence of tidal and rainfall events and to estimate the combined water level probability.[561]

Coastal Erosion – the policy recognises that accelerated sea level rise will generally cause an increase in the rate of coastal erosion, and will interact with local coastal processes in quite complex ways.[562] The recession/erosion standards discussed below are similar to the flooding ones in that they require development to be safe from the effects of a 0.3 m sea level rise and to be capable of being protected against additional recession due to a further 0.7 m of rise, and thus generally require a 100 year planning timeframe, although different timeframes are anticipated for both minor and major new development.[563]

Unlike in Qld for example, the state government has not provided default mapping of these coastal hazard areas, leaving this to be undertaken largely by local government, and often in relation to particular development proposals.

Strategic Considerations and Development Controls

The policy positions of the Coast Protection Board have been implemented as standard provisions for all development plans in coastal areas via objectives and principles of development control. For example, the objectives in development plans include:

- development only undertaken on land which is not subject to or that can be protected from coastal hazards including inundation by storm tides or combined storm tides and stormwater, coastal erosion or sand drift, and probable sea level rise;[564]
- development that can accommodate anticipated changes in sea level due to natural subsidence and probable climate change during the first 100 years of the development;[565] and
- development which will not require, now or in the future, public expenditure on protection of the development or the environment.[566]

The accompanying principles of development control address environmental protection, maintenance of public access, hazard risk minimisation, erosion buffers and subdivision including, for example:

Development should be designed and sited so that it does not prevent natural landform and ecological adjustment to changing climatic conditions and sea levels.[567]

Development should maintain or enhance public access to and along the foreshore,[568] and should provide for a public thoroughfare between the development and any coastal reserve.[569] Some new development (other than small scale infill development in a predominantly urban zone) is required to incorporate a public coastal reserve of at least

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[561] Coast Protection Board South Australia, *Coast Protection Board Policy Document: Revised 22 May 2012* (2012) Appendix 1, 47.
[562] Coast Protection Board South Australia, *Coast Protection Board Policy Document: Revised 22 May 2012* (2012) Appendix 1, 47.
[563] Coast Protection Board South Australia, *Coast Protection Board Policy Document: Revised 22 May 2012* (2012) Appendix 1, 20; design periods of 50 years for minor development, 100 years for strategic planning in existing settled areas and 200 years for new settlements and significant developments such as power stations.
[564] Objective 5; see for example, SA Department of Planning, Transport and Infrastructure (DPTI), *Onkaparinga (City) Development Plan* (2012) 17.
[565] Objective 6; see for example, DPTI, *Onkaparinga (City) Development Plan* (2012).
[566] Objective 7; see for example, DPTI, *Onkaparinga (City) Development Plan* (2012).
[567] Principles of Development Control – Environmental Protection – No. 8; see for example, DPTI, *Onkaparinga (City) Development Plan* (2012) 18.
[568] Principles of Development Control – Maintenance of Public Access – No. 9; see for example, DPTI, *Onkaparinga (City) Development Plan* (2012) 17.
[569] Principles of Development Control – Maintenance of Public Access – No. 10.

50m width in addition to development setbacks which accommodate potential impacts of sea level rise on coastal erosion.[570]

Development and its site should be protected against the standard sea-flood risk level which is defined as the 1 in 100 year average return interval flood extreme sea level (tide, stormwater and associated wave effects combined), plus an allowance for land subsidence for 50 years at that site.[571]

Commercial, industrial, tourism or residential development, and associated roads and parking areas should be protected from sea level rise by ensuring that site levels are at least 0.3 m above the standard sea-flood risk level; building floor levels are at least 0.55 m above the standard sea-flood risk level; and there are practical measures available to protect the development against a further sea level rise of 0.7 m above the minimum site level required.[572] Buildings to be sited over tidal water or which are not capable of being raised or protected by flood protection measures in future, should have a floor level of at least 1.25 m above the standard sea-flood risk level.[573]

Development that requires protection measures against coastal erosion, sea or stormwater flooding, sand drift or the management of other coastal processes at the time of development, or in the future, should only be undertaken if measures themselves will not have an adverse effect on coastal ecology, processes, conservation, public access and amenity; the measures do not nor will not require community resources, including land, to be committed; the risk of failure of measures such as sand management, levee banks, flood gates, valves or stormwater pumping, is acceptable relative to the potential hazard resulting from their failure; and binding agreements are in place to cover future construction, operation, maintenance and management of the protection measures.[574]

Development should be set back a sufficient distance from the coast to provide an erosion buffer which will allow for at least 100 years of coastal retreat for single buildings or small scale developments, or 200 years of coastal retreat for large scale developments (ie new townships) unless the development incorporates appropriate private coastal protection measures to protect the development and public reserve from the anticipated erosion; or the council is committed to protecting the public reserve and development from the anticipated coastal erosion.[575] Existing or new coastal reserves must meet these erosion buffer standards.[576]

Development should not occur where essential services cannot be economically provided and maintained having regard to flood risk and sea level rise, or where emergency vehicle access would be prevented by a 1 in 100 year average return interval flood event, adjusted for 100 years of sea level rise.[577]

Land should not be divided for commercial, industrial or residential purposes unless a layout can be achieved whereby roads, parking areas and development sites on each allotment are at least 0.3 m above the standard sea-flood risk level, unless the land is, or can be provided with appropriate coastal protection measures.[578] There is a preference for infill in existing developed areas or development concentrated into

[570] Principles of Development Control – Maintenance of Public Access – No. 11, No. 12.
[571] Principles of Development Control – Hazard Risk Minimisation – No. 18.
[572] Principles of Development Control – Hazard Risk Minimisation – No. 19.
[573] Principles of Development Control – Hazard Risk Minimisation – No. 20.
[574] Principles of Development Control – Hazard Risk Minimisation – No. 21.
[575] Principles of Development Control – Erosion Buffers – No. 22.
[576] Principles of Development Control – Erosion Buffers – No. 23.
[577] Principles of Development Control – Erosion Buffers – No. 24.
[578] Principles of Development Control – Land Division – No. 27.

appropriately chosen nodes, not in a scattered or linear form;[579] and for coastal dependent development.[580]

In addition, each development plan provides zone provisions which outline what would be complying or non-complying development in coastal areas.[581]

Disclosure Laws

There are no specific regulations requiring a vendor to disclosure information on natural hazard exposure under South Australian law; and local government does not issue planning certificates as in NSW. However, regulations under the *Land and Business (Sale and Conveyancing) Act 1994* prescribe the matters that must be included in a vendor's statement as part of the contract for the sale of land. This includes general information on the development controls contained in the applicable development plan and any proposed amendment to the plan.[582] As such, this would include information on relevant zoning or overlays controls; however there appears to be no specific provision for the communication of further hazard related information through this mechanism.

1.6.1.3 Governance/Procedural Provisions

Where development is proposed on 'coastal land', it must be referred under s 37 of the *Development Act*, to the Coast Protection Board for consideration.[583] The *Development Regulations 2008* determine which applications are referred, and whether the relevant authority is subject to the direction of the Board or whether it must only have regard to the Board's response. In cases involving excavation or filling to a certain volume or coastal protection works, the Board has the power to *direct* the local council to refuse the development application or place conditions on its approval.[584] In most cases however, the Board's powers are advisory only.[585] The Board may make its own assessment of coastal hazards and any coastal protection works proposed for a development, and provide advice to the planning approval authority. For major projects and development where the Minister has requested some level of environmental impact assessment, advice in accord with Board policy will be provided to the Minister.[586]

1.6.1.4 Existing Development

Development plans do not relate to existing development, and are only applicable when new development is being assessed.

Some of the policy positions expressed in the 2012 policy and implemented through the standard planning provisions however have some application to further development or re-development which may occur in existing developed areas, particularly those policies favouring infill development where there is already an

[579] Principles of Development Control – Land Division – No. 29.
[580] Principles of Development Control – Land Division – No. 30.
[581] *Development Regulations 2008* (SA) Schedule 4 outlines what will be considered complying development for the purposes of a development plan.
[582] *Land and Business (Sale and Conveyancing) Regulations 2010* (SA) Schedule 1 – Contracts for sale of land or business – forms.
[583] See *Development Regulations 2008* (SA) s 2, Table cl 1.
[584] See *Development Regulations 2008* (SA) s 1(2)(d); see also s 2, Table cl 1. The power to direct the council applies to circumstances involving excavation or filling of a certain volume, or involving coastal protection works within 100 m landward of the coast measured from mean high water mark on the sea shore at spring tide or within 1 km seaward measured from mean high water mark on the sea shore at spring tide.
[585] Relevant authority cannot consent or approve the development without having regard to the response of the prescribed body, *Development Regulations 2008* (SA) s 1(2)(d).
[586] Coast Protection Board South Australia, *Coast Protection Board Policy Document: Revised 22 May 2012* (2012) Standard 11.

established need to protect existing development and where this protection is likely to be provided by local or State government.[587]

The SA policy is notably clear in its position on cost sharing in relation to protection of existing and future development. Since 1980 there has been a clear policy position in SA not to fund protection of private property and thereby act as a free insurer for seafront property as this would serve encourage further inappropriate development and unreasonable community expectations. As a consequence, only protection works needed due to some previous mistake or lack of understanding about coastal processes were to be supported and potentially funded by the Coast Protection Board.[588]

Under the new State Climate Change Adaptation Framework, regional and sectoral adaptation plans are being prepared. Regional plans will bring together a number of adjoining local government areas to consider a broad range of adaptation issues, and in the context of land use planning, it is anticipated that these processes will be used to develop options for managing risks in existing settlements, not unlike the objectives of the Coastal Hazard Adaptation Strategy process in Qld, although admittedly broader in scope and lacking specific legal mandate.

Regulation of Land Acquisition

Similar to other jurisdictions, the Development Act provides that the Minister may purchase land by agreement for any public purpose, in which case the provisions of the *Land Acquisition Act 1969* do not apply.[589] It also provides for the compulsory acquisition of land,[590] in which case the Land Acquisition Act is applicable and governs process and just terms compensation requirements.

1.6.2 South Australia - Bushfire

Following the major bushfires in Canberra in 2003 and Victoria in 2009, the regulatory framework for planning and building in bushfire prone areas in SA has been reviewed and updated substantially and its spatial application increased.[591]

1.6.2.1 Legal Architecture

Similar to coastal hazards, development in bushfire prone areas in SA is controlled under the *Development Act 2003*, via a number of state planning instruments, which are implemented through local development plans. Once an area is delineated in a local development plan as a Bushfire Prone Area (BPA), a number of planning and building controls apply.

The key planning controls are contained in the *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010), which includes mandatory provisions which must be taken into account in the assessment of development (other than complying development)[592] in a BPA. Local Development Plans also contain standard bushfire planning provisions.

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[587] For example, Coast Protection Board South Australia, *Coast Protection Board Policy Document: Revised 22 May 2012* (2012) Standard 8.

[588] Coast Protection Board South Australia, *Policy on Coast Protection and New Coastal Development* (1991) 10, 17.

[589] *Development Act 1993* (SA) s 77.

[590] *Development Act 1993* (SA) s 78.

[591] *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010) 1.

[592] Schedule 4 of the *Development Regulations 2008* (SA) provides for development which will be considered to be complying and will therefore not require development assessment; cl 1(a) provides that (except in historic/heritage zones) no development consent is required for the construction of a new building in the same, or substantially the same, position as a building which was demolished within the previous three years where the new building has the same, or substantially the same, layout and external appearance as the previous building.

For building regulation, Building Rules Consents in BPAs reference the relevant standards in Building Code of Australia (with the relevant South Australian variations).[593]

Two pieces of legislation govern emergency management in SA: *Emergency Management Act 2004* (and state emergency management plan under this Act) and the *Fire and Emergency Services Act*. The management frameworks operating under this legislation are relevant to managing bushfire risk in existing settlements.

1.6.2.2 Substantive Provisions

Identification of hazard areas

The basis for development controls is the identification of BPAs in local development plans. The state government (in conjunction with local government) has mapped these areas extensively for SA based on risk analysis techniques that involved satellite images, slope and topography, weather statistics, vegetation data (including fuel loads) and population growth.[594] There appears to be no specific reference to the potential implications of climate change for bushfire risk.

Three distinct levels of bushfire risk are delineated: *general*, *medium* and *high.* A fourth category of *excluded* areas is also mapped for areas such as townships, with adequate fire protection measures, where it is generally not considered necessary to introduce specific bushfire planning requirements, however some buildings standards may still apply.[595] 39 Councils across the state in metropolitan, outer metropolitan and country areas now include BPAs.[596]

These maps are included in local development plans and are publicly available.[597]

Strategic Considerations and Development Controls

The *Minister's Code – Undertaking Development in a Bushfire Prone Area* provides a broad policy statement on planning and building within BPAs including some mandatory provisions that must be considered in development assessment. Mandatory provisions relate to road access, water supply and to a limited extent, the siting of buildings in relation to hazardous vegetation. Notably, the provisions relating to bushfire buffer zones for subdivisions lack prescriptive detail and are not mandatory.

Access and Egress

For applications involving the *subdivision of land*, the Code sets mandatory standards applicable to all public roads created by a subdivision, to ensure safe entry and exit from all allotments. These include all weather surface requirements, proximity to hazardous vegetation, width, gradient and design parameters.[598]

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[593] See *Development Regulations 2008* (SA) reg 78.

[594] Bushfire risk maps were reviewed and amended based on comments received from Councils, Fire Prevention Officers and the South Australian Country Fire Service, and extensive public consultation; see *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010) 1.

[595] Standards applicable to construction in excluded areas in close proximity to high bushfire risk areas are discussed further, below.

[596] *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010) 1.

[597] For example, an online search tool can identify whether a particular property is within a BPA, the assigned level of bushfire risk and any applicable planning and building requirements. See DPTI, *Bushfire Protection Areas* (2012) <http://www.planning.sa.gov.au/go/bushfire-protection> (accessed 19/07/2012); Development Plans are also available online at, Government of SA, *Online Development Plans* <http://www.sa.gov.au/subject/Housing%2C+property+and+land/Building+and+development/Building+and+development+applications/Development+plans+and+their+use/Accessing+relevant+development+plans/Online+development+plans> (accessed 19/07/2012).

[598] *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010) Mandatory Provision 2.2.2.

Similarly, for applications for dwellings, tourist accommodation or other habitable buildings, mandatory entry and exit requirements are established for private roads and driveways of more than 30 m. These are of a similar nature to those required for public roads.[599]

Access to dedicated Water Supply

A dedicated fire-fighting water supply is to be located adjacent to the buildings or in another location on the allotment that is accessible for fire-fighting purposes. The proposed capacity must be appropriate for the level of bushfire risk determined for the site (a minimum of 5000 litres for general and medium risk areas and 22000 litres for high risk areas).[600] These provisions are mandatory.

Siting

The Code provides that buildings are to be located 'away from areas that pose an unacceptable bushfire risk' such as steep slopes, rugged terrain or hazardous vegetation. It requires applications to provide information on the size of buildings and their distance from hazard areas, the slope of the land on which the building is to be located, location of existing vegetation and key topographical features such as watercourses.[601] Yet there is very little prescriptive detail in these provisions leaving decision makers with considerable discretion. The only provision which is a mandatory consideration and which is prescriptive, is the requirement to locate buildings at least 20 m away from existing hazardous vegetation so as to create an asset protection zone.[602] Asset protection zones vary in size depending on slope and must be a minimum width of 20 m on flat land with the width of the zone increasing as the slope increases.[603]

Buffers

For a subdivision adjacent to or within a high bushfire risk area, a bushfire buffer zone is required to isolate the residential area from areas posing an unacceptable bushfire risk.[604] However, there is no specification of the required dimensions of the buffer zone, and this provision is not mandatory.

Information requirements

Applicants are required to provide information on how their application meets the requirements of the Code.[605]

Local Development Plan Provisions

Local development plans also include bushfire planning provisions, adapted from the standard SA planning provisions. These include objectives[606] and principles of

[599] *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010) Mandatory Provision 2.3.3.1.
[600] *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010) Mandatory Provision 2.3.4.1.
[601] *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010) Provision 2.3.2.
[602] *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010) Mandatory Provision 2.3.5.
[603] The Code provides the following standards: 10-15 degree slope requires a 25 m width buffer; 15-20 degree slope requires a 30 m buffer; 20 degree slope requires a 40 m buffer, see *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010) 11.
[604] *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010) Provision 2.2.3.
[605] *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010) Provisions 2.2, 2.2.1, 2.3, 2.3.1.
[606] For example, the SA Department of Planning, Transport and Infrastructure, *Adelaide Hills Development Plan* (2012) includes two related objectives: Objective 107 – development should minimise the threat and impact of bushfire on life and property while protecting the natural and rural character; Objective 108 – buildings and the intensification of non-rural land uses directed away from areas of high bushfire risk.

development control, which reflect the policy position stated in the ministerial direction above.[607]

Interaction with Building Regulations

To ensure buildings are designed and constructed to provide an appropriate level of protection from bushfire, the relevant standards of the Building Code of Australia (with the South Australian variations) apply to building works requiring consent in a Bushfire Prone Area. These are based on the Australian Standard 3959. Requirements differ according to the level of bushfire risk: in general bushfire risk areas, construction requirements are those specified for a bushfire attack level of BAL-low; for medium risk areas, compliance with BAL-12.5 is required; and on sites located in a high risk area, an individual site assessment to determinate the applicable category/BAL is required.[608] In excluded areas, new buildings within 500m of a high risk area must also comply with the BAL - low standard, and those within 100m of such an area must have an individual site assessment against the Australian Standard 3959.

Policy Guidance for managing trade-offs

Recent amendments to the Native Vegetation Regulations under the *Native Vegetation Act 1991* (SA) now provide a clear exemption to the requirement to obtain development consent, for the clearing of vegetation around a dwelling site to achieve the required asset protection zone (minimum 20 m)*.*[609] Beyond the asset protection zone, consent will be required.

In relation to both public and private roads, the Code does require that these be located such that the need to clear native vegetation or a significant tree is minimised.[610]

1.6.2.3 Governance/Procedural Provisions

Similar to the arrangements in Victoria, the SA Country Fire Service plays a central role in development assessment in identified Bushfire Prone Areas as a referral authority. Applications for subdivision or for dwellings, tourist accommodation and other forms of habitable buildings in a High Bushfire Risk Area must be referred to the CFS, who has the power to direct the council to approve (with or without conditions) or refuse the application. The council must comply with such a direction.[611]

Local government also plays a key role in awareness raising and compliance activities (fuel reduction on private land) and bushfire management planning under the *Fire and Emergency Services Act 2005* (SA).

1.6.2.4 Existing Development

Addressing bushfire risk for existing developments is a critical issue in bushfire prone areas across South Australia. Arrangements are similar to those in place in other states, and focus on regional bushfire management planning[612] to govern fuel reduction and other hazard mitigation activities across land tenure, and community awareness raising about bushfire preparedness.

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[607] SA Department of Planning, Transport and Infrastructure, *Adelaide Hills Development Plan* (2012) 102-117.

[608] *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010) 11-12. See also *Development Regulations 2008* (SA) reg 78. In addition, any buildings that are required to have a dedicated fire fighting water supply must also comply with the SA Department of Planning and Local Government, *Minister's Specification: SA 78 Additional Requirements in designated Bushfire Prone Areas* (2010).

[609] *Native Vegetation Regulations 2003* (SA) reg 5A.

[610] *Minister's Code – Undertaking Development in a Bushfire Prone Area* (Feb 2009, as amended May 2010) Mandatory provisions 2.2.2, 2.3.3.1.

[611] *Development Regulations 2008* (SA) Schedule 8.

[612] This is governed by the *Fire and Emergency Services Act 2005* (SA).

