

Governance arrangements for climate change adaptation and natural disaster risk management in Victoria

An initial analysis of legal and regulatory issues

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Governance models for climate adaptation and natural disaster risk management: an initial legal and regulatory analysis

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This VCCCAR report to the Victorian Government is an initial desktop analysis. The Report presents general legal and related research as a preliminary scoping examination of legal and regulatory issues related to adaptation to climate change in Victoria. The Report does not constitute legal advice.

The views expressed herein are not necessarily the views of the State of Victoria, and the State of Victoria does not accept responsibility for any information or advice contained within

The Report has been compiled based on publicly available information.

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Background to this report

This report has been written by a team of academic staff from the University of Melbourne, Latrobe University and RMIT as part of a Victorian Centre for Climate Change Adaptation Research (VCCCAR) project.

The two-year project, *Governance models for adaptation and natural disaster risk management: legal, regulatory, institutional and financial assessment*, will examine selected governance arrangements that are relevant to managing the impacts of climate change across various sectors within Victoria. It focuses on enhancing the risk management of extreme events such as flood, bushfire, heat stress, and storm surge by considering how relevant legal and regulatory frameworks, institutional arrangements and regulatory models might be effectively developed to meet the challenge of climate change adaptation.

The project is designed to produce relevant research outputs for the Victorian Government and to provide options to assist policy development.

The project aims to:

- Describe the existing legal and governance arrangements that influence adaptation in relation to selected extreme events and natural disasters in Victoria, focusing on the manner in which key points of risk management and decision-making arise under heightened conditions of uncertainty introduced by climate change;
- Examine whether current legal, institutional and regulatory arrangements in selected sectors provide a robust model for effective adaptation to climate change;
- Identify the particular areas of law that are relevant as drivers of adaptation and risk management; and
- Make recommendations to assist in the development of governance arrangements for reducing the impacts of extreme events and disasters.

INTRODUCTION

The economic, social and environmental costs of extreme weather events and disasters are immense. Recent events in Victoria are testimony to the disruption and destruction that such events can cause. The changing climate is predicted to exacerbate and change the frequency and severity of extreme events and to have other impacts on, among other things, natural resources management, and on community health and well being. A basic premise of this research is that the laws and governance arrangements which range across, and are integral to, the operation of government, business and the community sector will play an important role in managing climate impacts and the enhanced risks of extreme events. To date, there has been limited research on how legal, institutional and regulatory frameworks can support and facilitate effective adaptation and responses to climate risks.

The importance of building resilience and adaptive capacity in the private sector has been highlighted in recent policy settings.¹ While many factors influence resilience and the capacity to prepare for, respond to and recover from extreme events such as flood and bushfire, legal and regulatory frameworks remain significant drivers of behavioral change and capacity building in the community and in the private sector.

In tandem, risk management has emerged as the means of responding to the challenge of adapting to a changing and variable climate, as expressly provided for in the Victorian Climate Change Adaptation Plan ('Adaptation Plan') developed pursuant to the *Climate Change Act 2010 (Vic)*. Again, law and governance arrangements are important means by which to enhance climate risk management across the community.

This project aims to provide a research platform to assist policy development designed to enhance government preparedness for climate change risk and build the adaptive capacity and climate resilience of Victorians.

This report comprises an initial identification of relevant legal and regulatory frameworks in respect of selected climate risks and extreme events. It examines general legal, institutional and governance implications in terms of fostering effective adaptation to climate change impacts and for the management of natural disaster risk within Victoria.

Part A provides background to why climate change adaptation and responses to extreme weather events are a challenge for legal and regulatory frameworks specifically, and governance more generally.

Part B explores how relevant laws and governance arrangements provide for adaptation and the management of the risks associated with extreme weather events.

Part C uses an example of the governance arrangements for managing flood risk to highlight the complexity involved in climate risk management.

¹ Victorian Government, *Victorian Climate Change Adaptation Plan* (2012); Victorian Government, *Victorian Emergency Management Reform* (2012).

PART A

THE ADAPTATION CHALLENGE

Adapting to the impacts of a changing climate, extreme events and other impacts

While it is difficult to predict and assess with precision the future impacts of climate change, the general trends associated with climate change – a reasonable likelihood of increased severity and/or frequency of various extreme climate and weather events, heightened variability in the climate and long term change such as ocean acidification and sea level rise – indicate that failing to take measures to prepare for and respond to climate change impacts could be costly, in social, economic and environmental terms.²

In its submission to the Productivity Commission's *Inquiry into Barriers to Effective Climate Change Adaptation*,³ the Australian Government highlighted recent findings that:

- climate change could reduce Australia's GNP by 2 per cent by 2050, and 7 per cent by 2100, mostly due to the reduced performance or failure of infrastructure;
- more than \$226 billion in existing commercial, industrial, road, rail, and residential assets are potentially exposed to inundation and erosion hazards with sea level rise of 1.1 m;
- drought could be up to 20% more common by 2030. The economic impact would be significant - the 2002-2003 drought cost the Australian economy an estimated \$6.6 billion.