1.7 Tasmania

Planning in Tasmania is governed by the *Land Use Planning and Approvals Act 1993* (Tas) (LUPAA). Schedule 1 of LUPAA stipulates that the objectives of the Resource Management and Planning System (RMPS) relevantly include:

(f) to secure a pleasant, efficient and safe working, living and recreational environment for all Tasmanians and visitors to Tasmania; and

(g) to conserve those buildings, areas or other places which are of scientific, aesthetic, architectural or historical interest, or otherwise of special cultural value; and

(h) to protect public infrastructure and other assets and enable the orderly provision and co-ordination of public utilities and other facilities for the benefit of the community; and

(i) to provide a planning framework which fully considers land capability.

Planning schemes must further the objectives of the RMPS. As such, planning authorities would be acting in accordance with the LUPAA to include measures relating to coastal hazards.

Tasmania is currently implementing a series of significant planning reforms. A standardised Planning Scheme Template and Model Provisions were introduced in 2012.[613] *Planning Directive No. 1 - The Format and Structure of Planning Schemes* (PD1) sets out a new template that specifies the overall structure of planning schemes, sets out mandatory provisions that all planning schemes must contain, and includes model provisions for voluntary components of all new planning schemes.

The planning reform process has also introduced Regional Planning Units,[614] for which Regional Land Use Strategies (RLUSs) have been prepared to guide development and investment and encourage appropriate settlement patterns. The State has been divided into three regions: Northern, Southern and Cradle Coast. Declared Regional Land Use Strategies become Statutory Planning Instruments for the purposes of the Resource Management and Planning Framework.[615]

New and Interim Local Planning Schemes must further the objectives and outcomes of the provisions of these Regional Strategies. In order to assist local authorities to implement the terms of PD1 and the RLUSs, each regional authority is preparing a Model Planning Scheme for the region. Each Regional Model Planning Scheme will essentially populate the PD1 Template with standard content for the region. At the time of writing, these model schemes had not been publicly released, although the new Launceston Planning Scheme has been released.

1.7.1 Tasmania - Coastal Climate Hazards

1.7.1.1 Legal Architecture

Tasmania does not have specific coastal management legislation, nor does it yet have any specific legally-binding, state-level planning policies governing the incorporation of coastal climate risks into planning schemes or development assessment decisions. The current *State Coastal Policy 1996* only makes passing reference to climate change and contains no substantive provisions.[616] This means that decisions regarding the incorporation of climate change factors into planning schemes are left entirely at the

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[613] Issued by the Tasmanian Minister for Planning, *Planning Directive No. 1 - The Format and Structure of Planning Schemes* (19 September 2012, as modified 5 December 2012), accessible at, <http://www.planning.tas.gov.au/__data/assets/pdf_file/0016/210454/Modified_Planning_Directive_No._1_and_Template_-_5_December_2012.pdf>.

[614] *Land Use Planning and Approvals Act 1993* (Tas) s 30C.

[615] *Land Use Planning and Approvals Act 1993* (Tas) s 30C.

[616] Tasmanian Department of Premier and Cabinet (DPAC), *Tasmanian State Coastal Policy 1996*, Outcome 1.4.3.

discretion of local councils as planning authorities, guided by the broader planning framework which leaves final approval of new schemes and scheme amendments with the Tasmanian Planning Commission. In October 2012, the Tasmanian Government introduced new sea level rise planning allowances of 0.2 m by 2050 and 0.8 m by 2100, relative to 2010 levels. These allowances have not yet been incorporated into formal planning codes or requirements, but this is expected to follow.

1.7.1.2 Substantive Provisions

Tasmanian State Coastal Policy 1996

The *Tasmanian State Coastal Policy 1996* (State Coastal Policy), is a 'State Policy' under the *State Policies and Projects Act 1993* (Tas) (SPPA). By its own terms, it is 'intermediate between the provisions of an Act and the lesser policies and provisions of planning schemes and other mechanisms identified in the relevant legislation comprising the RMPS'.[617] Planning schemes must be brought into compliance with State Policies and a State Policy prevails to the extent of an inconsistency with a pre-existing planning scheme,[618] but planning schemes introduced after the introduction the State Coastal Policy are taken to be consistent with it.[619] Contravention of, or non-compliance with, a requirement of a State Policy is punishable by fine, but the State Coastal Policy does not impose duties or obligations on members of the public – only on state and local governments.[620] Local authorities are not obliged to consider the terms of the State Coastal Policy in considering individual development applications; only in developing new planning schemes.[621]

The policy contains statements of general principle guiding desired outcomes for each principle. The guiding principles are:

- natural and cultural values of the coast shall be protected;
- the coast shall be used and developed in a sustainable manner; and
- integrated management and protection of the coastal zone is a shared responsibility.

The principle of protection of the natural and cultural values of the coast recognises, among other things, 'the susceptibility of the coast to the effects of natural events, including sea-level rise'.[622] Clause 1.4: Coastal Hazards, stipulates the following outcomes:

1.4.1 Areas subject to significant risk from natural coastal processes and hazards such as flooding, storms, erosion, landslip, littoral drift, dune mobility and sea-level rise will be identified and managed to minimise the need for engineering or remediation works to protect land, property and human life.

1.4.2 Development on actively mobile landforms such as frontal dunes will not be permitted except for works consistent with Outcome 1.4.1.

Clause 1.4 has the potential to guide local authorities in controlling development in coastal areas but the failure to define key terms such as frontal dunes and consequent disagreement over its meaning, have limited its effectiveness. Some would argue that its inclusion has actually generated greater uncertainty and dispute.[623] The principle of sustainable use and development acknowledges that:

[617] DPAC, *Tasmanian State Coastal Policy 1996*, Outcome 1.4.3 ii.
[618] *State Policies and Projects Act 1993* (Tas) s 13.
[619] *St Helen's Area Landcare and Coastcare Group Inc v Break O'Day Council* [2007] TASSC 15, [30].
[620] *Richard G Bejah Insurance & Financial Services Pty Ltd v Maning* [2002] TASSC 36.
[621] *St Helen's Area Landcare and Coastcare Group Inc v Break O'Day Council* [2007] TASSC 15, [39].
[622] DPAC, *Tasmanian State Coastal Policy 1996*, Outcome 1.4.1.
[623] Research Interviews, State and local government planning officers, Tasmania, March – August 2012.

- the availability of the coastal zone for some activities, uses and development will be limited by the ability of natural and physical resources to meet the foreseeable needs of future generations and by the need to sustain the life-supporting capacity of air, water, soil and ecosystems;..
- and the importance of public access to and along the coast consistent with protection of natural coastal values, systems and processes.

The State Coastal Policy also foreshadows the development of specific policies dealing with the impacts of climate change on coastal hazards. These have not yet eventuated.

The Department of Primary Industries, Parks, Water and Environment (DPIPWE) has produced a General Information Paper articulating its policy coastal hazards in Tasmania, and a set of internal principles guiding its management of Crown Land.[624] It is understood that the principles articulated in that guidance document include:

- risks associated with coastal hazards rest with the property owner, whether public or private;
- DPIPWE has no future obligation to repair or reduce the impacts of coastal hazards on private property or assets sited on public land;
- an open, evidence-based, risk-based approach will be taken to land use planning and decision making in coastal risk areas that will consider both the short- and longer- term consequences of planning and land use decisions;
- on land managed by DPIPWE, intensification of uses will be avoided, considering both short and longer-term consequences; and
- man-made protections will generally be avoided.[625]

The State Government has embarked on two important initiatives that will influence law and policy in respect of planning for coastal and other hazards. The first is the articulation of *Principles for the Consideration of Natural Hazards in the Planning System.* These principles, together with an implementation guide, will form the basis for a new *Coastal Hazards Code.* As part of this process, the Government announced in October 2012 new planning allowances for sea level rise of 0.2 m by 2050 and 0.8 m by 2100. These allowances should inform future local and state planning, pending their formalisation in a *Coastal Hazards Code.*[626] The Government also released coastal inundation maps for the State, based on the sea level rise planning allowances, and is the process of completing coastal erosion maps.[627]

The second initiative is the development of a new coastal framework that would address, among other things, adaptation planning and the development of the *Coastal Hazards Code*. It is expected that this framework will be based upon principles for consideration of natural hazards, and address both future and existing development. It is understood that it will cover planning controls, regulation of protective works, and compensation and liability issues.

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[624] Department of Primary Industries, Planning, Water and the Environment (DPIPWE)*, Coastal Hazards in Tasmania General Information Paper* (2008) <http://www.dpiw.tas.gov.au/inter.nsf/Attachments/HBAW-7HNW35?open>.

[625] DPAC, *Guide to considering natural hazard risks in land use planning* (Draft under development, June 2012) 14-15.

[626] DPAC, *New Tools to Improve Planning for Sea Level Rise and Coastal Hazards* <http://www.dpac.tas.gov.au/divisions/climatechange/what_the_government_is_doing/new_tools_to_improve_planning_for_sea_level_rise_and_coastal_hazards> (accessed 25/10/2012).

[627] DPAC, *New Tools to Improve Planning for Sea Level Rise and Coastal Hazards* <http://www.dpac.tas.gov.au/divisions/climatechange/what_the_government_is_doing/new_tools_to_improve_planning_for_sea_level_rise_and_coastal_hazards> (accessed 25/10/2012).

Regional Land Use Strategies

The *Southern Tasmania Regional Land Use Strategy* 2010–2035 (SRLUS) specifically identifies the impacts of climate change as an overarching consideration.[628] Strategic Direction 6 relates to 'Increasing Responsiveness to the natural environment' and advises that settlement planning needs to recognise natural values and hazards, and factor the presence of hazards into the identification of suitable areas for future development. It commits to minimising inappropriate residential development in areas at risk from hazard including sea level rise and bushfire.[629] It advocates a strong risk management approach should be taken for hazards that cannot be avoided.[630] The strategy sees land use planning that takes hazards and risks into account as the single most important mitigation measure in areas of new development.[631] The SRLUS contains no specific regional policy regarding coastal hazards, erosion or sea level rise.

The policies on land use contained in the *Cradle Coast Regional Land Use Strategy* (CCRLUS) recognise that land use planning needs to 'monitor the effects of climate change on the Region and apply an integrated mitigation, adaptation and risk management approach taking into account all relevant knowledge and available information.'[632] The land use processes for urban settlements are to implement structure plans and regulatory instruments for each settlement which 'minimise[s] exposure of people and property to unacceptable levels of risk to health or safety.'[633] Settlements will be directed away from areas of unacceptable levels of risk, but the processes for risk management should not sterilise land by limiting development because of some future risk.

New development or intensification of existing development should be avoided on land that is already exposed to or affected by natural hazards, including coastal inundation and erosion and bushfire.[634] The strategy supports guidelines and technical measures to reduce the impact of risks and reduce vulnerability of strategically important places, including provision for protection, accommodation and abatement, or retreat.[635] A hazard risk assessment will be required for new or intensified use or development on at-risk land. The assessment should address the nature and severity of the hazard, risk factors specific to the proposed use or development, and measures needed to mitigate risks with an exceedance probability of greater than 1% at any time over the life of the development.[636] The CCRLUS also provides that current and future landowners should be put on notice of existing and future risks.[637]

[628] Southern Tasmania Regional Planning Project, *Southern Tasmania Regional Land Use Strategy 2010-2035* (SRLUS) (2011) 7.
[629] Southern Tasmania Regional Planning Project, SRLUS (2011) 81.
[630] Southern Tasmania Regional Planning Project, SRLUS (2011) 17.
[631] Southern Tasmania Regional Planning Project, SRLUS (2011) 30.
[632] Cradle Coast Regional Planning Initiative, *Living on the Coast: the Cradle Coast Regional Land Use Planning Framework*, 'Cradle Coast Regional Land Use Strategy 2010 – 2030' (CCRLUS) (2011).
[633] Cradle Coast Regional Planning Initiative, *Living on the Coast: the Cradle Coast Regional Land Use Planning Framework*, CCRLUS (2011) 146.
[634] Cradle Coast Regional Planning Initiative, *Living on the Coast: the Cradle Coast Regional Land Use Planning Framework*, CCRLUS (2011) 147.
[635] Cradle Coast Regional Planning Initiative, *Living on the Coast: the Cradle Coast Regional Land Use Planning Framework*, CCRLUS (2011) 148.
[636] Cradle Coast Regional Planning Initiative, *Living on the Coast: the Cradle Coast Regional Land Use Planning Framework*, CCRLUS (2011).
[637] Cradle Coast Regional Planning Initiative, *Living on the Coast: the Cradle Coast Regional Land Use Planning Framework*, CCRLUS (2011).

The Regional Land Use Strategy of Northern Tasmania (NRLUS) stipulates that:

Land designated for housing, industry, community and infrastructure services must not be located within or adjacent to areas which are vulnerable to an unacceptable level of risk including coastal inundation, landslip, flooding or contaminated land.[638]

It acknowledges, however, that some developments can sustain some level of risk, depending upon the consequences for that development and the options for managing that risk.[639] The NRLUS requires all planning schemes to include provisions for areas subject to high coastal hazard.[640] Areas at high risk of sea level rise, inundation and shoreline recession should be identified through overlays or zones, and schemes should restrict development so as to minimise the long term risk to life and property and minimise its impact on the coastal process. They should also require that the impact of engineering works on coastal processes is adequately assessed against appropriate engineering standards and best practice.[641]

As noted above, each Regional Council Authority is currently preparing a regional version of the model planning scheme template that is consistent with the terms of the Regional Land Use Strategy. At the time of writing, none of these regional model schemes had been completed.

Planning schemes

At present, in the absence of clear guidance from the State, responsibility for introducing planning controls relating to coastal climate hazards rests with local authorities. The sophistication with which local planning schemes address coastal hazards is highly variable across the state. The only Interim Planning Scheme to have been approved under the new planning reforms to date is the Launceston scheme, which contains a very basic Coastal Code. Clarence City Council, for example, has conducted extensive research into the present risks facing its coastline and the likely future scenarios under climate change, and has amended its planning scheme to provide controls that reflect these risks. In 2011 it completed amendments to its planning scheme to contain a 'subject to inundation' overlay, a 'coastal management overlay' and a 'coastal erosion hazard' overlay.

Under the *Subject to Inundation Overlay,* minimum floor levels are set for every affected part of the city for 2050 and 2100, based on the estimated sea level heights for 1% AEP (100 year ARI) storm events, excluding wave run-up, plus 300 mm. Development must comply with the specified level for either 2050 or 2100.[642] Discretionary development within these areas must show that habitable areas will not be subject to inundation, whether achieved through floor height, form of construction, ability to raise the building, or otherwise demonstrate that the existing parts of the building will not cause an unreasonable risk to life of users or damage to property. The *Coastal Management Overlay* prohibits all development in the frontal dune system and within 50 m of a tidal flat, saltmarsh or lagoon.[643] All other development is discretionary within the areas covered by the overlay, with specific decision requirements that relevantly include: regard for coastal hazards; protection of the coastal environment; facilitation of public access; and stabilisation where necessary.[644] The provisions allow

[638] Local Government Committee of Northern Tasmania Development, *Regional Land Use Strategy – Northern Tasmania* (NRLUS) (2011) 109.
[639] Local Government Committee of Northern Tasmania Development, NRLUS (2011) 109.
[640] Local Government Committee of Northern Tasmania Development, NRLUS (2011) CW-PO3, CW-AO4, 116.
[641] Local Government Committee of Northern Tasmania Development, NRLUS (2011) CW-PO3, CW-AO4, 116.
[642] City of Clarence, *Clarence Planning Scheme* (2007) cl 7.2.4(a).
[643] City of Clarence, *Clarence Planning Scheme* (2007) cl 7.3.2.
[644] City of Clarence, *Clarence Planning Scheme* (2007) cl 7.3.2.

for referral of development to the DPIPWE Coastal Marine Program or to Marine Safety Tasmania for comment.

All development within the *Coastal Erosion Hazard Overlay* is discretionary. Applications must include a report from an engineer that demonstrates that the specific decision requirements are met. The decision requirements vary depending on the type of development and the nature of the area within which it is located, but relate broadly to structural or siting methods for minimising damage to or loss of buildings; minimising the need for future remediation works and risks of future hazards; and maintenance of public access.

Kingborough Council has just released a draft scheme for public comment, containing a Coastal Hazards Code based on Clarence Council's new Schedule. It is understood that all of the southern coastal Councils will be using a similar Code or at least a common version, but that other regions (north and northwest) are doing things differently.[645]

Disclosure laws

There are no requirements for vendor disclosure of natural hazard risks under current Tasmanian law. There are several mechanisms, however, through which disclosure can be effected. A person may obtain a certificate from a local council under the *Local Government Act 1993* (Tas) (LGA) relating to the operation of the planning scheme or special planning orders as they affect a specified parcel of land, current zoning and planning restrictions, and building lines and setbacks as they affect a parcel of land. [646]

Under the LUPAA, parties can enter a 'Part 5 Agreement' which attaches to a land title. Part 5 Agreements specify management regimes for the land or conditions which prohibit, restrict or regulate use or development on the land.

Clause 8 of the draft *Residential Property Transactions Bill 2012* allows for the inclusion of a warning notice in a contract, but clear definitions of natural hazards are not included, so the provision is unlikely to be effective in its present form.

1.7.1.3 Governance/Procedural Provisions

Planning at the state level is the responsibility of the Tasmanian Planning Commission (TPC). The TPC is responsible for approving State Policies under the SPPA, and for assessing and approving draft planning schemes, including interim planning schemes.

The TPC publicly exhibited the *Draft State Coastal Policy 2008* in 2010. On the basis of the TPC's assessment and the representations received, it recommended against the adoption of the Policy because the deficiencies were such that it would not be able to be satisfactorily altered without major modification. One of the eight major deficiencies identified by the TPC was that there was 'no evidence that the Policy was developed with consideration of climate change, sea-level rise and other scientific advances'. The TPC rejected the *Draft State Coastal Policy 2008* in 2011 and a new policy is now being developed. The TPC recommended that 'projected sea-level rise limits be considered, and agreed upon by the Tasmanian Government and included as part of a coastal policy package'.[647] In the absence of clearer guidance from the State Government, however, local councils have had to develop their own responses.

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[645] Research interviews conducted by the authors, local government planning officers (Tasmania) March - August 2012.

[646] *Local Government Act 1993* (Tas) s 337.

[647] Tasmanian Planning Commission, *Report on the Draft State Coastal Policy 2008* (April 2011) Recommendation 6, accessible at, <http://www.planning.tas.gov.au/__data/assets/pdf_file/0019/170263/State_Coastal_Policy_2008_Report_on_the_Draft.pdf>.

The *Tasmanian State Coastal Policy 1996* recognises that primary responsibility for coastal zone management rests with the State Government, but that planning authorities also have a key role in through planning schemes and decisions guided by the State Coastal Policy.

1.7.1.4 Existing Development

There are no provisions governing the protection or relocation of existing development. The acceptability of private protective works will depend on the terms of the applicable planning scheme. In 2006, DPIPWE prepared a Template Coastal Risk Management Plan[648] to guide local planners and managers in assessing, analysing, and managing risks to built and natural assets in the coastal zone that are vulnerable to erosion and inundation hazards exacerbated by sea-level rise. The template is based on Australian Standard Risk Management Principles and supported by a suite of technical documents also publically available.[649] It is designed primarily for assets such as local roads, sewage and waste water plants, community or public buildings and natural reserves, although it is capable of modification for broader application.[650]

For local authorities considering the implementation of retreat strategies, the LUPAA entitles the owner or occupier of land to compensation where land is set aside for a public purposes under a planning scheme or special planning order, where access to land is restricted by the closure of a road or where a permit has been refused on the basis that the land will be needed for a public purpose.[651]

1.7.2 Tasmania - Bushfire

1.7.2.1 Legal Architecture

Unlike coastal hazards, development in bushfire prone areas in Tasmania is controlled under a specific State-wide Planning Directive under the LUPAA. *Planning Directive No. 5 Bushfire-Prone Areas Code* (PD5) was introduced on 19 September 2012.

All new planning schemes and Interim Planning Schemes must contain the requirements specified in Attachment 1 of PD5,[652] which contains the *Bushfire-Prone Areas Code* (the *Bushfire Code*). The purpose of the Bushfire Code is:

to ensure that use and development is appropriately designed, located, serviced, and constructed, to reduce the risk to human life and property, and the cost to the community, caused by bushfires.653

The Bushfire Code is the product of a 2010 *Review of Construction and Development Control in Bushfire Prone Areas* by the Office of Security and Emergency Management

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[648] DPIPWE, *Coastal Risk Management Plan: Template and Guidelines* (2009).

[649] DPIPWE, *Coastal Risk Management Plan: Template and Guidelines* (2009); DPIPWE, *General Information Paper on Coastal Hazards in Tasmania* (2008) < http://www.dpipwe.tas.gov.au/inter.nsf/Attachments/HBAW-7HNW35/$FILE/CCCRMP-General_Info_Paper.pdf>; DPIPWE, *Climate Change and Coastal Asset Vulnerability: An audit of Tasmania's coastal assets potentially vulnerable to flooding and sea-level rise* (2008) <http://www.dpiw.tas.gov.au/inter.nsf/Attachments/HBAW-7HP26R/$FILE/CCCRMP-Audit_Report.pdf>; DPIPWE, *Sea-Level Extremes in Tasmania: Summary and Practical Guide for Planners and Managers* (2008) <http://www.dpiw.tas.gov.au/inter.nsf/Attachments/HBAW-7HP2YV/$FILE/CCCRMP-Summary_Prac_Guide.pdf>; DPIPWE, *Reference Manual: Historical and Projected Sea-Level Extremes for Hobart and Burnie, Tasmania* (2008) <http://www.dpiw.tas.gov.au/inter.nsf/Attachments/HBAW-7HP3BD/$FILE/CCCRMP-Hunter_Report.pdf>.

[650] DPIPWE, *Coastal Risk Management Plan: Template and Guidelines* (2009) 1.

[651] *Land Use Planning and Approvals Act 1993* (Tas) s 66.

[652] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) cl 3; available at, <http://www.planning.tas.gov.au/__data/assets/pdf_file/0016/210436/Planning_Directive_No._5_Bushfire-Prone_Areas_Code_-_19_September_2012.pdf>.

[653] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) E.1.1.1.

within the Department of Premier and Cabinet.[654] That Review recommended that 'subdivision, use and construction of building in Bushfire Prone Areas be controlled through the application of appropriate measures under both the *Building Act 2000* (Tas) and the [LUPPA]'.[655] It endorsed the definition of a bushfire prone area as being within 100 m of one hectare of vegetation and recommended amendment of Part 2 (Restrictions on Buildings) of the *Building Regulations 2004* (Tas) to incorporate that definition. It also recommended that the State undertake state-wide mapping of areas, based on that definition. PD5, incorporating the Bushfire Code has implemented many of the recommendations contained in the Review, but has not included mapping of bushfire prone areas.

The Bushfire Code requires a permit to be obtained for all development (subdivision and construction of habitable buildings) and hazardous or vulnerable uses on bushfire-prone land.[656] Bushfire-prone land is defined to cover land that is within the boundary of a bushfire-prone area shown on an overlay on a planning scheme map or any land that is within 100 m of an area of bushfire-prone vegetation equal to or greater than one hectare.[657] Once an area is delineated in a planning scheme as a bushfire prone area, a number of mandatory planning controls apply, unless one of the exemptions applies. The exemptions include: that the development is one that is certified by the Tasmanian Fire Service (TFS) or an accredited person as involving an insufficient increase in risk to the development from bushfire to warrant any specific bushfire protection measures; non-habitable buildings; and small extensions to existing buildings.[658]

Emergency management in Tasmania is governed by the *Emergency Management Act 2006* (Tas) and the *Fire Services Act 1979* (Tas). The management framework operating under these Acts is relevant to managing bushfire risk in existing settlements.

1.7.2.2 Substantive Provisions

Identification of hazard zones

The basis for development controls is the identification of bushfire prone areas in Planning Schemes. As noted above, the State Government has not mapped these areas because the high levels of vegetation cover across Tasmania would mean that most areas would be mapped as bushfire prone. Accordingly, individual authorities are responsible for preparing bushfire overlays should they wish to do so. Mapping provides certainty for those properties falling within mapped bushfire prone areas, but the determination of bushfire prone land for properties outside those mapped areas must still be left to a site by-site assessment.

The Bushfire Code contains no specific reference to the potential implications of climate change for bushfire risk. The exacerbating effects of climate change on bushfire risk is likely to be taken into account by adjusting the 'Bushfire Attack Level' currently set at BAL 19 under the Australian Standard, to which development must comply.[659]

The Bushfire Code contains mandatory provisions that must be considered in development assessments. Mandatory provisions relate to vulnerable uses, road access, water supply and to a limited extent, the siting of buildings in relation to hazardous vegetation.

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[654] Office of Security and Emergency Management, Tasmanian DPAC, *Review of Construction and Development Control in Bushfire Prone Areas* (2010).
[655] Office of Security and Emergency Management, Tasmanian DPAC, *Review of Construction and Development Control in Bushfire Prone Areas* (2010) 4.
[656] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) E1.2.
[657] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) E1.3.1.
[658] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) E1.4.
[659] Research interview, Tasmanian State Government Officer (Tasmania, 13 September 2012).

Vulnerable uses

Vulnerable uses include custodial facilities, schools and day care centres, hospitals, aged care homes, and visitor accommodation. With the exception of visitor accommodation, vulnerable uses are only to be located in BPAs in exceptional circumstances where they are of an overriding benefit to the community and that there is no suitable alternative site.[660]

Hazard Management Areas in subdivisions

For a subdivision adjacent to, or within, a high bushfire risk area, a bushfire hazard management area or buffer zone is required to isolate the residential area from areas posing an unacceptable bushfire risk.[661] These must either meet the Acceptable Solution – namely the minimum requirements set for BAL 19 in Table 2.4.4 of *AS 3959 – 2009 Construction of Buildings in Bushfire Prone Areas* or meet the performances standards. These are a certification that the measures in place are otherwise adequate having regard to:

- the nature of the bushfire-prone vegetation including the type, structure and flammability;
- topography, including slope;
- other potential forms of fuel and ignition sources;
- the risk of bushfire to lots at any stage of staged subdivision; and
- separation distance from the bushfire-prone vegetation does not unreasonably restrict subsequent development.[662]

Where Bushfire Management Areas that are to be located on land owned by another person require the owner of that land to enter a Part 5 Agreement, it will be registered on the title to that property that they consent to the management of their land as a bushfire management area.

The goals are the same for bushfire management areas for habitable buildings on pre-existing lots but the standard with which they must comply is BAL 29, not 19.[663]

Access and Egress

For applications involving the *subdivision of land*, the Bushfire Code sets standards applicable to all public roads created by a subdivision, to ensure safe entry and exit from all allotments and to provide access to bushfire prone vegetation for fire fighting. Acceptable solutions are specified, for example the requirement that all buildings be within 200m of a through road and that all roads greater than 200m in length must be through roads, with performance criteria listed as alternatives to the Acceptable Solutions.[664] The Bushfire Code also sets out standards for roads, private access and fire trails in bushfire-prone areas – for subdivision, and approved lots, based on the Australian Road Research Board (ARRB) *Unsealed Roads Manual – Guidelines to*

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[660] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) E1.5.1.1.
[661] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) cl 1.6.1.1.
[662] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) cl 1.6.1.1.
[663] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) cl 1.6.3.1
[664] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) cl 1.6.1.2

Good Practice 3rd Edition.[665] Criteria for private access to pre-existing lots strive for the same broad objectives, but can be satisfied at lower standards.[666]

Access to dedicated Water Supply for fire-fighting purposes

For new subdivisions, a dedicated fire-fighting water supply is to be located adjacent to the buildings or in another location on the allotment that is accessible for fire-fighting purposes. In areas on town water, all parts of a building area must be located within reach of a 120m long hose connected to a fire hydrant.[667] In other areas, either a certified bushfire management plan must certify that water supply is adequate, or there must a static water supply of at least 10000l per building area, connected to fire hydrants.[668]

For building on approved lots and pre-existing, adequate, accessible and reliable water supply must be available for firefighting purposes.[669] The requirements mirror those in relation to subdivision.[670]

Siting

The Bushfire Code sets development standards for habitable buildings on approved lots in order to provide adequate separation of buildings from bushfire prone vegetation, reduce radiant heat levels, flame and ember attack, and provide a zone of protection for occupants and firefighters.[671] These standards can be satisfied either by showing that the buildings were on a subdivision the plan for which complied with the hazard management area requirements for subdivisions or that they otherwise comply with BAL 19. If these Acceptable Solutions cannot be met, the performance criteria require there to be 'adequate separation from the bushfire-prone vegetation', with adequacy to be determined taking into account:

- vegetation type, structure and flammability;
- other potential forms of fuel and ignition sources;
- slope;
- any fire shielding structures or features,
- and that the dimensions, given the nature of the construction, provide adequate protection for the building and to fire fighters and occupants defending property from bushfire.[672]

Bushfire Management Plans

All new subdivisions and buildings on new or existing lots must be accompanied by a Bushfire Hazard Management Plan that outlines the means of protection from bushfires, that has been prepared by an accredited person.

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[665] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) cl 1.6.1.2, Table E3, cl 1.6.2.2.
[666] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) cl 1.6.3.2.
[667] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) cl 1.6.1.3.
[668] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) cl 1.6.1.3.
[669] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) cls 1.6.2.3, 1.6.3.3.
[670] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) cls 1.6.2.3, 1.6.3.3.
[671] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) cl 1.6.2.
[672] Tasmanian Planning Commission, *Planning Directive No. 5 Bushfire-Prone Areas Code* (2012) cl 1.6.2.

Building Regulations

The *Building Act 2000* (Tas) controls standards for building. The objectives of the *Building Act 2000* include; 'to establish, maintain and improve standards for the construction and maintenance of sustainably designed buildings'. The Building Code of Australia (BCA) is the required standard for the construction of buildings and building works. The 2010 *Review of Construction and Development Control in Bushfire Prone Areas*[673] recommended that once a Planning Directive for controlling development in bushfire prone areas was completed, Part 2 of the *Building Regulations (Restrictions on Buildings)* would be amended to include an agreed definition of 'bushfire prone area'. This would activate the BCA's requirements for construction of Class 1, 2, and 3 buildings in designated building prone areas. At the time of writing, this amendment had not occurred.

The 2010 review also identified the need for other construction related measures relating to fire-fighting water supply and access requirements. As noted above, these have been reflected in the new Bushfire Code to a standard that enables planning officers to be certain that these safety provisions can be applied and are feasible at the development approval stage. In addition, however, it is expected that detailed construction requirements will be included in the Tasmanian Appendix of the BCA.

Regional land use strategy and planning scheme provisions

All new planning schemes and interim planning schemes must now adopt the terms of PD5. In addition, the SRLUS specifically addresses bushfire risk. The first priority of the SRLUS in Managing Risks and Hazards is to: 'Minimise the risk of loss of life and property from bushfires'.[674] This goal is to be achieved by addressing the management and mitigation of bushfire issues at the rezoning or subdivision stages, including in relation to vegetation clearance and the provision of safe road exit points; by identifying and protecting buffer zones; and through site design and layout – measures that are now covered by the Bushfire Code.[675] PD5 also allows for clearance of vegetation around existing dwellings to implement management plans (subject to the requirements of the *Threatened Species Protection Act 1995* (Tas), *Nature Conservation Act 2002* (Tas) and *Forest Practices Act 1985* (Tas). PD5 recognises that that compliance checks on the maintenance of bushfire management plans by individual landowners are virtually non-existent, and proposes to develop and fund a compliance program.[676]

The NRLUS also contains a regional policy of ensuring that future land use and development minimises the risk to people and property resulting from bushfire hazard.[677] The associated actions for achieving this policy are to 'include controls in planning schemes based on current best practice to minimise risk to persons and property resulting from bushfire hazard' and 'ensure subdivision design responds to bushfire hazard risks by providing for alternative access, building setbacks and buffer distances based on current best practice.'[678] These actions are likely to be achieved via the introduction of the new Bushfire Code.

1.7.2.3 Governance/Procedural Provisions

As outlined above, the key decision-making roles within the planning framework are played by local councils, the TFS and accredited certifiers. Local councils are the consent authority for a development within bushfire prone areas and are required to obtain the certification of the TFS or an accredited bushfire certifier if the development

[673] Office of Security and Emergency Management, Tasmanian DPAC, *Review of Construction and Development Control in Bushfire Prone Areas* (2010).
[674] Southern Tasmania Regional Planning Project, SRLUS (2011) 31, MRH 1.
[675] Southern Tasmania Regional Planning Project, SRLUS (2011) 30.
[676] Southern Tasmania Regional Planning Project, SRLUS (2011) 31.
[677] Local Government Committee of Northern Tasmania Development, NRLUS (2011) NH-PO3, 115.
[678] Local Government Committee of Northern Tasmania Development, NRLUS (2011) NHAO5 and AO6.

complies with the 'acceptable solutions' of the Bushfire Code. If the development does not meet an 'acceptable solution', it must be treated as discretionary development and determined solely by the planning authority. The preparation and certification of bushfire management plans has been privatised and is now the domain of accredited certifiers.[679] Local authorities are protected from liability in respect of anything done in accordance with a bushfire hazard management plan or other plan relating to environmental or natural hazards that has been approved by an accredited person.[680]

1.7.2.4 Existing Development

The new Bushfire Code does not apply to existing development, but does contain provisions relating to extensions to existing development, and redevelopment of existing lots. In many parts of the state, development in bushfire prone areas identified under current planning schemes has required the preparation of bushfire management plans, but no council appears to have a systematic mechanism for monitoring compliance.

[679] *Land Use Planning and Approvals Act 1993* (Tas) s 51(2)(d).
[680] *Land Use Planning and Approvals Act 1993* (Tas) s 69A.

1.8 Victoria

Land use planning in Victoria is governed by the *Planning and Environment Act 1987* (Vic). Like most state planning regimes, this legislation requires planning policies and controls to be contained in local level planning instruments - municipal planning schemes - which are operationalised through spatial zoning maps. Yet the format and much of the content of planning schemes is standardised across the state through the use of standard planning provisions. As such, all planning schemes accord to a prescribed format and contain 'state standard provisions' and 'local provisions'. The state standard provisions are taken from the Victoria Planning Provisions (VPPs), which include the State Planning Policy Framework (SPPF), state standard zones and overlay controls. While the 'head clauses' of zones and overlays are determined by the state, many do have schedules that can be tailored to local circumstances or, in some cases, populated entirely by the local planning authority (e.g. Environmental Significance Overlay). The local provisions, the Local Planning Policy Framework, consist of a Municipal Strategic Statement (MSS) (land use and development objectives and policies and strategies for achieving them) and specific provisions governing use and development within the municipality.[681]

The key roles in the planning system are played by local government and the minister for planning at the state level.[682] Local councils develop the local content of planning schemes (together with state government and within the scope of the standardised format noted above) and in many cases, act as the consent authority for development applications. Yet the state planning minister has the final say on the making or amendment of planning schemes.[683] The minister also sets the VPPs that must be included in all schemes,[684] can amend any planning scheme at will,[685] and can take the power to decide particular permit applications from councils.[686]

In addition, councils are required to refer permit applications to referral authorities where provided for in a planning scheme, and may be required to comply with the recommendations of the referral authority in deciding to approve, approve with conditions, or refuse a development application.[687] The VPPs provide for standard referral requirements in relation to bushfire and flood hazards; however there is no such general referral for coastal climate hazards. Specific arrangements are discussed further below.

Other key players in the Victorian planning system are planning panels and advisory committees. Planning panels are appointed by the Victorian Planning Minister to consider and report on proposed amendments to planning schemes. Planning authorities are not required to adhere to the recommendations of a panel but they must consider them prior to making a final decision on whether to proceed with a proposed amendment.[688] Advisory committees are similar to planning panels; they are statutory bodies established by the state planning minister to provide advice on particular planning issues.[689] While both planning panels and committees only have advisory

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[681] *Planning and Environment Act 1987* (Vic) s 7.
[682] In addition, there are some state agencies that are also recognised as planning authorities, including the Port of Melbourne Authority and Department of Sustainability & Environment for planning for the Alpine Resorts.
[683] *Planning and Environment Act 1987* (Vic) s 8.
[684] *Planning and Environment Act 1987* (Vic) s 4A.
[685] *Planning and Environment Act 1987* (Vic) s 8.
[686] *Planning and Environment Act 1987* (Vic) s 97B.
[687] *Planning and Environment Act 1987* (Vic) s 55; Standard referral requirements are provided in the *Victoria Planning Provisions (VPPs)* cl 66 of the General Provisions, *Referral and Notice Provisions*, accessible at <http://planningschemes.dpcd.vic.gov.au/vpps/>.
[688] See *Planning and Environment Act 1987* (Vic) Part 3.
[689] See *Planning and Environment Act 1987* (Vic) Part 7.

functions, they play an important role in the Victorian planning system and can have considerable influence on its design and implementation.

Finally, under the planning system, permit applicants, objectors and other third parties are entitled to seek merits review of planning permit decisions before the Victorian Civil and Administrative Tribunal (VCAT).[690] In deciding appeals, VCAT effectively 'sits in the shoes' of the original decision maker and is required to have regard to all matters considered by the responsible authority.[691]

Other relevant legislation

Like South Australia, Victoria has specific climate change legislation: *Climate Change Act 2010*. The primary focus is climate change mitigation; however it does require the preparation of a climate change adaptation strategy which will provide high level strategic direction for adaptation.[692] The Act also requires decision-makers operating under a range of relevant legislation to consider climate change in certain functions, including in relation to coastal management planning.[693] Significantly, decisions under the *Planning and Environment Act 1987* are not referenced in this context.

Specific coastal management and emergency management legislation is also relevant to coastal climate hazards and bushfire and is overviewed in each section below.

1.8.1 Victoria - Coastal Climate Hazards

1.8.1.1 Legal Architecture

Victoria has specific coastal management legislation: *Coastal Management Act 1995,* which works in tandem with the principal planning legislation to regulate coastal climate hazards within the planning framework. There are five main instruments:

Victorian Coastal Strategy 2008 (VCC 2008) prepared under the *Coastal Management Act 1995* – sets the overarching policy framework for coastal management in Victoria and includes specific provisions addressing climate coastal hazards.

The 'Environmental Risks' provision of the SPPF (SPPF, clause 13) contains specific provisions dealing with climate change (Clause 13.01). This state planning policy operationalises the coastal climate hazards policy of the *Victorian Coastal Strategy* within the planning framework. Its provisions are automatically included as part of municipal planning schemes.

The 'Settlement' provision of the SPPF (SPPF, clause 11) – is a planning policy which addresses the sustainable growth and development of Victorian settlements and includes provisions dealing with the impacts of climate change and natural hazards. Again, the provisions are included in municipal planning schemes.

Ministerial Direction No.13, *Managing Coastal Hazards and the Coastal Impacts of Climate Change* – governs planning scheme amendments involving the rezoning of non-urban land for urban use and development in coastal areas.[694]

General Practice Note, Managing coastal hazards and the coastal impacts of climate change[695] – contains additional procedural and substantive guidelines for decision-makers dealing with coastal climate hazards.

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[690] *Planning and Environment Act 1987* (Vic) Part 4, Division 2.
[691] *Planning and Environment Act 1987* (Vic) s 84B.
[692] *Climate Change Act 2010* (Vic) s 16 requires the Minister to prepare an adaptation plan that outlines and provides a risk assessment of the potential impacts of climate change on various regions in Victoria; and a statement of the Government's state-wide priorities and strategic response for adaptation to the potential impacts of climate change.
[693] *Climate Change Act 2010* (Vic) s 14 and Schedule 1 – climate change must be taken into account by the Minister when considering a draft Coastal Management Strategy under the *Coastal Management Act 1995* (Vic).
[694] Issued under s 12(2)(a) of the *Planning and Environment Act 1987* (Vic).

1.8.1.2 Substantive Provisions

Identification of hazard areas

The Victorian planning instruments adopt a SLR benchmark of not less than 0.8 m by 2100 and require planners to allow for the combined effects of tides, storm surges, coastal processes and local conditions.[696] Recent amendments to the policies apply a differentiated benchmark depending on the nature of land being developed: for urban infill developments, a planning benchmark of 0.2 m over current 1 in 100 year flood levels by 2040 is to be used; for new greenfield development outside of town boundaries, a planning benchmark of not less than 0.8 m sea level rise by 2100 is to be used.[697] Yet unlike other states, such as Qld, these hazard areas have not been comprehensively mapped for the purposes of embedding them within planning schemes (eg, as an overlay).

Strategic Considerations and Development Controls

The centrepiece of the Victorian planning policy, as reflected in the *Victorian Coastal Strategy*, is the policy that decision makers should 'apply the precautionary principle to planning and management decision-making when considering the risks associated with climate change'.[698] The strategy formally defines the precautionary principle in the same terms used in the Rio Declaration on Environment and Development:

[W]here there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the body of the strategy, the principle is described as:

…a 'commonsense' notion that requires decision-makers to be cautious when assessing potential health or environmental harms in the absence of the full scientific facts.[699]

To put the principle into practice, the strategy requires decision makers to:

- plan for sea level rise of not less than 0.8 m by 2100 and allow for the combined effects of tides, storm surges, coastal processes and local conditions;
- avoid development in low-lying coastal areas; and
- ensure that new development is located and designed so that it can be appropriately protected from climate change's risks and impacts and coastal hazards.[700]

This policy position is operationalised by the state planning policy *SPPF Clause 13: Environmental Risks* (Clause 13). After amendments in July 2012, it now requires responsible authorities and planning authorities to:

- plan for sea level rise of not less than 0.8 m by 2100 and the impacts of storms and coastal processes;
- consider the risks associated with climate change in planning and management decision making processes;
- for urban infill developments, use a planning benchmark of 0.2 m over current 1 in 100 year flood levels by 2040;

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[695] Victorian DPCD, *General Practice Note, Managing coastal hazards and the coastal impacts of climate change* (2012).
[696] Victorian Coastal Council, *Victorian Coastal Strategy* (2008) 38.
[697] SPPF cl 13, as amended July 2012.
[698] Victorian Coastal Council, *Victorian Coastal Strategy* (2008) 38.
[699] Victorian Coastal Council, *Victorian Coastal Strategy* (2008) 37.
[700] Victorian Coastal Council, *Victorian Coastal Strategy* (2008) 38.

- for new greenfield development outside of town boundaries, use a planning benchmark of not less than 0.8 m sea level rise by 2100;
- ensure that future development is not at risk;
- ensure that development or protective works seeking to respond to coastal hazard risks avoids detrimental impacts on coastal processes; and
- avoid development in identified coastal hazard areas susceptible to inundation and other coastal hazards.

Under the terms of Clause 13, planning bodies are also required to have regard to the *Victorian Coastal Strategy 2008*, any relevant coastal action or management plans issued under the *Coastal Management Act 1995* (Vic) or *National Parks Act 1975* (Vic),[701] and any relevant Land Conservation Council[702] recommendations.

Added to this are the provisions of *SPPF Clause 11: Settlement*, which, inter-alia seeks to 'promote the sustainable growth and development of regional Victoria through a network of settlements identified in the Regional Victoria Settlement Framework plan'. One of the principles identified in this sub-clause is to respond to the impacts of climate change and natural hazards, and promote community safety, by:

- siting and designing new dwellings, subdivisions and other development to minimise risk to life, property, the natural environment and community infrastructure from natural hazards, such as bushfire and flooding; and
- developing adaptation response strategies for existing settlements in hazardous and high risk areas to accommodate change over time.

For any proposed amendments to a planning scheme which involve the rezoning of non-urban land for urban use and development where the land abuts the coastline or a coastal reserve, or is less than 5 m AHD and 1 km from the coastline, *Ministerial Direction No. 13* requires planning authorities to include, in the materials sent to the planning minister, an explanation of how the amendment is consistent with the SPPF framework, addresses the current and future risks associated with coastal climate hazards, presents an outcome that seeks to avoid or minimise exposing future development to projected coastal climate hazards, and ensures new development will be located, designed and protected from potential coastal hazards to the extent practicable.

The General Practice Note - *Managing coastal hazards and the coastal impacts of climate change* - contains several general policy prescriptions, including the following:

For strategic planning and rezoning of land:

Development of coastal areas outside of existing settlements and in non-urban areas should be sited and designed in a way that does not unnecessarily expose future communities and assets to coastal hazard risk over its intended lifespan.

Development should be avoided in areas that are likely to be impacted by projected coastal hazards under climate change.

Coastal vulnerability assessments can be used to inform re-zonings in coastal areas.

In deciding whether to rezone coastal areas for urban purposes, decision makers may have regard to a range of considerations, including:

[701] In the hierarchy of coastal plans in Victoria, Coastal Action Plans (CAPs) are strategic documents prepared by Regional Coastal Boards, whereas coastal management plans (usually known as Foreshore Management Plans) are usually prepared by local Committees of Management for coastal Crown land (which may be citizen-based or prepared by the municipality).

[702] The Land Conservation Council has been succeeded by the Environment Conservation Council and later the Victorian Environmental Assessment Council.

- the intended use and design lifespan and value of a proposal, assessed against the relative risk exposure during that time and the local geographic characteristics of the coastline (e.g. ocean exposure and land type);
- the role of natural coastal processes and the need to allow for such processes to continue as a cost effective form of coastal defence against climate change;
- the critical need for coastal protection infrastructure and the type, location and cost of providing and maintaining such infrastructure throughout its intended lifespan;
- the need to establish appropriate setbacks to avoid a projected permanent hazard event and/or withstand a temporary event;
- the ability for a proposal to provide safe, all-weather access during times of emergency;
- consideration of appropriate built form responses; and
- the cumulative impact or any flow-on effects of proposed development and any associated protection works to adjacent properties and the coastline.

For planning permit applications, the practice note outlines referral procedures involving floodplain authorities (see below) and provides that for development applications concerning land outside existing settlements or urban areas, councils may request the proponent to prepare a coastal vulnerability assessment to assist with understanding erosion rates and developing appropriate setbacks or protection works. Coastal hazard vulnerability assessments should be carried out by a suitably qualified coastal engineer or coastal processes specialist. Further, agreements between the responsible authority and the owner of land within a planning scheme area (s 173 agreements) should not be applied to individual properties to prevent hazards being considered for future use and development.

Disclosure Laws

Any person may apply for a planning certificate (an official statement of the planning controls applicable to a particular property) under Part 9, Division 7 of the *Planning and Environment Act 1987* (Vic). Planning certificates are used to satisfy the requirements of the *Sale of Land Act 1962* (Vic), which requires vendors to issue a vendor's statement (s 32 statement) to purchasers before they sign a contract for the sale of land.[703]

Planning certificates contain information on any applicable zoning and overlay controls, and should also contain information on any relevant planning proposal, such as a planning scheme amendment or if the land is affected by a new strategy or document adopted by the council. Beyond this, councils may include further information on hazard exposure or applicable council policies at their discretion.

Unlike bushfire planning, because there is no standard planning overlay for coastal hazards in Victoria, these certificates will only contain information on coastal hazards where particular councils have either employed other available overlays as *de facto* coastal hazard overlays; or where they have developed applicable planning controls and decide to include this additional information.

An example of the former is the use of the Environmental Significance Overlay in Wellington Shire as a de facto coastal overlay. The Land Subject to Inundation Overlay

[703] The information to be included in this statement is provided in s 32(2) of the *Sale of Land Act 1962* (Vic), including the name of any applicable planning instruments; the responsible planning authority; and any applicable zoning controls.

also covers some areas at risk of inundation from the sea, where areas are subject to a combination of catchment-based flooding and storm surge effects.

An example of the latter is the specific notation in planning certificates issued by the East Gippsland Shire Council, which notifies prospective purchasers of applicable development controls if the land falls within the low-lying *Lakes Entrance Business District*. Land within this district is subject to the provisions of an incorporated document at cl 52.03 of the Planning Scheme - *Lakes Entrance Business District Interim Use and Development Control, Incorporated Document, December 2011*. This interim development control introduced particular requirements for the approval of use and development in the area in relation to risks of combined sea level rise, storm surge and riverine flooding.

A property planning report can also be obtained online by any person free of charge. These reports do not have the legal status of planning certificates, but may provide an opportunity to obtain more detailed information on the specific clauses of relevant municipal planning schemes.[704]

1.8.1.3 Governance/Procedural Provisions

In Victoria, the Victorian Coastal Council established under the *Coastal Management Act 1995* (Vic) is responsible for preparing the Victorian Coastal Strategy and the state's three regional coastal boards can prepare coastal action plans. Local councils are required to take the strategy and any applicable action plan into account when determining permit applications and performing other relevant functions, including preparing planning scheme amendments.

Referral authorities also play an important role in the determination of development applications. In contrast to the arrangements in relation to bushfire and flood, there is no general referral for coastal climate hazards specified by the standard Victoria Planning Provisions. There are, however, close correlations between areas affected by flood risks and by the risk of coastal inundation. In practice, floodplain authorities are involved both in an advisory and a formal referral authority role in many development assessment processes involving coastal hazards. The *General Practice Note, Managing coastal hazards and the coastal impacts of climate change* advises that permit applications should be referred to floodplain authorities for advice where it is considered necessary.[705] As the formal referral authority for development in flood zones and overlays,[706] floodplain authorities can also find themselves dealing with coastal risks, and are required to do so where these are an issue.[707]

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[704] Victorian DPCD, *Get information about your planning scheme* <http://www.dpcd.vic.gov.au/planning/planningschemes/get-information> (accessed 31/10/2012).

[705] Victorian DPCD, *General Practice Note, Managing coastal hazards and the coastal impacts of climate change* (2012).

[706] The *Water Act 1989* (Vic) provides that a designated floodplain management authority has a responsibility to control developments that may be proposed for land adjoining waterways, to develop and implement plans to take any action necessary to minimise flooding and flood damage and to provide advice about flooding and controls on development proposals to local councils. A statutory referral to the floodplain management authority is currently required where a Land Subject to Inundation Overlay, Floodway Overlay or Special Building Overlay applies. A permit application in an area under these overlays must be referred under s 55 of the *Planning and Environment Act 1987* (Vic) to floodplain authorities; see Victorian DPCD, *Victoria Planning Provisions* (VPPs) cl 66.03: *Referral of permit applications under other State standard provisions*.

[707] Victorian Department of Sustainability and Environment, *Guidelines for Coastal Catchment Management Authorities: Assessing Development in relation to Sea Level Rise* (2012).

In assessing permit applications, floodplain authorities will be guided by one of two documents:

- Planning for sea level rise – Assessing development in areas prone to tidal inundation from sea level rise in the Port Phillip and Westernport Region, Melbourne Water;[708] or
- the Victorian Department of Sustainability and Environment's Guidelines for Coastal Catchment Management Authorities: Assessing Development in relation to Sea Level Rise (2012).

For coastal climate hazards, the most relevant referral authorities are Victoria's five coastal floodplain authorities: Melbourne Water (within the Port Phillip and Westernport Catchment Management region), Glenelg-Hopkins Catchment Management Authority (CMA), Corangamite CMA, West Gippsland CMA and East Gippsland CMA).

1.8.1.4 Existing Development

Regulation of Land Acquisition

Similar to other jurisdictions, the *Planning and Environment Act 1987* (Vic) confers broad powers of compulsory acquisition on the Minister or a responsible authority, including in relation to any land required for the purposes of a planning scheme; or any land used for a purpose which is not in conformity with a planning scheme.[709] The *Land Acquisition and Compensation Act 1986* (Vic) provides the process for the acquisition of land for public purposes and the determination of compensation payable in respect of land so acquired.

1.8.2 Victoria - Bushfire

1.8.2.1 Legal Architecture

The Black Saturday bushfires in February 2009 led to extensive review and reform of the bushfire planning provisions within the Victorian system. The key planning instruments are:

- the 'Environmental Risks' provision of the SPPF (SPPF, Clause 13) contains specific provisions dealing with bushfire (Clause 13.05). This sets the overarching objects and principles concerning the management of bushfire risks in land use planning decisions;
- the *Bushfire Management Overlay* (BMO) (Clause 44.06 of the VPPs) operationalises the above policy position and includes statutory provision of development controls within planning schemes and a map showing areas where these apply. It is possible for council to prepare local schedules to the overlay to vary the provisions according to local circumstances; and
- Clauses 52.47 and 52.48 of the Particular Provisions – show requirements for specific uses and developments within the planning schemes, and provide the details to facilitate the implementation the BMO.
- *Ministerial Direction no.11 – Strategic Assessment of Amendments* – this direction provides that in preparing an amendment to a planning scheme, special consideration must be given to how the amendment addresses any bushfire risk (Clause 3.1).

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[708] Melbourne Water, *Planning for Sea Level Rise – Guidelines: Assessing development in areas prone to tidal inundation from sea level rise in the Port Phillip and Westernport Region* (Final Version, 2012), available at <http://www.dpcd.vic.gov.au/__data/assets/pdf_file/0017/111950/Melbourne-Water-Planning-for-sea-level-rise-guidelines.pdf>.

[709] *Planning and Environment Act 1987* (Vic) s 172; see also the specific provision for compulsory acquisition or acquisition by agreement in the context of projects of state or regional significance, Part 9A.

In addition, a number of guidelines and practice notes are available, including:

- *Practice Note 65 – Local Planning for Bushfire Protection* - provides an overview of the considerations that can support local planning for bushfire protection, assists councils to tailor the Local Planning Policy Framework in response to bushfire matters and provides guidance on how to prepare local schedules to the BMO.

Interaction with Building Regulations

Similar to other state systems, building regulations complement the above planning provisions, and are based on mapping of Bushfire Prone Areas and the application of the *Australian Standard for construction of buildings in bushfire prone areas* (AS 3959-2009). These standards employ a concept of Bushfire Attack Level (BAL) which is a measure of the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact. The Australian Standard includes six BALs: BAL-LOW; BAL-12.5; BAL-19; BAL-29; BAL-40 and BAL-FZ (Flame Zone). A minimum construction standard for new buildings of BAL-12.5 applies in all areas mapped as Bushfire Prone Areas in Victoria, although higher standards are required in different circumstances under the BMO.

1.8.2.2 Substantive Provisions

Identification of Hazard Areas

A key reform implemented following Black Saturday in Victoria has been a state-led review of bushfire hazard mapping to support the bushfire planning and building regulations.

Initially, the new planning provisions applied to areas previously mapped under the Wildfire Management Overlay; however new mapping is being rolled out across the state in 2012. This was a key recommendation of the Royal Commission into the Victorian Bushfires, as it was found that many areas affected by the Black Saturday fires were not previously mapped under the Wildfire Management Overlay in municipal planning schemes, and a coordinated, state-led program of hazard mapping was required.[710] Mapping for the BMO is based on vegetation classes, and takes into account fuel loads, patch sizes, and includes a substantial buffer to encompass areas that may be vulnerable to ember attack. The potential impacts of climate change on bushfire behaviour are difficult to quantify and represent spatially, so have been taken into account largely by favouring a more conservative approach to mapping the overlay.[711]

Regional Bushfire Planning Assessments have also been prepared for regions involving groups of adjoining municipalities, and map bushfire hazard areas in relation to significant planning features such as settlements, urban interfaces and access roads.[712] These are intended to support both land use planning functions and broader emergency management planning.

[710] 2009 Victorian Bushfires Royal Commission, *Final Report - Volume II Fire Preparation: Response and Recovery* (2010) 217-224.

[711] Research interviews conducted by the authors, state bushfire planning officers (Victoria) March - August 2012.

[712] Victorian DPCD, *Regional Bushfire Planning Assessments* <http://www.dpcd.vic.gov.au/planning/plansandpolicies/bushfire-planning-and-building-resource/planning-for-bushfire-protection/regional-bushfire-planning-assessments> (accessed 17/08/2012).

Bushfire Prone Areas are mapped separately to the BMO for the purposes of building regulation, and have also been reviewed following the 2009 fires, with a focus on aligning the mapping to support building and planning regulation.[713]

Both BMO and BPA hazard mapping are publicly available.[714]

Strategic Considerations and Development Controls

Clause 13.05 of the SPPF sets the overarching objectives and principles concerning the management of bushfire risks in land use planning decisions. The aim of the provision is to 'assist to strengthen community resilience to bushfire.' This is to be achieved by:

- prioritising the protection of human life over other policy considerations in planning and decision-making in areas at risk from bushfire; and
- applying the precautionary principle to planning and decision-making when assessing the risk to life, property and community infrastructure from bushfire.

The policy provides a number of more specific strategies:

- planning schemes are to identify where the level of bushfire hazard requires development controls to govern the design, location and construction of new development; and where development should not proceed unless the risk to life and property from bushfire can be reduced to an acceptable level;
- Strategic and Settlement Planning must address bushfire risk at both a local and broader context and implement measures to reduce this risk to an acceptable level. Timely consultation with the relevant fire authority is recommended;
- planning schemes are to specify the requirements and standards for assessing whether the risk to a proposed development from bushfire is acceptable and the conditions under which new development may be permitted;
- planning schemes are to require a site-based assessment for proposed development to identify appropriate bushfire protection measures; and
- new development may only be permitted where the risk to human life, property and community infrastructure can be reduced to an acceptable level; where bushfire protection measures can be readily implemented and managed within the property; and where the risk to existing residents, property and community infrastructure from bushfire is not increased.

This strong strategic focus is complemented by *Ministerial Direction No*. *11 – Strategic Assessment of Amendments*, which seeks to ensure that bushfire risk is a key consideration at a strategic planning level when preparing an amendment to a planning scheme.[715]

The specific provisions in Clause 13.05 of the SPPF are also complemented by those contained in Clause 11, which sets down principles and strategies for settlements in the Melbourne hinterland and regions, including to 'respond to the impacts of climate change and natural hazards and promote community safety by siting and designing new dwellings, subdivisions and other development to minimise risk to life, property,

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[713] New BPAs came into effect on 8 September 2012; see Victorian DPCD, *Building for bushfire protection* <http://www.dpcd.vic.gov.au/planning/plansandpolicies/bushfire-planning-and-building-resource/building-for-bushfire-protection> (accessed 17/08/2012).

[714] Land Victoria, a division of the Department of Sustainability and the Environment, *Planning Maps Online (interactive mapping service)* <http://services.land.vic.gov.au/landchannel/jsp/map/PlanningMapsIntro.jsp> (accessed 17/08/2012).

[715] Victorian DPCD, *Ministerial Direction No. 11: Strategic Assessment of Amendments* (2011), available at <http://www.dpcd.vic.gov.au/__data/assets/pdf_file/0016/43216/dir11.pdf>.

the natural environment and community infrastructure from natural hazards, such as bushfire and flooding'.

The Local Planning Policy Framework (LPPF) within municipal planning schemes may also address bushfire planning. The use of these local provisions to express planning strategy in relation to bushfire is likely to be expanded as local governments implement some of the specific strategies of Clause 13.05.

The BMO is the primary means of implementing restrictions on development considered at risk from bushfires. In areas covered by the BMO, a planning permit is required for the subdivision of land, construction of a building or carrying out works associated with a wide range of uses (Clause 44.06-1). Exemptions from the need to obtain a permit apply for an alteration or extension to an existing building (used for a dwelling or dependent person's unit) that does not increase the floor area by 50% or more; or if a schedule to the overlay specifies that no permit is required. For subdivisions, it is expected that bushfire protection measures will be dealt with via section 173 agreements for each lot within the subdivision, rather than requiring particular conditions for a planning permit for individual lots.[716]

The BMO provides that an application must be accompanied by a locality and site description and a bushfire management statement, and sets out the requirements for these documents.[717] The standards applicable to the bushfire management statement are found in Clause 52.47 described below.

A permit is required to include a condition requiring the ongoing maintenance of the bushfire mitigation measures relating to construction standards, defendable space, water supply and access.[718]

It also requires relevant permit applications to be referred to the relevant fire authority and sets down mandatory considerations for permit decisions, which include:

- the SPPF and LPPF;
- the applicable bushfire management statement;
- whether the level of risk to life, property and community infrastructure from bushfire is acceptable;
- relevant approved State, regional or municipal fire prevention plans; and
- any relevant guidance issued by the relevant fire authority.[719]

The final key part of the planning framework is found in the Particular Provisions of the VPPs. Clause 52.47 provides a range of objectives, standards (some of which are mandatory) and decision guidelines which apply to applications to subdivide land, construct a building or carry out works under the provisions of the BMO. The *objectives* provide the desired outcomes to be achieved in the completed development; and a development is required to meet all the objectives of the clause. *Standards* set out the requirements to meet the objectives, and should normally be met; however alternative design solutions may be acceptable. A number of *mandatory standards* are also prescribed, for which alternative design solutions must not be considered by the responsible authority. In addition, *decision guidelines* set out the matters that the responsible authority must consider before deciding if an application meets the

[716] Victorian DPCD, VPPs cl 44.06-4, cl 44.06-1.
[717] Victorian DPCD, VPPs cl 44.06-2.
[718] Victorian DPCD, VPPs cl 44.06-4; '[t]he bushfire mitigation measures forming part of this permit or shown on the endorsed plans, including those relating to construction standards, defendable space, water supply and access, must be maintained to the satisfaction of the responsible authority and the relevant fire authority on a continuing basis. This condition continues to have force and effect after the development authorised by this permit has been completed.'
[719] Victorian DPCD, VPPs cl 44.06-7.

objectives. Together these provisions provide some substance as to what is considered to be 'an acceptable risk to life, property and community infrastructure.' Generally, these provisions are far more prescriptive than those in place prior to the recent reforms, and now include clear-cut prescriptive codification of requirements where it is possible to achieve this.

For example, the relevant standards include:

- Residential Subdivisions: each lot must be capable of achieving an appropriate level of defendable space around a dwelling; providing adequate water supply for fire fighting purposes; and providing safe access for emergency and other vehicles. These requirements must be achieved prior to the approval of a subdivision.[720]
- Development should avoid locations where the risk to life, property and infrastructure cannot be reduced to an acceptable level through bushfire protection measures (due to the characteristics of the bushfire hazard, the topography of the land, the likely bushfire behaviour, access and egress opportunities)[721]
- Siting and layout of development should minimise the bushfire risk, having regard to slope, access, aspect, orientation and vegetation.[722]

Mandatory standards are provided in relation to:

The implementation and maintenance of bushfire protection measures in perpetuity;[723]

Achieving the required area of defendable space – the required area is prescribed according to the use (dwelling, industry, office and retail or other occupied buildings) and in conjunction with the construction standards to achieve the required Bushfire Attack Level (BAL). Generally, the lower the construction standards, the more defendable space is required to achieve the desired level of bushfire protection.[724] The defendable space required must be achievable on the land to which the planning permit will apply, and generally cannot rely on neighbouring land to achieve the required standards.[725]

Water supply and safe access for emergency and other vehicles must be provided at all times.[726]

Policy Guidance for balancing trade-offs

Reflecting the debates in the immediate aftermath of the Black Saturday fires, the bushfire planning provisions give explicit priority to the protection of human life over other policy considerations.[727] One of the difficult policy trade-offs in this context is in relation to achieving defendable space requirements around both new and existing development through the clearing of native vegetation, with implications for biodiversity conservation; land and water degradation; and amenity values.

In the context of new development, there may be scope to minimise the clearing of native vegetation required to achieve the prescribed level of bushfire protection (BAL) by increasing the construction standards applicable. Yet, given the priority placed on

[720] Standard BF2, cl 52.47-2.
[721] Standard BF3, cl 52.47-3.
[722] Standard BF4, cl 52.47-4.
[723] Mandatory Standard BF5, cl 52.47-5.
[724] Mandatory Standard BF5, cl 52.47-5 – 52.47-8.
[725] Mandatory Standard BF9, cl 52.47-9; unless the adjoining land does not require management to minimise the spread and intensity of bushfire or there is reasonable assurance that land will be managed to minimise bushfire risk.
[726] Mandatory Standard BF10, cl 52.47-10.
[727] State Planning Policy Framework cl 13.05.

the protection of human life (and the specific lack of a reference to minimising environmental impacts in the relevant provisions of the State Planning Policy Framework), it seems difficult to envisage a situation where a development could be refused on the basis that achieving the required level of defendable space would lead to an undesirable environmental outcome. In practice, much will rely on the particular context and whether there is scope (and a desire) to minimise environmental impacts.

In the context of existing development (buildings used for accommodation), broad exemptions from permit requirements concerning the removal of vegetation apply.[728] These exemptions allow the removal, destruction or lopping of any vegetation within 10 m of an existing building used for accommodation; and the removal, destruction or lopping of any vegetation except trees within 30 m of an existing building used for accommodation. In areas covered by the BMO, the area in which any vegetation except trees (understorey vegetation) can be removed is within 50 m of an existing building used for accommodation.[729] Similarly, removing vegetation within 4 m either side of a fence or boundary is also exempt.[730] The very broad application of these exemptions across Victoria (not just in areas covered by the BMO and including many areas that have no or very little bushfire risk) clearly prioritises bushfire hazard mitigation over native vegetation conservation and other related considerations. Implications for competing policy considerations will depend on the practical uptake of these exemptions and an ability to monitor this uptake.

Rebuilding after bushfire

Following the 2009 fires, special provision was also made within the planning scheme to facilitate the rebuilding of dwellings and buildings used for agriculture that were damaged or destroyed by the 2009 fires. These activities were made exempt from planning scheme requirements including the new bushfire planning provisions, provided a site plan was submitted to the responsible authority detailing the siting of rebuilding and compliance with some limited use and development conditions regarding access and water supply for example.[731]

Disclosure Laws

As noted above, planning certificate issued under the *Planning and Environment Act 1987* (Vic) are used to satisfy the requirements of the *Sale of Land Act 1962* (Vic), which requires vendors to issue a vendor's statement (s 32 statement) to purchasers before they sign a contract for the sale of land. In order the implement the recommendations of the Royal Commission into the 2009 Victorian Bushfires, there have been recent amendments to these disclosure laws to explicitly disclose potential bushfire hazard exposure. Following these amendments, if the land is in a bushfire-prone area within the meaning of regulations made under the *Building Act 1993* (Vic), the vendor's statement must include a specific statement that the land is in such an area. It is not required that such a statement be made where land is not in a bushfire-prone area.[732]

1.8.2.3 Governance/Procedural Provisions

One of the key reforms introduced after the 2009 fires was a greater and strengthened role for relevant fire authorities in both strategic and statutory planning functions. At a

[728] Victorian DPCD, VPPs cl 52.48; this clause is intended to ensure that planning measures do not impede the implementation of bushfire protection measures and exemptions from permit requirements are also included for the modification of buildings for the purposes of creating community fire refuges and private bushfire shelters.
[729] Victorian DPCD, VPPs cl 52.48-1.
[730] Victorian DPCD, VPPs cl 52.48-2.
[731] Victorian DPCD, VPPs cl 52.39.
[732] *Police and Emergency Management Legislation Amendment Bill 2012 Explanatory Memorandum* (Vic) Part 5.

strategic level, the Country Fire Authority (CFA) is one of many agencies involved in the development of strategic land use planning policies.[733] The CFA also has statutory roles as a referral agency - any relevant permit application under the BMO must be referred (under s 55 of the *Planning and Environment Act 1987* (Vic)) to the relevant fire authority.[734]

A key issue in bushfire hazard mitigation is ensuring that defendable space requirements are maintained over time, and this is recognised by the requirement noted above that a planning permit include a condition requiring the ongoing maintenance of the bushfire mitigation measures relating to construction standards, defendable space, water supply and access.[735] It is important to note that councils, as responsible planning authorities, are the enforcement agencies for any such conditions on planning permits,[736] yet there are limited provisions within the governing legislation to facilitate this ongoing role, and resource constraints are a significant concern for councils in this area.[737]

1.8.2.4 Existing Development

Measures to manage bushfire risks for existing communities and infrastructure are covered by a range of emergency management planning processes. Foremost is the strategic, regional program called *Integrated Fire Management Planning*, which seeks to bridge bushfire mitigation, response and recovery measures.[738] A key output will be a spatial analysis of bushfire risk at a regional scale, which will be a critical input to strategic land use planning decisions.

The *Country Fire Authority Act 1958* (Vic), also establishes a municipal fire prevention program, which includes plans made at the municipal scale and the employment of municipal fire prevention officer by local councils. The focus of this program is the protection of existing assets from bushfire hazard, particularly fuel reduction activities.[739]

The exemptions from the need to obtain development consent for the clearance of native vegetation discussed above are also measures which seek to manage bushfire hazard in existing development.

Following the 2009 Victorian bushfires, in response to a recommendation by the Royal Commission,[740] a voluntary program of buy back for properties affected by the fires was

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[733] For example, the views of the CFA must be sought and applied at the planning scheme amendment level; see Victorian DPCD, *Ministerial Direction No. 11: Strategic Assessment of Amendments* (2011) cl 3.1.

[734] Victorian DPCD, VPPs cl 66.03; a permit application in an area under the BMO must be referred under s 55 of the *Planning and Environment Act 1987* (Vic) to the relevant fire authority.

[735] Victorian DPCD, VPPs cl 44.06-4; '[t]he bushfire mitigation measures forming part of this permit or shown on the endorsed plans, including those relating to construction standards, defendable space, water supply and access, must be maintained to the satisfaction of the responsible authority and the relevant fire authority on a continuing basis. This condition continues to have force and effect after the development authorised by this permit has been completed.'

[736] See discussion in 2009 Victorian Bushfires Royal Commission, *Final Report - Volume II Fire Preparation: Response and Recovery* (2010) 264-6.

[737] See discussion in 2009 Victorian Bushfires Royal Commission, *Final Report - Volume II Fire Preparation: Response and Recovery* (2010) 264-6; see particularly, Recommendation 52: the State develop and implement, in consultation with local government, a mechanism for sign-off by municipal councils of any permit conditions imposed under the Bushfire-prone Overlay and the regular assessment of landowners' compliance with conditions.

[738] CFA, *Fire Management Planning: Working Together* <http://www.cfa.vic.gov.au/firesafety/buildingandregulations/firemanagementplanning/working-together.htm> (accessed 22/08/2012).

[739] CFA, *Building Regulations: Fire Management Planning* <http://www.cfa.vic.gov.au/firesafety/buildingandregulations/firemanagementplanning/index.htm> (accessed 22/08/2012).

[740] 2009 Victorian Bushfires Royal Commission, *Final Report - Volume II Fire Preparation: Response and Recovery* (2010) 252; see especially Recommendation 46: the State develop and implement a retreat and

introduced with the dual objectives of ensuring that residential properties are not re-built in areas of high bushfire risk, and enabling affected landowners to re-settle elsewhere. This was available to owner-occupiers whose principal place of residence was destroyed in the 2009 bushfires; who had not commenced rebuilding; and where a site was not available on the property that would enable a replacement dwelling to be located at a distance of greater than 100 m from forest vegetation and that vegetation adjoins a large area of forest such as a national park, state park, state forest or private plantation.[741]

resettlement strategy for existing developments in areas of unacceptably high bushfire risk, including a scheme for non-compulsory acquisition by the State of land in these areas. The resulting program has been criticised for its lack of strategic focus and voluntary nature which did not allow it to fully eliminate the bushfire risk for targeted areas. A compulsory acquisition program operated in the Dandenong Ranges over 30 years to create a bushfire buffer zone. This involved extensive compulsory acquisition and restructuring of often inappropriately subdivide residential lots with the objective of separating residential development from areas of high fire risk. It was considered to be successful in preventing many people from building in an area of extremely high fire risk.

[741] Victorian Department of Justice, *Buyback* (2012) <http://www.justice.vic.gov.au/buyback> (accessed 22/08/2012).

1.9 Western Australia (WA)

The principal land use planning statute in Western Australia is the *Planning and Development Act 2005* (WA). It is complemented by a number of other pieces of legislation and subordinate legislation, including the *Environmental Protection Act 1986* (WA), *Town Planning Regulations 1967* (WA) and the *Planning and Development Regulations 2009* (WA). The *Planning and Development Act 2005* (WA) (PD Act) provides for the development of a State Planning Strategy[742] (SPS) which is a high level strategic planning document, setting out the key planning challenges and priorities for WA until 2029.[743] The PD Act also provides for a collection of all of the state's strategic and statutory planning policies under a State Planning Framework. The Framework sets out the policies and development controls that are then implemented through local and regional planning schemes. A range of other planning instruments are used to guide strategic and statutory planning decisions, including regional, district and local structure plans, non-statutory policies prepared by the Western Australian Planning Commission (WAPC) and local governments, and residential planning codes.

There is no specific climate change legislation in WA, and climate change is not mentioned in the PD Act.

The governance structure in the Western Australian planning regime is similar to that in other Australian jurisdictions, with the most notable difference being the prominent role that the WAPC plays.[744] The key functions are performed by the Minister for Planning and Infrastructure, WAPC and local government. The Minister oversees the planning system and, amongst other things, is responsible for giving final approval to state planning policies and regional and local planning schemes. Like the Tasmanian Planning Commission, the WAPC performs both advisory and substantive functions and lies at the centre of the regime. It is responsible for the preparation, review and amendment of the state planning strategy, state planning policies and regional planning schemes, determines all subdivision (and some strata subdivision) applications in the state, has development control powers under regional schemes (which are usually delegated to local government), and has advisory functions concerning the preparation and amendment of local planning schemes.

The WAPC prepares formal planning policies - State Planning Policies (SPPs)[745] and less formal development control policies (DCs). These policies are operationalised at the local government level, through regional planning schemes[746] and in local planning schemes. Reference must be had to SPPs and DCs in the drafting and interpretation of local and regional planning schemes. The WAPC also prepares, and assists in the preparation of structure plans and improvement plans (and improvement schemes) and provides policy advice and guidance to the minister, local governments and other relevant bodies.

Local governments develop local planning schemes, which are intended to be consistent with, and complement, regional planning schemes. To assist in this function, the *Town Planning Regulations 1967* (WA) include a Model Scheme Text and the WAPC has published a Town Planning Schemes Manual. Local governments also prepare and use planning policies and structure plans, and have responsibility for determining development applications under their planning schemes and regional schemes (where WAPC has delegated approval powers).

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[742] Western Australian Planning Commission (WAPC), *State Planning Strategy: Final Report* (December 1997) <http://www.planning.wa.gov.au/dop_pub_pdf/SPSreport.pdf> (accessed 15/12/2012).
[743] *Planning and Development Act 2005* (WA) s 14(b).
[744] *Planning and Development Act 2005* (WA) s 14.
[745] SPPs are prepared pursuant to s 26 of the *Planning and Development Act 2005* (WA) and must be signed off by the minister for planning and the Governor and gazetted.
[746] The regions that are the subject of regional schemes are set out in Schedules 3 and 4 to the *Planning and Development Act 2005* (WA).

Since mid-2011, some of the development control functions of the WAPC and local government have been reallocated to Development Assessment Panels (DAPs) made under Part 11A of the *Planning and Development Act 2005 (WA)* and the *Planning and Development (Development Assessment Panels) Regulations 2011* (WA). There are two types of DAPs: Local DAPs (LDAPs) and Joint DAPs (JDAPs). LDAPs cover the jurisdiction of a single local government area and must comprise two local government representatives and three specialist members, all of whom are appointed by the planning minister. In making local government representative appointments, the minister is required to abide by the advice of the relevant local government unless the local government fails to make a nomination within the prescribed period (minimum 40 days).[747] For specialist member appointments, the minister is required to have regard to a short-list compiled by a working group formed under the regulations and, if he/she wants to appointment someone other than those on the short-list, the person must still be on the register of specialists maintained under the regulations.[748] JDAPs cover more than one local government area and are made up of two local government members from the relevant local government areas and three specialist members. As with the LDAPs, there are probity rules governing JDAP appointments to ensure it contains the requisite mix of local representation and specialist skills.[749]

At the time of writing, there was one LDAP (covering the City of Perth) and 14 JDAPs. The development control functions of these DAPs are based on mandatory and voluntary triggers that hinge on development type and value thresholds set under the regulations. For example, if a development application is made within the district of the City of Perth and it is not an 'excluded development application' and has an estimated cost of $15 million or more, it must be determined by the City of Perth LDAP.[750] Excluded development applications are prescribed under the regulations and include the construction of a single house (and any associated incidental development), construction of 10 grouped or multiple dwellings (and any associated incidental development), development by a local government or the WAPC, and development in an improvement scheme area.[751] In addition to this mandatory trigger, if a development application is made within the district of the City of Perth and it is not an excluded development application and has an estimated cost of between $10 million and $15 million, the applicant can elect to have it determined by the LDAP.[752] The regulations also allow for the City of Perth to delegate development assessment powers to the LDAP in certain circumstances.[753]

Several other agencies play important functions in the planning system. Chief amongst them are the Environmental Protection Authority (EPA) and Minister for Environment. The EPA reviews proposals to prepare regional and local planning schemes and determines whether they require an environmental assessment. Where an assessment is required, it is prepared and released for public concurrently with the proposed scheme. At the completion of the public comment period, the assessment and submissions are sent to the EPA, after which the Environment Minister may require the scheme to be amended to incorporate environmental conditions. The EPA can also perform referral authority functions in development application processes, similar to a number of other agencies.

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[747] *Planning and Development (Development Assessment Panels) Regulations 2011* (WA) Part 4, Divisions 1, 2.
[748] *Planning and Development (Development Assessment Panels) Regulations 2011* (WA) Part 4, Divisions 1, 2.
[749] *Planning and Development (Development Assessment Panels) Regulations 2011* (WA) Part 4, Divisions 1, 2.
[750] *Planning and Development (Development Assessment Panels) Regulations 2011* (WA) reg 5.
[751] *Planning and Development (Development Assessment Panels) Regulations 2011* (WA) reg 3.
[752] *Planning and Development (Development Assessment Panels) Regulations 2011* (WA) reg 6.
[753] *Planning and Development (Development Assessment Panels) Regulations 2011* (WA) Part 3.

The other key player in the Western Australian planning system is the State Administrative Tribunal.[754] Applicants for approval who are dissatisfied with the decision made by the responsible authority can usually apply to the Tribunal for review. The scope for appeals to the Tribunal is set under the Act, regulations and planning schemes. Like other planning appeal bodies, the Tribunal 'sits in the shoes' of the original decision maker and can confirm or replace the original decision.

1.9.1 Western Australia - Coastal Climate Hazards

1.9.1.1 Legal Architecture

The main planning instrument governing the response to coastal climate hazards in Western Australia is the *State Planning Policy 2.6: State Coastal Planning Policy*, which was originally made in 2003 under the *Town Planning and Development Act 1928* (WA). This policy complements several other related policies, including:

State Planning Policy No. 1: State Planning Framework Policy

State Planning Policy No. 2: Environment and Natural Resources Policy

State Planning Policy No. 3: Urban Growth and Settlement, and State Planning Policy No. 3.4: Natural Hazards and Disasters.

There are also several non-statutory policies and procedures relevant to the management of planning responses to coastal climate hazards. These include the Department of Transport's *Coastal Protection Policy for Western Australia* and the 2001 draft *Coastal Zone Management Policy for Western Australia*. At the time of writing, the *State Coastal Planning Policy* was under review and changes are expected to be introduced in 2013.

1.9.1.2 Substantive Provisions

Identification of Hazard Areas and Development Controls

The *State Coastal Planning Policy* is intended to reflect a precautionary approach to coastal climate hazards[755] that protects and conserves coastal values, provides for ongoing public access to foreshore areas and 'ensures that the location of coastal facilities and development takes into account coastal processes including erosion, accretion, storm surge, tides, wave conditions, sea level change and biophysical criteria'.[756] To promote this, the policy requires the use of setbacks to accommodate coastal processes and includes detailed physical processes setback guidelines. It also provides for the creation and management of coastal foreshore reserves and stipulates that, as a general rule, the land seaward of the setback 'should be given up free of cost at the time of development, subdivision or strata subdivision, over and above the required provision of public open space'.[757] To avoid confusion, the policy stipulates that the physical processes setbacks calculated in accordance with the guidelines do 'not necessarily equate to coastal foreshore reserve requirements' and that additional setbacks can be imposed for these purposes.[758]

The physical processes setback guidelines determine setback distances from a defined line known as the 'horizontal setback datum' (HSD),[759] which is set having regard to the physical and biological characteristics of the coast. For these purposes, the policy identifies four coastal types: sandy, rocky, mangrove and cyclonic. Once the HSD is determined, the policy breaks the setback calculation into three parts to reflect different types of coastal hazards: storm surge impacts, chronic coastal erosion and sea level

[754] *State Administrative Tribunal Act 2004* (WA); *Planning and Development Act 2005* (WA) Part 14.
[755] WAPC, *Coastal Zone Management Policy for Western Australia* (Draft, 2001).
[756] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) cl 5.1(xxii).
[757] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) cl 5.1(vi).
[758] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) cl 2.3.
[759] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) cl 7.

rise. The total physical processes setback is the sum of the allowances calculated for each hazard and is intended to provide for these potential impacts over a 100-year planning timeframe.

For storm surge, the policy requires the setback to be based on the modelled impact of a 1 in 100 storm event or, where modelling is unavailable, a default value of 40m is to be used.[760] For chronic coastal erosion, the setback is required to be calculated as '100 times the assessed present longer-term annual rate of erosion', where the long-term rate is determined on the basis of at least 40 years of data on shoreline movement.[761] For relatively stable shorelines, the policy sets a minimum allowance of 20m unless there is evidence of 'chronic accretion' in excess of 20m over the 100-year planning period.[762] For sea level rise, the current policy uses a SLR benchmark of 0.38m over the period 2000 to 2100.[763] Relying on the Bruun rule, the policy uses a multiplier of 100 to provide a setback of 38m for sandy shores. For other shore types, the policy requires the SLR setback allowance to be calculated on the basis of local geography.[764]

In addition to general rules regarding the calculation of setbacks, the policy provides for a range of variations and exemptions for specific types of development. The variations are split into four groups.

Infill development of an existing coastal subdivision. The policy provides that, 'as a guiding principle', the setback for infill development should provide immediate protection for the new development 'while accepting the reasonable and likely future protective requirements of adjoining development'.[765] While ambiguous, this appears to suggest that the setback distance should protect the development from existing hazards but, because of the likelihood of the existing settlement being protected, it need not account for potential future hazards.

Development adjacent to coastal protective structures or systems. The policy provides that development that will benefit from existing formal coastal protection structures or systems should be determined on a case-by-case basis having regard to the nature of the structure or system. The general principles are that: (a) if there is a sandy beach within the system, the setback should still account for acute erosion associated with storm surge events; (b) if the works are likely to be maintained, there is no need for the setback to account for chronic erosion; and (c) if the structure has been designed for wave heights and sea levels that will exist at the end of the 100-year planning term, there is no need for the setback to account for storm surge or SLR unless there is a sandy beach.[766]

Development on a rocky shoreline. Rocky shorelines are defined 'as a coast where the highest visible impact of sea action is in direct contact with lithified material'.[767] If the coast is predominantly sandy with intermittent rocky outcrops it is treated as sandy rather than rocky. For rocky shorelines, the guidelines provide that setbacks are to be 'determined following a geotechnical survey accounting for possible erosion over a 100-year period' and, in the absence of a survey, the minimum setback should be 50 m from the HSD.[768]

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[760] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) Schedule 1, cl D.1.
[761] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) Schedule 1, cl D.2.
[762] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) Schedule 1, cl D.2.
[763] The 0.38m assumption is based on the mean of the median model of sea level rise from the United Nations Intergovernmental Panel on Climate Change, Third Assessment Report, *Climate Change 2001* (2003) publically available at, <http://www.grida.no/publications/other/ipcc_tar/>.
[764] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) Schedule 1, cl D.3.
[765] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) Schedule 1, cl F.1.
[766] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) Schedule 1, cl F.2.
[767] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) Schedule 1, cl F.3.
[768] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) Schedule 1, cl F.3.

Development in cyclone-prone areas. The policy states that 'any development located to the north of latitude 30 degrees to be set back from the foreshore to afford protection from the impact of cyclonic storms'.[769] The setback for these purposes is required to be determined on a case-by-case basis having regard to storm surge impacts, chronic coastal erosion and sea level rise, and that the storm surge allowance should be determined on the basis of the maximum (worst case) impacts of a Category 5 cyclone.

There are five general exemptions:[770]

1. development with an expected useful lifespan of less than 30 years that is undertaken by a public utility or government agency for a public purpose, provided it is on the condition that the development is removed or modified if it is threatened by erosion or creates an erosion threat to other land;
2. temporary and easily relocatable structures that are 'demonstrably coastally dependent' (e.g. surf life saver lookouts);
3. industrial and commercial development that is demonstrably dependent on a foreshore location (e.g. marinas, port facilities and cage based aquaculture);
4. Department of Defence operational installations that require a foreshore location; and
5. development nodes that provide for a range of facilities to benefit the broader public. These nodes can be developed within the setback area but should only be located where necessary ancillary coastal protection structures would not result in erosion or destabilisation of adjacent coast.

As noted in 1.9.1.1 (Appendix A), the *State Coastal Planning Policy* is currently under review and a draft of the proposed revised policy has been released for public comment.[771] The draft policy retains many aspects of the existing policy but includes several important proposed amendments. These include:

- the insertion of a specific policy measure titled, 'Coastal hazard risk management and adaptation planning', which requires:
- coastal hazard risk management and adaptation planning to be undertaken in areas identified as being at risk of coastal hazards over the planning timeframe;
- where coastal hazard risks are identified, that they be disclosed to those likely to be affected, including by inserting a notification on certificates of title in the form, 'VULNERABLE COASTAL AREA – This lot is located in a area likely to be subject to coastal erosion and/or inundation over the next 100 years'; and
- where areas are identified as being at high risk, measures should be taken to 'reduce those risks down to acceptable or tolerable levels' and the measures should be determined on the basis of a hierarchy of avoid, retreat, accommodate and protect (i.e. avoid is the most desirable, protect the least desirable);[772]
- the insertion of a specific policy measure titled, 'Coastal protection works', which establishes a general presumption against new coastal protection works and specifies that they should only be supported where it can be demonstrated that they will not have a significant adverse impact on the adjacent environment, there are appropriate funding arrangements in place to support ongoing maintenance and they are primarily proposed to advance the public interest;

[769] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) Schedule 1, cl F.4.
[770] WAPC, *State Planning Policy 2.6: State Coastal Planning Policy* (2003) Schedule 1, cl G.
[771] WAPC, *Draft State Planning Policy 2.6: State Coastal Planning Policy* (2012).
[772] WAPC, *Draft State Planning Policy 2.6: State Coastal Planning Policy* (2012) cl 5.5(iii).

- the insertion of a specific policy measure concerning the precautionary principle that stipulates that the proponent of a development carries the burden of proving that it 'does not pose any likelihood of serious or irreversible harm to the environment' and, if that cannot be demonstrated, they must show that the harm can be managed;[773]
- an increase in the SLR allowance under the coastal processes setback guidelines to 0.9 m over the period 2010 to 2110; and
- a requirement that, when determining the storm surge setback allowance, consideration be given to 1 in 500 year storm events.

The draft policy was accompanied with a detailed set of guidelines to further assist practitioners in implementation.[774]

Disclosure Laws

Unlike the planning legislation in a number of other jurisdictions, the *Planning and Development Act 2005* (WA) does not include a procedure for the issuance of planning certificates (an official legal statement of the planning controls applicable to the subject land). However, planning schemes can (and do) provide for the creation and issuance of these instruments. For example, the Metropolitan Region Scheme, Peel Region Scheme and Greater Bunbury Region Scheme all explicitly provide for the issuance of scheme certificates by the WAPC that specify that way the subject land is affected by the scheme and the purposes (if any) for which the land is reserved under the scheme.[775] Notably, this will only include information on coastal hazards where the scheme has included controls concerning these issues. Beyond the provisions in planning schemes, councils may provide additional information on hazard exposure or applicable council policies at their discretion.

1.9.1.3 Governance/Procedural Provisions

As detailed above, the planning minister and WAPC have the main powers and responsibilities concerning planning responses for coastal climate hazards. In particular, the WAPC is responsible, with the approval of the Minister, for preparing the *State Coastal Planning Policy* and any amendments to the policy.[776] WAPC also prepares the regional planning schemes, has advisory functions concerning the preparation and amendment of local planning schemes and is responsible for development control concerning subdivisions. The key function of local governments is in the preparation and implementation of local planning schemes, which is intended to accord with the *State Coastal Planning Policy*. The City of Perth LDAP and 14 JDAPs are now central to the development assessment process in the state and, in theory, should ensure greater consistency in the application of the policy.

The Department of Transport and Minister for Transport also has a significant role in responses to coastal hazards. The transport portfolio takes in all maritime issues in Western Australia, which includes coordinating and facilitating the construction and maintenance of coastal protection works. Due to this, the Transport Department prepared, and has oversight of, the *Coastal Protection Policy for Western Australia*. This policy sets out the principles regarding the construction of the coastal protection works in the state. Consistent with the *State Coastal Planning Policy*, these include ensuring that such works are only constructed where the benefits outweigh the costs, to minimise the interference with natural coastal processes, ensuring the coast remains available to benefit the whole community and 'ensuring that the direct beneficiaries of

[773] WAPC, *Draft State Planning Policy 2.6: State Coastal Planning Policy* (2012) cl 5.11.
[774] WAPC, *Draft State Planning Policy 2.6: State Coastal Planning Policy Guidelines* (2012).
[775] *Metropolitan Region Scheme* (WA) cl 42; *Greater Bunbury Region Scheme* (WA) cl 53; and *Peel Region Scheme* (WA) cl 47.
[776] *Planning and Development Act 2005* (WA) Part 3.

coastal development carry all consequential costs'.[777] One of Department's main responsibilities under the policy is to administer the coastal protection grant scheme, under which local governments can apply for up to 50% of the funding for the investigation, design, construction and maintenance of coastal protection works.

1.9.1.4 Existing Development

Infill development

As discussed in 1.9.1.2 (Appendix A), the *State Coastal Planning Policy* includes a variation to the general principles for infill development. This dictates that the required setback protect the proposed development from immediate risks associated the coastal processes but it need not account for potential future hazards. Reduced setbacks are also allowed for development adjacent to existing formal coastal protection structures and systems.

Under the proposed amendments to the policy, the approach to infill development would change.[778] The general variations for infill and development adjacent to existing protective structures have been omitted. The intent is that all infill development be considered within the broader coastal hazard risk management and adaptation planning processes. Specifically, the draft policy states:

Where development is likely to be subject to coastal hazards over the planning timeframe, coastal hazard risk management and adaptation planning measures (Section 5.5) should be implemented to reduce the risk from coastal hazards over the full planning time frame to an acceptable level.[779]

In practice, the new policy is intended to result in coastal hazard risk management and adaptation planning occurring in areas identified as potentially being of risk. Where coastal risks are identified, landholders are supposed to be notified (including through notifications on certificates of title) and the hierarchy of approaches (avoid, retreat, accommodate and protect) is meant to be applied to ensure risks are reduced to tolerable levels.

To provide additional clarity about infill development, the guidelines that accompany the draft policy set out when development should be considered to constitute infill. These guidelines state that development on land adjacent to existing development should not be treated as infill if the existing development is on one side only (e.g. the edge of a town site or zone) 'or where there is a reasonable distance between the lots to negate the benefit of a shared coastal hazard risk management and adaptation planning'.[780]

Coastal protection works

The existing *State Coastal Planning Policy* and *Coastal Protection Policy for Western Australia* contain the broad strategic framework for coastal protection works. These instruments embody a precautionary approach to coastal protection works where the emphasis is on ensuring that these measures are only constructed where there are clear public benefits. The proposed new draft state coastal policy makes this more explicit through the 'Coastal protection works' policy measure. As noted, this establishes a general presumption against new coastal protection works and specifies that they should only be supported where, amongst other things, it can be demonstrated that they will not have a significant adverse impact on the adjacent environment and they are primarily directed toward generating public rather than private benefits.

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[777] Western Australian Department of Transport, *Coastal Protection Policy for Western Australia* (2011) 6.
[778] WAPC, *Draft State Planning Policy 2.6: State Coastal Planning Policy* (2012).
[779] WAPC, *Draft State Planning Policy 2.6: State Coastal Planning Policy* (2012) cl 5.6.
[780] WAPC, *Draft State Planning Policy 2.6: State Coastal Planning Policy* (2012) 12.

Protection of existing uses/development rights

Western Australia is one of a minority of jurisdictions that provides compensation for 'injurious affection' to land. This phrase is defined in the *Planning and Development Act 2005* (WA) as covering the following circumstances concerning the making or amendment of a planning scheme:[781]

- where land is reserved for a public purpose under the planning scheme;
- where the planning scheme limits development on the land to development for a public purpose;
- where the planning scheme prohibits, wholly or partially, the continuance of a use of land that was lawful immediately prior to the scheme coming into operation; and
- where the planning scheme prohibits, wholly or partially, the erection, alteration or extension of any building in connection with or in furtherance of the continuance of a use of land that was lawful immediately prior to the scheme coming into operation, provided the erection, alteration or extension would have been lawful under the previous laws.

1.9.2 Western Australia - Bushfire

The State Planning Framework discussed at the beginning of this section includes policies that establish development controls for areas at risk of bushfires. This area of the planning system is currently being overhauled as a result of the recommendations of inquiries following the 2011 Perth Hills, Nannup and Margaret River bushfires. The Government has established a substantial stakeholder consultation processes to publicise the progress of its implementation of the recommendations, and has set up a Bushfire Risk Identification and Mitigation Project to assess and manage future bushfire risk in WA. Bushfire risk assessments, comprehensive mapping, and amendments to policy and regional and local planning schemes are currently underway. Areas that have been, or are in future, declared to be 'bushfire prone areas' are subject to particular restrictions for new subdivisions and development. Substantial reform to the State's planning framework for bushfire is expected to result from these processes.

1.9.2.1 Legal Architecture

There is little recognition at the policy and planning scheme levels of the link between climate change and increased bushfire incidence and gravity. Local governments are required to implement or interpret local and regional planning schemes consistently with the State Planning Framework and the SPS assigns responsibility for bush fire control to local government authorities.[782] The SPP 3.4 *Natural Hazards and Disasters*[783] (SPP 3.4) sets out the overarching policy for addressing the risk of bushfire and other disaster events as they affect the environment, community and the economy in WA. It guides the implementation of planning responsibilities, including between WAPC and local governments, and integrates and coordinates the operations of State agencies that influence the use and development of land that may be affected by natural hazards and disasters. It requires that all levels of the planning process

[781] *Planning and Development Act 2005* (WA) ss 172-174.

[782] WAPC, *State Planning Strategy: Final Report* (December 1997), 21 <http://www.planning.wa.gov.au/dop_pub_pdf/SPSreport.pdf> (accessed 15/12/2012). It is acknowledged in the supporting reports to the SPS that a changing climate is likely to have implications for the planning regime (including in relation to coastal policy), but there is no mention of increased risk of the incidence or intensity of bushfires; see the SPS *Discussion Paper for Environment and Natural Resources* (December 1995) <http://www.planning.wa.gov.au/dop_pub_pdf/Environment.pdf>.

[783] WAPC, *State Planning Policy 3.4 Natural Hazards and Disasters* (2006) <http://www.planning.wa.gov.au/dop_pub_pdf/SPP3_4.pdf> (accessed 14/12/2012).

consider the impact of natural disasters to minimise the impact that such disasters may have on communities, the economy and the environment. SPP 3.4 is implemented through the *Planning for Bushfire Protection (Edition 2) Guidelines* (Guidelines). The Guidelines[784] provide a detailed consideration of bushfire risk in WA and identify matters that must be addressed at various stages of the planning process. The guidelines apply to new developments and land uses, and subdivisions on land where a bushfire risk is identified.

Development Control Policy 4.2: Planning for Hazards and Safety (DC 4.2) identifies risks to the public arising from man-made and natural events, including in areas that are prone to bushfires.[785] This policy highlights the principles that guide considerations of such risk in the planning process and the relevant procedures to be followed in development proposals. SPP 3.4 and DC 4.2 apply when development applications are assessed, when planning schemes are made or amended, or when land is set aside for a public or community use. At the local or regional level, a planning authority may incorporate 'Special Control Areas' (SCAs) in the local or regional planning scheme, to which special conditions or particular provisions may attach as required, including, for example, bushfire risk mitigation requirements such as Fire Management Plans, access to water and vegetation clearing.[786]

The 2012 Margaret River Bushfire Review recommended the development of a new bushfire-focused SPP to supersede the position currently set out in SPP 3.4, and to strengthen the effect of the Guidelines.[787]

Two additional pieces of legislation govern emergency management in WA: the *Emergency Management Act 2005* (WA) and the *Bush Fires Act 1954* (WA). The management frameworks established under these are relevant to managing bushfire risk in existing settlements.

Interaction with Building Regulations

As in other States, Building Protection Zones (BPZ) have been incorporated into WA's planning provisions in accordance with Australian Standard AS3959 Section 2 - Construction of Dwellings in Bush Fire Prone Areas.[788] The BPZ is based on mapping of bushfire prone areas conducted at the local government level (ongoing, see comments below) and complements the local planning provisions. To the extent that bushfire prone areas remain unidentified across WA, the requirements of BPZ may still be imposed on proposed developments in areas of known high bushfire risk through

[784] WAPC, WA Department of Planning and the Fire and Emergency Services Authority of WA (FESA), *Planning for Bushfire Protection (Edition 2)* Guidelines (May 2010), <http://www.planning.wa.gov.au/publications/1125.asp> (accessed 14/12/2012).

[785] WAPC, *Development Control Policy 4.2: Planning for Hazards and Safety* (1991) <http://www.planning.wa.gov.au/dop_pub_pdf/DC_4_2.PDF> (accessed 14/12/2012).

[786] The The WAPC, *Western Australian Local Planning Manual* (2010) 23, [3.5.7], defines Special Control Areas as follows: 'Special control areas (SCAs) are intended to control particular types or characteristics of development associated with a factor which does not generally coincide with a zones or reserve. The control may apply to only part of a zone or reserve or may overlap zone and reserve boundaries,' <http://www.planning.wa.gov.au/dop_pub_pdf/Local_Planning_Manual.pdf>.

[787] Western Australian Department of Premier and Cabinet, *Bushfire Review Stakeholder Briefing: Recommendations of the Margaret River Bushfire Review Complete or In Progress* (10 October 2012), 10 <http://www.dpc.wa.gov.au/Publications/Documents/Bushfire%20Implementation%20Stakeholder%20Briefing%20-%20Friday%2012%20October%202012%20.pdf>; approval to review the *Planning for Bush Fire Protection (Edition 2)* Guidelines is being sought from the WAPC to progress the implementation of this recommendation. The WAPC now has responsibility to determine the most appropriate way forward in developing a new bushfire-specific SPP and reviewing the *Planning for Bushfire Protection (Edition 2)* Guidelines. This matter is identified as 'signed off' by the implementation group so the recommended review and updated bushfire-specific SPP are likely to be forthcoming in the near future.

[788] Building Commission, *Building for Better Protection in Bushfire Areas: A Homeowner's Guide* (November 2011) <http://www.dfes.wa.gov.au/safetyinformation/fire/bushfire/BushfireProtectionPlanningPublications/FESA-Building_Protection_Zone_Standards.pdf> (accessed 15/12/2012).

the mechanism of SCAs. To the extent of any inconsistency, building standards (as set out in any regulation made under the *Building Act 2011* (WA)) will prevail over the operation of a regional or local planning scheme.[789]

1.9.2.2 Substantive Provisions

Identification of Hazard Areas

There is no formal definition of a bushfire prone area. Local governments are responsible for designating areas as bushfire prone areas, a process which is still underway.[790] There does not appear to be consistency in the mapping and assessments that are required or currently taking place across local government areas. Some local planning schemes now incorporate Bushfire Hazard Assessment Maps showing areas as low, moderate or high risk areas. The assessment of the level of risk may be undertaken at a number of stages in the planning process, particularly for areas outside established urban areas and townsites including, as noted in the Guidelines:

- at the local planning scheme review or structure plan stage;
- over areas in a local planning scheme or structure plan stage where a change to the existing situation is being proposed (eg new development areas);
- at a localised level to support an individual rezoning, subdivision or development application; or
- at a localised level (at the construction stage) to determine construction standards under AS 3959.[791]

The designation of bushfire prone areas will be governed by appropriate planning and building policies to guide future development applications.[792]

Strategic Considerations and Development Controls

Until new measures are introduced following the recent reviews of fires in Perth Hills, Nannup and Margaret River review, bushfire risk is addressed in the planning process as follows through *State Planning Policy* 3.4 *Natural Hazards and Disasters.*[793] The objectives of SPP 3.4 are to:

- include planning for natural disasters as a fundamental element in the preparation of all statutory and non-statutory planning documents, specifically town planning schemes and amendments, and local planning strategies; and
- through the use of these planning instruments, to minimise the adverse impacts of natural disasters on communities, the economy and the environment.

New or amended regional or local planning schemes should be consistent with the objectives and policy content of the SPP and the SPP and planning decisions must

[789] *Planning and Development Act 2005* (WA) s 131.

[790] WAPC, *State Planning Strategy: Final Report* (December 1997), 21 <http://www.planning.wa.gov.au/dop_pub_pdf/SPSreport.pdf> (accessed 15/12/2012); see also WAPC, WA Department of Planning and FESA, *Planning for Bushfire Protection (Edition 2)* Guidelines (May 2010), <http://www.planning.wa.gov.au/publications/1125.asp> (accessed 14/12/2012).

[791] WAPC, WA Department of Planning and FESA, *Planning for Bushfire Protection (Edition 2)* Guidelines (May 2010), <http://www.planning.wa.gov.au/publications/1125.asp> (accessed 14/12/2012).

[792] Western Australian Department of Premier and Cabinet, *Bushfire Review Stakeholder Briefing: Recommendations of the Margaret River Bushfire Review Complete or In Progress* (10 October 2012), 28 <http://www.dpc.wa.gov.au/Publications/Documents/Bushfire%20Implementation%20Stakeholder%20Briefing%20-%20Friday%2012%20October%202012%20.pdf>.

[793] WAPC, *State Planning Policy 3.4 Natural Hazards and Disasters* (2006) <http://www.planning.wa.gov.au/dop_pub_pdf/SPP3_4.pdf> (accessed 14/12/2012).

take into account the SPP and guidelines. SPP 3.4 incorporates the *Planning for Bushfire Protection (Edition 2)* Guidelines[794] to achieve these objectives.

Development Control 4.2: Planning for Hazards and Safety[795] identifies risks to the public arising from man-made and natural events, including in areas that are prone to bushfires. Clause 8.2 of the DC 4.2 sets out the WAPC's policy on planning for natural events. Clause 8.2.6 articulates a preference for strongly discouraging the location of residential and intensive rural uses in high hazard areas. It stipulates that areas in which fire control measures, (firebreaks, buffer zones, fire access tracks, water supplies and fire suppression arrangements), cannot be practically met should be avoided. It also requires that local rural strategies and applications to rezone or subdivide bushfire-prone land should include details of bush fire evaluation and/or mitigation measures which have been or will be undertaken to the satisfaction of the Bush Fires Board and the local authority.

The *Planning for Bushfire Protection (Edition 2) Guidelines* (Guidelines)[796] were developed jointly by the WAPC and the Fire and Emergency Services Authority of WA and are the current, comprehensive guidelines for management of bushfire risk within the planning system in WA. They provide specific details for the consideration of bushfire risk in the planning process from strategic and structure planning phases through to consideration of new developments and subdivisions. The Guidelines were released as an interim measure following a review of the bushfire planning and general fire planning guidelines in Western Australia in 2010. They will be further reviewed in light of the final report of the 2009 Victorian Bushfires Royal Commission and the recommendations of the final reports and recommendations from the special inquiries into the 2011 Perth Hills, Nannup and Margaret River bushfires.

The Guidelines are based on three key objectives: [797]

- Objective 1: To identify areas where fire poses a significant threat to life and property, and through the use of an assessment methodology, determine the level of bush fire hazard applying to those areas.
- Objective 2: To avoid increased fire risk to life and property through inappropriately located or designed land use, subdivision and development.
- Objective 3: To ensure that land use, subdivision and development takes into account fire protection requirements and includes specified fire protection measures where there is any risk from fires, especially involving land that has a moderate or extreme bush fire hazard level or a bush fire attack level between BAL-12.5 and BAL-FZ.

The three objectives are underpinned by five key principles, including that: [798]

1. bushfire hazards must be considered at all stages of the planning process to avoid increased fire risk to life and property through inappropriately located or designed land use and development;

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[794] *Planning for Bushfire Protection* WAPC, WA Department of Planning and FESA, *Planning for Bushfire Protection (Edition 2)* Guidelines (May 2010), <http://www.planning.wa.gov.au/publications/1125.asp> (accessed 14/12/2012).

[795] WAPC, *Development Control Policy 4.2: Planning for Hazards and Safety* (1991) <http://www.planning.wa.gov.au/dop_pub_pdf/DC_4_2.PDF> (accessed 14/12/2012).

[796] WAPC, WA Department of Planning and FESA, *Planning for Bushfire Protection (Edition 2)* Guidelines (May 2010), <http://www.planning.wa.gov.au/publications/1125.asp> (accessed 14/12/2012).

[797] WAPC, WA Department of Planning and FESA, *Planning for Bushfire Protection (Edition 2)* Guidelines (May 2010), <http://www.planning.wa.gov.au/publications/1125.asp> (accessed 14/12/2012).

[798] WAPC, WA Department of Planning and FESA, *Planning for Bushfire Protection (Edition 2)* Guidelines (May 2010), <http://www.planning.wa.gov.au/publications/1125.asp> (accessed 14/12/2012).

2. bushfire hazards should be identified in local government schemes and strategies;
3. subdivision and development should be avoided in extreme risk areas;
4. if development in those areas is unavoidable, permanent hazard reduction measures should be implemented; and
5. in areas that are at moderate to extreme risk of bushfires, structure plans, subdivisions and development should comply with the performance criteria and acceptable solutions approach set out in the Guidelines.

The Guidelines set out guidance statements for documents such as strategic plans, planning strategies, planning schemes, planning scheme amendments and structure plans (involving land that has a moderate to extreme bush fire hazard level); and guidance statements for subdivision applications, strata applications and development applications (involving land that has a moderate to extreme bush fire hazard level or BAL-12.5 to BAL-FZ). Planning authorities are required to consider the potential vulnerability of an area bushfire as part of their development assessment process.[799] In designated bushfire prone areas (defined as those with a moderate or extreme hazard level) all new habitable buildings must comply with AS 3959.[800]

The Guidelines also set out detailed requirements for a range of specific planning and development scenarios, and specifying when an application or development proposal must be referred to the Fire and Emergency Services Authority.[801] The guidelines recommend that provisions be inserted into local planning schemes that deal with 'Special Control Areas', to ensure that land use and development takes into account bushfire protection measures and specifies such measures where there is risk of bushfire in the relevant area. They also provide model 'Special Control Area' provisions and a model fire management plan and compliance checklist for performance criteria and acceptable solutions to minimise the impact of fire on communities.

SCAs operate as a development control and may apply to only part of a zone or reserve, or may overlap zone and reserve boundaries. The requirements of the SCA apply in addition to the requirements of the zone or reserve. SCAs will usually be outlined in a planning strategy and then represented in the zoning and text of the associated local planning schemes. SCAs may operate to require a permit holder to take action in relation to bushfire risk, over and above the requirements set out in the Guidelines and, in the absence of full mapping and assessment to identify bushfire prone areas, SCAs are currently used to address a recognised bushfire risk where the BCA AS3959 does not automatically apply.

The Local Planning Manual, which provides planning authorities with guidance for the development of local planning schemes and strategies, identifies the following planning approval requirements that may attach to an SCA:

[A]pplications for planning approval in the Bushfire Management SCA (BFMSCA) must be accompanied by a statement or report which demonstrates that all fire protection

[799] WAPC, WA Department of Planning and FESA, *Planning for Bushfire Protection (Edition 2)* Guidelines (May 2010), <http://www.planning.wa.gov.au/publications/1125.asp> (accessed 14/12/2012).
[800] WAPC, WA Department of Planning and FESA, *Planning for Bushfire Protection (Edition 2)* Guidelines (May 2010), <http://www.planning.wa.gov.au/publications/1125.asp> (accessed 14/12/2012).
[801] For example, Guidance Statement 6 requires that advice be sought from the Fire and Emergency Services Authority where compliance with the Guidelines is unlikely to be achieved or compliance is proposed to be achieved through measures other than those originally approved. The Fire and Emergency Services Authority must also be consulted for bushfire safety advice on the preparation of any strategic bushfire hazard assessment, and for the selection of areas that are appropriate for more intensive development; WAPC, WA Department of Planning and FESA, *Planning for Bushfire Protection (Edition 2)* Guidelines (May 2010), <http://www.planning.wa.gov.au/publications/1125.asp> (accessed 14/12/2012).

requirements for buildings and works, access, water supply, vegetation and other relevant performance standards contained in Planning for Fire [a policy that was rescinded with the publication of the Guidelines] have been achieved. All building must be constructed to comply with Australian Standard 3959: Building in Bushfire Prone Areas.[802]

In addition to any specific development requirements or assessment criteria, an SCA may also trigger particular referral requirements for all or some types of development, for example referral of rural housing to the Fire and Emergency Services Authority. A Fire Management Plan,[803] for example, will usually be prepared in consultation with the Fire and Emergency Services Authority, or will require its sign off before planning approval can be granted.

Bushfire controls can also be incorporated into Local Planning Strategies that define the objectives and strategic approach which are then operationalised in the local planning schemes. The use of local planning strategies to improve decision-making regarding bushfire risk is likely to be expanded as the State Planning Framework is amended to reflect the recommendations of the inquiries into the 2011 bushfires.

Policy Guidance for balancing trade-offs

Like the bushfire codes and overlays in other jurisdictions, the WA Guidelines provide guidance on balancing the requirement to address bushfire risk and conservation goals.[804] The Guidelines make clear that issues involving landscape protection and bushland retention/impact on conservation values will also be considered and that in some cases, the level of vegetation clearing required to provide permanent hazard reduction may mean that the proposal has an unacceptable impact on conservation values. In such cases a clearing permit may be required to be sought prior to the development application being approved by the planning authority, and the Guidelines recommend that the planning authority seek advice from the Department of Environment and Conservation if permanent hazard reduction measures may constitute clearing of native vegetation. In practice, however, conservation requirements are likely to be secondary to property protection requirements to mitigate an identified bushfire risk in areas that are identified as 'bushfire prone areas'.[805]

Disclosure Laws

As noted above in respect of coastal hazards, the PD Act contains no provision for disclosing risks associated with a parcel of land as part of a planning certificate. The PD Act sets out a range of provisions governing the occasions on which subdivision of land is to be managed by the WAPC, including a provision that the WAPC may note such a hazard on the title and land register, if it considers it desirable that current or prospective owners be informed of a hazard that seriously affects the use and enjoyment of the land (s 165). Although unlikely to be used for this purpose, it may

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[802] The WAPC, *Western Australian Local Planning Manual* (2010) Appendix 5.4, 53 <http://www.planning.wa.gov.au/dop_pub_pdf/Local_Planning_Manual.pdf> (accessed 16/12/2012).

[803] The Guidelines define a Fire Management Plan as follows: 'Ongoing, dynamic document that sets out medium to long-term mitigation strategies for fire hazards and risks in particular local government areas. Fire management plans are generally prepared by the local government, with the assistance of FESA staff and using a standard framework', WAPC, WA Department of Planning and FESA, *Planning for Bushfire Protection (Edition 2)* Guidelines (May 2010) 14, <http://www.planning.wa.gov.au/publications/1125.asp> (accessed 14/12/2012); and includes a model Fire Management Plan in Appendix 3.

[804] WAPC, WA Department of Planning and FESA, *Planning for Bushfire Protection (Edition 2)* Guidelines (May 2010) 4, <http://www.planning.wa.gov.au/publications/1125.asp> (accessed 14/12/2012).

[805] The WAPC, *Shire of Augusta-Margaret River Planning Scheme* (2010) cl 4.21.3(c) specifies that '[o]n lots where there are areas of indigenous native vegetation, clearing of land shall be limited to clearing required to comply to criteria set out in Planning for Bushfire Protection AS 3.6.2.' [AS 3959-1999 regarding the inclusion of shutters on windows]; and in the same scheme cl 5.20.3(h) states that 'non-compliance with a Tree Preservation Order shall not contravene the Scheme where the person acted: (i) to remove an immediate threat to life or property; or (ii) to comply with the *Bush Fires Regulations 1954*'.

offer a means to ensure awareness of a high fire risk in areas that are likely to be declared 'bushfire prone areas' but where mapping and assessment is not yet complete.

In addition, a 'seller's disclosure statement' *may* be prepared by a vendor's solicitor or conveyancer on behalf of the estate agent in the sale of land in WA, but is not compulsory.[806] This document is designed to disclose any relevant property information about which the potential buyer must be aware and would be likely to include a 'bushfire prone area' declaration.

A mandatory disclosure requirement has been a key recommendation of the final report from the 2012 Margaret River Bushfire Special Inquiry, as considered by the Bushfire Risk Identification and Mitigation Project. The recommendation referred to the amendment of title deeds to indicate that a property is in a declared bushfire prone area, but other mechanisms are also being considered.[807] The preferred option is that 'bushfire prone areas' be declared through planning policy mechanisms, and then recorded with the land records department (Landgate). Prior to purchasing a property, an individual will then be able to lodge a Property Interest Inquiry through Landgate and be notified of any existing 'bushfire prone area' declaration.[808]

1.9.2.3 Governance/Procedural Provisions

Ongoing maintenance of Bushfire Protection Zones, and compliance with the terms of Fire Management Plans if included in the conditions of a permit, continue to be the responsibility of the permit holder.

Enforcement is the responsibility of the 'responsible authority' which will be the local government for development under local planning schemes and either the WAPC or the local government under regional planning schemes, whichever is responsible for determining a development application.[809] The local government has powers to enforce the provisions of the scheme, including any decisions made under the scheme and the requirements for development and conditions of approval. As is the case in Victoria, there is little provision for the manner in which enforcement of such conditions is to occur in the PD Act.

1.9.2.4 Existing Development

Management of bushfire risk on existing development is governed by the *Bush Fires Act 1954* (WA). Local authorities may require an occupier of land to plough or clear a fire break 'as a measure for preventing the outbreak of a bush fire, or for preventing the spread or extension of a bush fire which may occur' and to maintain the fire breaks of inflammable matter.[810] Additions and extensions to existing properties are also required to comply with new building regulations for bushfire under the BCA and AS 3959.

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[806] Except to the extent that the purchaser asks for information and the vendor provides information under statutory declaration that is false - the *Sale of Land Act 1970* (WA) prescribes penalties for misrepresentations by a vendor (s 17) and identifies the rights of the purchaser in s 23 as including a right to assume that such a statement about the property is true and correct.

[807] Western Australian Department of Premier and Cabinet, *Bushfire Review Stakeholder Briefing: Recommendations of the Margaret River Bushfire Review Complete or In Progress* (10 October 2012) <http://www.dpc.wa.gov.au/Publications/Documents/Bushfire%20Implementation%20Stakeholder%20Briefing%20-%20Friday%2012%20October%202012%20.pdf>.

[808] Western Australian Department of Premier and Cabinet, *Bushfire Review Stakeholder Briefing: Recommendations of the Margaret River Bushfire Review Complete or In Progress* (10 October 2012), 29 <http://www.dpc.wa.gov.au/Publications/Documents/Bushfire%20Implementation%20Stakeholder%20Briefing%20-%20Friday%2012%20October%202012%20.pdf>.

[809] See definition of 'responsible authority' in the *Planning and Development Act 2005* (Vic).

[810] The current penalty for failing to comply is $5,000, *Bush Fire Act 1954* (WA) s 33(3).

The Guidelines[811] note that planning authorities (local government or the WAPC) are likely to be subject to a duty of care as a result of their statutory responsibilities for planning, especially in areas that have a moderate to extreme bush fire hazard (between BAL-12.5 and BAL-FZ). On that basis, the Guidelines recommend that planning authorities do everything practicable to ensure that development that may be outside the purview of the Guidelines nevertheless comply with the Guidelines, including:

- existing buildings in established subdivisions;
- subdivisions not yet developed but with full and valid planning approval granted prior to the Guidelines being published; and
- new subdivisions based on a structure plan approved prior to the Guidelines that have not yet been developed.

The Margaret River Bushfire Special Inquiry Report recommended that the WA State and local governments recognise the persistent risk of bushfire in the Perth Hills as a consequence of existing development; urge residents to retrofit their homes and in compliance with AS 3959 – 2009; and examine options to retrospectively bring these areas into compliance with Planning for Bushfire Protection Guidelines.[812] At that stakeholder briefing, progress on implementing the report's recommendations noted that there has been a great deal of community education as a result of this recommendation but that development of policy and statutory provisions to require retrofitting of existing developments and dwellings will require significant work.[813] The implementation of this recommendation is described as 'in progress'.

[811] WAPC, WA Department of Planning and FESA, *Planning for Bushfire Protection (Edition 2)* Guidelines (May 2010) 2, <http://www.planning.wa.gov.au/publications/1125.asp> (accessed 14/12/2012).

[812] Western Australian Department of Premier and Cabinet, *Bushfire Review Stakeholder Briefing: Recommendations of the Margaret River Bushfire Review Complete or In Progress* (10 October 2012), 28 <http://www.dpc.wa.gov.au/Publications/Documents/Bushfire%20Implementation%20Stakeholder%20Briefing%20-%20Friday%2012%20October%202012%20.pdf>.

[813] Western Australian Department of Premier and Cabinet, *Bushfire Review Stakeholder Briefing: Recommendations of the Margaret River Bushfire Review Complete or In Progress* (10 October 2012), 10 <http://www.dpc.wa.gov.au/Publications/Documents/Bushfire%20Implementation%20Stakeholder%20Briefing%20-%20Friday%2012%20October%202012%20.pdf>.

APPENDIX B: APPROACHES TO DECISION MAKING UNDER UNCERTAINTY

1.1 Expected Utility Analysis

Expected utility analysis is the most widely used approach to evaluating the merits of different policy options in the face of uncertainty. It is an extension of expected value analysis, where possible future outcomes (or states of nature) are identified and probabilities are assigned to the different states (i.e. it assumes the uncertainties can be captured by a single probability density function). The net costs and benefits of different options are then evaluated under the different states; with the optimal (best) policy option assumed to be that with the highest net benefits (or lowest net costs) after being risk-weighted. A major deficiency in expected value analysis is that it assumes people are risk neutral, or that each additional unit of consumption results in an equal increase in utility (or happiness). This is unrealistic, a fact reflected in the saying 'a bird in the hand is worth two in the bush' – people will often prefer a certain-but-smaller benefit to a larger but uncertain one.[814] To account for this, expected utility analysis uses utility functions (effectively a weighting on outcomes) to capture the social utility derived from different outcomes under uncertainty. In doing so, the best option becomes that which maximises the present value of expected utility.

To illustrate, assume there are three potential outcomes (states of nature): low, medium and high sea level rise, and the probabilities of each occurring are 20%, 60% and 20% respectively. The option before the decision maker is whether to build a seawall to deal with coastal climate hazards associated with sea level rise. Table 6 shows the estimated net social benefits associated with the seawall under each state of nature, along with the associated utility weight for each outcome. With low sea level rise, there are construction costs and the environmental costs associated with the seawall but few offsetting benefits (the seawall does not perform its intended protective function because the threat does not materialise). As a result, the seawall leads to a net loss of $14 and, because the community is very averse to losses, it is given a utility weight of 10. In the medium and high sea level rise scenarios, there are still construction and environmental costs; however, these costs are offset by the protective benefits provided by the seawall. Due to this, the seawall produces net benefits, equal to $2 and $10 in the medium and high sea level rise scenarios respectively. The $2 benefit in the medium sea level rise scenario is given a utility weight of 1, while the $10 benefit in the high sea level rise scenario is given a utility weight of 4, reflecting the fact that the community derives less utility for each additional unit of consumption. Using expected value as the decision criterion would lead to the conclusion that the seawall produces a net benefit of $0.40 ((-$14 x 0.2) + ($2 x 0.6) + ($10 x 0.2)), indicating that the seawall should be constructed. The opposite conclusion is reached using expected utility; the expected utility of the seawall option is -$18.80 (i.e. social costs exceed social benefits) ((-$14 x 0.2 x 10) + ($2 x 0.6 x 1) + ($10 x 0.2 x 4)), leading to the conclusion that the project should be rejected.

[814] Machina M, 'Choice Under Uncertainty: Problems Solved and Unsolved' (1987) 1(1) *Journal of Economic Perspectives* 121; O'Riordan T and Cameron J (eds), *Interpreting the Precautionary Principle* (Earthscan Publications, 1994).

Table 7: Hypothetical expected utility associated with a seawall

Sea level rise	Probability of occurrence	Net benefits ($)	Utility weight
Low	20%	-14	10
Medium	60%	2	1
High	20%	10	4

1.2 Precautionary Principle

As formally defined, the precautionary principle states that 'if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation'.[815] Although it is a common feature of international and domestic legal and policy regimes, the interpretation and application of the principle differs widely.[816] The most popular interpretation suggests that it shifts the normal burden of proof;[817] when faced with a threat of serious or irreversible harm, and uncertainty as to the nature and scope of the threat, the decision maker must assume the threat is a reality. Proportionate measures may then be required to avoid or mitigate the threat.

Although the precautionary principle is directed at instances involving uncertainty, its universal applicability to deal with climate impacts and adaptation is doubtful. For instance, it is arguable whether the loss of a small number of houses due to inundation or bushfire is constitutes 'serious or irreversible' harm. Moreover, the principle does not dictate any particular response, it merely requires the decision maker to treat the threat as a reality and, when devising responses, to act proportionally.

1.3 Safe Minimum Standards (SMS)

The SMS approach suggests that, when faced with uncertainty and irreversibility, a safe minimum standard should be adopted to avoid critical thresholds in natural systems, unless the costs of doing so are unacceptably large.[818] This approach is similar to the precautionary principle in that it promotes aversion to uncertainty surrounding environmental impacts but qualifies this with an ambiguous test regarding its application, particularly the notion of what constitutes 'unacceptably large' costs.

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[815] *Rio Declaration on Environment and Development* (UN, 1992), Principle 15.

[816] Bodansky D, 'Scientific uncertainty and the precautionary principle' (1991) 33(7) *Environment* 4, 4-5, 43-44; O'Riordan T and Cameron J (eds), *Interpreting the Precautionary Principle* (Earthscan Publications, 1994); Neumayer E, *Weak versus Strong Sustainability: Exploring the Limits of Two Opposing Paradigms* (Edward Elgar, 1999); Goklany I, *The Precautionary Principle: A Critical Appraisal of Environmental Risk Assessment* (Cato Institute, 2001); Bondansky D, 'Deconstructing the precautionary principle' in Caron D and Scheiber H (eds), *Bringing New Law to Ocean Waters* (Brill, 2004).

[817] *Telstra Corporation Ltd v Hornsby Shire Council* [2006] NSWLEC 133.

[818] Ciriacy-Wantrup S, *Resource Conservation: Economics and Policy* (University of California Press, 1952); Bishop R, 'Endangered Species and Uncertainty: The Economics of a Safe Minimum Standard' (1978) 60(1) *American Journal of Agricultural Economics* 10; Bishop R 'Endangered Species, Irreversibility, and Uncertainty: A Reply' (1979) 61(2) *American Journal of Agricultural Economics* 376; Ready R and Bishop R, 'Endangered Species and the Safe Minimum Standard' (1991) 73(2) *American Journal of Agricultural Economics* 309; Hohl A and Tisdell C, 'How Useful are Environmental Safety Standards in Economics? – The Example of Safe Minimum Standards for Protection of Species' (1993) 2 *Biodiversity and Conservation* 168; Palmini D, 'Uncertainty, risk aversion and the game theoretical foundations of the safe minimum standard: a reassessment' (1999) 29 *Ecological Economics* 463; Berrens R, 'The safe minimum standard of conservation and endangered species: a review' (2001) 28(2) *Environmental Conservation* 104.

1.4 Minimax (or Maximin) Decision Criterion

The minimax decision rule suggests that, when faced with uncertainty, the optimal decision is that which minimises the losses under the worst case outcome (i.e. minimum expected value or, more commonly, minimum expected utility).[819] This can be flipped to maximising the minimum gain (maximin) where the uncertainty surrounds the gains associated with different options. A defining characteristic of the minimax (maximin) decision rule is that it is non-probabilistic. Scenarios are run to investigate what the potential outcomes could be and then the decision is made on the basis of the rule. There is no attempt to risk weight (i.e. assign probabilities) potential outcomes. This feature of minimax is a strength and weakness. Unlike standard expected utility analysis, there is no need to subjectively generate probabilities to quantify uncertainties. However, in avoiding risk weighting, the decision rule can lead to highly precautionary outcomes.

There are a number of extensions of the basic minimax (maximin) decision criterion, including:

minimax (maximin) regret decision criterion – where the standard minimax decision rule is changed to minimising the worst-case regret (or the difference between a policy option's expected utility under any outcome and the expected utility of the best policy option for that outcome);[820] and

minimax (maximin) regret decision criterion with Bayesian probabilities – where subjective probabilities are assigned to risk-weight the potential outcomes and thereby reduce conservatism (or excessive precaution).[821]

1.5 Robust Decision Approaches

Closely related to SMS and minimax (maximin) are robust decision approaches, which are defined by the fact that they characterise uncertainty using multiple representations of the future and use robustness as the decision criteria. There are differing definitions of robustness but all embody the notion that policy options should perform satisfactorily across a range of possible outcomes.[822] This objective – satisfactory performance –

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[819] Bishop R, 'Endangered Species and Uncertainty: The Economics of a Safe Minimum Standard' (1978) 60(1) *American Journal of Agricultural Economics* 10; Resnik M, *Choices: an Introduction to Decision Theory (*University of Minnesota Press, 1987); Ready R and Bishop R, 'Endangered Species and the Safe Minimum Standard' (1991) 73(2) *American Journal of Agricultural Economics* 309; Neumayer E, *Weak versus Strong Sustainability: Exploring the Limits of Two Opposing Paradigms* (Edward Elgar, 1999).

[820] Savage L, 'The theory of statistical decision' (1951) 46 *Journal of the American Statistical Association* 55; Loomes G and Sugden R, 'Regret Theory: An Alternative Theory of Rational Choice under Uncertainty' (1982) 92(368) *Economic Journal* 805; Bell D, 'Regret in Decision Making under Uncertainty' (1982) 30(5) *Operations Research* 961; Bell D, 'Disappointment in Decision Making under Uncertainty' (1985) 33(1) *Operations Research* 1; Read P, *Responding to Global Warming: The Technology, Economics and Politics of Sustainable Energy* (Zed Books, 1994); Neumayer E, *Weak versus Strong Sustainability: Exploring the Limits of Two Opposing Paradigms* (Edward Elgar, 1999).

[821] Read P, *Responding to Global Warming: The Technology, Economics and Politics of Sustainable Energy* (Zed Books, 1994).

[822] Simon H, 'Theories of Decision-Making in Economics and Behavioral Science' (1959) 49(3) *American Economic Review* 253; Ben-Haim Y, *Information-Gap Decision Theory: Decisions under Severe Uncertainty* (Academic Press, 2001); Toth F and Mwandosya M, 'Decision-making Frameworks' in IPCC, *Climate Change 2001: Mitigation. Contribution of Working Group III to the Third Assessment of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2001); Lembert R et al, 'Characterizing Climate-Change Uncertainties for Decision-Makers' (2004) 65 *Climatic Change* 1; Regan H et al, 'Robust Decision-Making under Severe Uncertainty for Conservation Management' (2005) 15(4) *Ecological Applications* 1471; Lempert R and Collins M, 'Managing the Risk of Uncertain Threshold Responses: Comparison of Robust, Optimum, and Precautionary Approaches' (2007) 27(4) *Risks Analysis* 1009; Lembert R and Groves D, 'Identifying and evaluating robust adaptive policy responses to climate change for water management agencies in the American west' (2010) 77 *Technological Forecasting & Social Change* 960; Hall J et al, 'Robust Climate Policies Under Uncertainty: A Comparison of Robust Decision Making and Info-Gap Methods' (2012) *Risks Analysis* DOI: 10.1111/j.1539-6924.2012.01802.x;

stands in contrast to optimality, which is the standard decision criterion under expected utility analysis. The representation of uncertainty with multiple possible scenarios also differs significantly from traditional expected utility analysis, where uncertainty is characterised using a single probability distribution (probability density function) and a single utility function is used to capture risk aversion.

Two quantitative robust decision approaches that have been applied to climate change and other environmental management challenges characterised by deep or severe uncertainty are info-gap analysis and Robust Decision Making.[823] Info-gap analysis starts with a quantitative assessment and representation of the range (or horizon) of uncertainty. The outcomes of different policy options across the range or discrete ranges are then assessed. There is no attempt to identify the optimal or best strategy. Rather the process seeks to assist decision makers visualise the trade-offs between policy options using two performance criteria: robustness (the minimum reward for each decision option at a given level of uncertainty) and opportuneness (the maximum reward for each decision option at a given level of uncertainty). To assist in this process, robustness and opportuneness curves are plotted with utility on the X-axis and uncertainty on the Y-axis. Decision makers are then free to choose the option that best reflects their preferences concerning costs, benefits and uncertainty.[824]

Like info-gap, Robust Decision Making is a quantitative decision support tool that uses visual representations of uncertainty to help decision-makers select robust policy options. However, it differs from info-gap and many other approaches by reversing the standard sequential order of analysis. Rather than starting with an analysis of future outcomes (e.g. future states of nature) and then identifying policy options, it commences with the identification of policy options and then assesses their performance across a range of plausible future scenarios ('assess-risk-of-policy' framework rather than 'predict-then-act' framework). The primary purpose of the assessment is to identify the scenarios where the policy options do not meet their objectives. These scenarios are then used to make comparisons of the robustness of different policy options. Three different definitions of robustness have been used for these purposes: trading some optimal performance for reduced sensitivity to uncertainty, satisfactory performance over a wide range of scenarios and keeping options open. Reflecting its 'assess-risk-of-policy' framework, Robust Decision Making processes have typically used expected regret to assess the performance of different policy options (i.e. minimax (maximin) regret).[825]

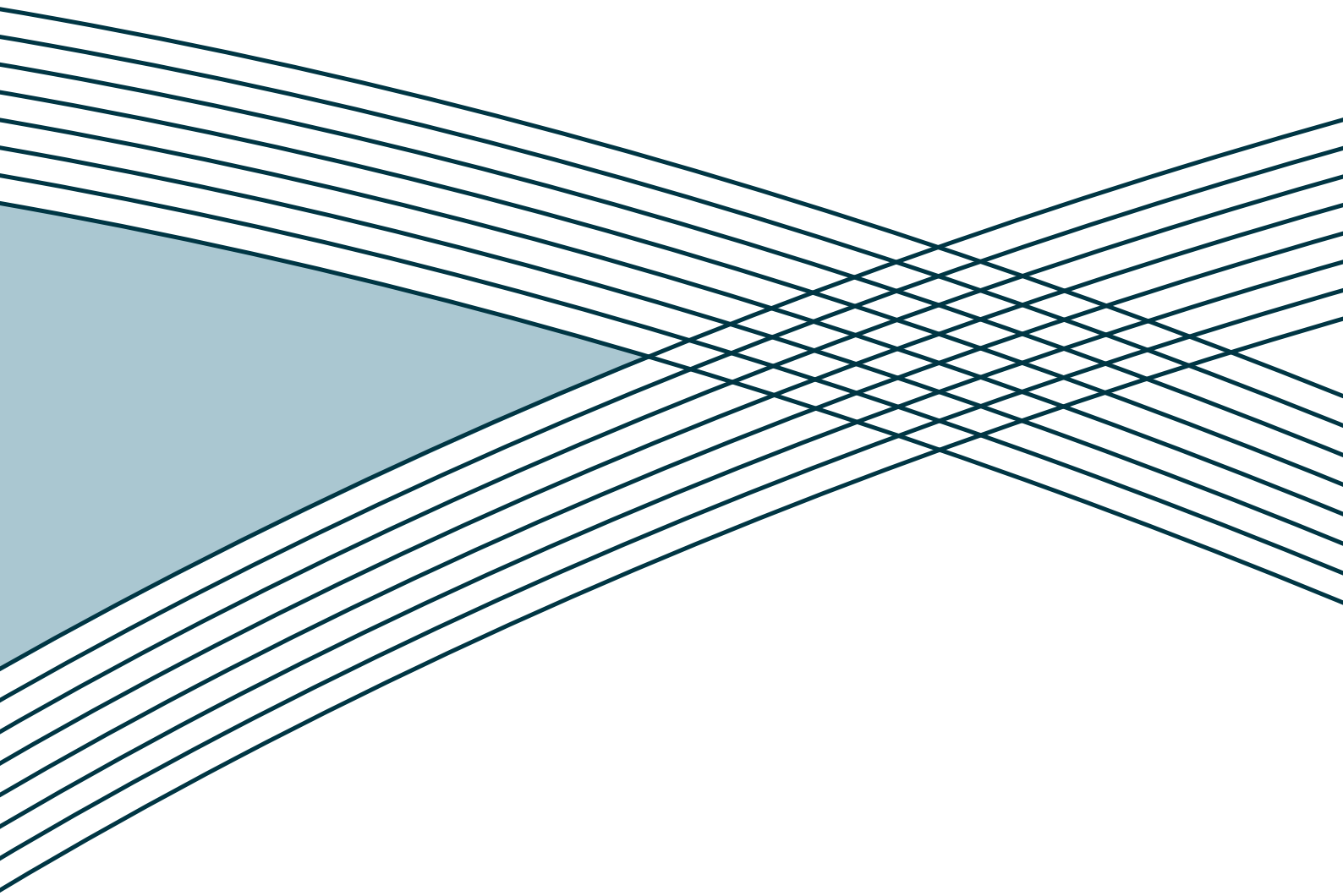
McInerney D, Lempert R and Keller K, 'What are robust strategies in the face of uncertain climate threshold responses?' (2012) 112(3-4) *Climatic Change* 547.

[823] Regan H et al, 'Robust Decision-Making under Severe Uncertainty for Conservation Management' (2005) 15(4) *Ecological Applications* 1471; Lempert R and Collins M, 'Managing the Risk of Uncertain Threshold Responses: Comparison of Robust, Optimum, and Precautionary Approaches' (2007) 27(4) *Risks Analysis* 1009; Lembert R and Groves D, 'Identifying and evaluating robust adaptive policy responses to climate change for water management agencies in the American west' (2010) 77 *Technological Forecasting & Social Change* 960; Hall J et al, 'Robust Climate Policies Under Uncertainty: A Comparison of Robust Decision Making and Info-Gap Methods' (2012) *Risks Analysis* DOI: 10.1111/j.1539-6924.2012.01802.x; McInerney D, Lempert R and Keller K, 'What are robust strategies in the face of uncertain climate threshold responses?' (2012) 112(3-4) *Climatic Change* 547.

[824] Ben-Haim Y, *Information-Gap Decision Theory: Decisions under Severe Uncertainty* (Academic Press, 2001); Regan H et al, 'Robust Decision-Making under Severe Uncertainty for Conservation Management' (2005) 15(4) *Ecological Applications* 1471; Hall J et al, 'Robust Climate Policies Under Uncertainty: A Comparison of Robust Decision Making and Info-Gap Methods' (2012) *Risks Analysis* DOI: 10.1111/j.1539-6924.2012.01802.x.

[825] Lembert R et al, 'Characterizing Climate-Change Uncertainties for Decision-Makers' (2004) 65 *Climatic Change* 1; Lempert R and Collins M, 'Managing the Risk of Uncertain Threshold Responses: Comparison of Robust, Optimum, and Precautionary Approaches' (2007) 27(4) *Risks Analysis* 1009; Lembert R and Groves D, 'Identifying and evaluating robust adaptive policy responses to climate change for water management agencies in the American west' (2010) 77 *Technological Forecasting & Social Change* 960; Bryant M and Lembert R, 'Thinking inside the box: A participatory, computer-assisted approach to scenario discovery' (2010) 77 *Technological Forecasting & Social Change* 34; Hall J et al, 'Robust Climate Policies

Under Uncertainty: A Comparison of Robust Decision Making and Info-Gap Methods' (2012) *Risks Analysis* DOI: 10.1111/j.1539-6924.2012.01802.x; McInerney D, Lempert R and Keller K, 'What are robust strategies in the face of uncertain climate threshold responses?' (2012) 112(3-4) *Climatic Change* 547.



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