Figure 1 Potential impacts of climate change in Australia

Extreme weather and climate events ('extreme events') include bushfires, floods, cyclones, heat waves, coastal flooding and drought. The vulnerability of certain sectors and groups of people – that is, their exposure and sensitivity to the impacts of extreme events – influences whether and how extreme events result in disaster situations. The potential for disaster draws attention to the human dimension of the adaptation challenge: the capacity of people to adapt to climate change impacts, factors giving rise to human vulnerability to those impacts and the importance of building resilient communities, and physical and social infrastructure.

In the face of such risks, there is a need to identify a range of responses; while recognising there are no simple answers to the questions of what type of adaptation action(s) are required, when and how they should be implemented and by whom. Research has identified that it will be important to ensure efforts to adapt to impacts are co-ordinated, integrated and complementary (or at least not counter-productive or maladaptive).⁴

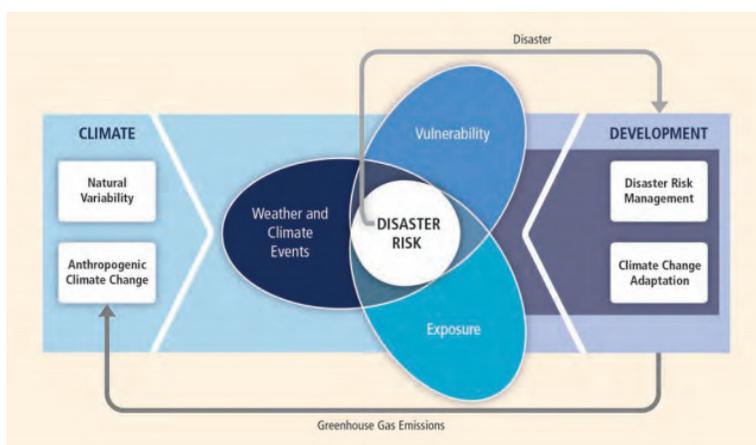


Figure 2 Extreme events, disaster risk and climate change
Source: IPCC *Managing the Risks of Extreme Events* (2012), p 2.

² In tandem, reducing emissions of climate changing greenhouse gases ('mitigation') is critical to reducing the severity of climate change impacts and as such adaptation and mitigation go hand in hand: U.S. Government, Global Change Research Program, *Global Climate Change Impacts in the United States* (2009), p 11. Ross Garnaut has suggested that efforts to reduce emissions can also be seen as a type of 'insurance': Update Paper 1, 'Weighing the costs and benefits of climate change action', 2011, p 11.

³ Australian Government, *Submission to the Productivity Commission, Barriers to Effective Climate Change Adaptation – Draft Report* (2012), p 2.

Uncertainty and complexity in adaptation planning

In general terms, adaptation means actions taken to manage the impacts of a changing climate, to reduce vulnerability to those impacts, as well as build adaptive capacity.⁵ In terms of extreme events research indicates the need to forward plan in order to manage the enhanced risks due to climate change impacts.

This is consistent with the Victorian Government's approach to adaptation which is to 'strengthen coordination across government and to integrate and mainstream consideration of climate risks into existing government policies, asset management approaches and service planning.'

The nature of adaptation actions and approaches can vary. The IPCC has listed various forms of adaptation.⁶ The consensus in emerging research is that there is a need for planned, anticipatory or proactive adaptation that engages all sectors in society and which addresses risks prior to impacts occurring.⁷

As the Victorian Government has stated, delayed measures could be costly especially in the case of extreme events.⁸ This research project examines the importance of undertaking a proactive and considered approach to developing suitable governance arrangements and legal measures to facilitate effective adaptation to the impacts of climate change.

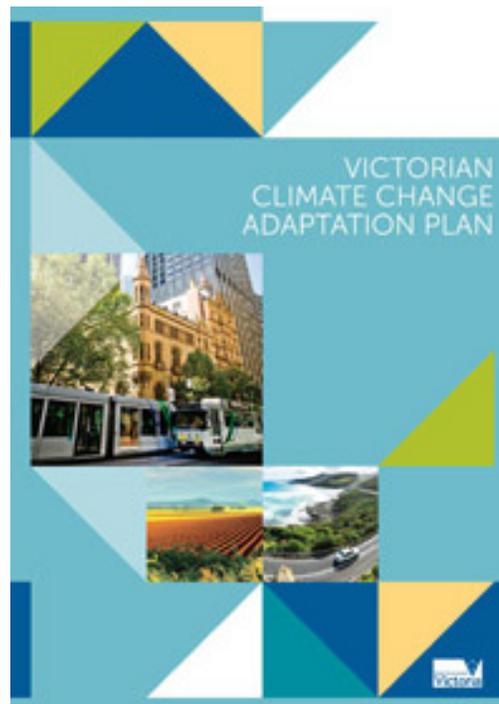


Figure 3 Victorian Climate Change Adaptation Plan

According to one account,⁹ adaptation planning involves three key elements:

- the identification of the way in which the climate may change;
- an analysis of the impacts of this change in the climate – considering impacts to society, ecosystems and the economy; and
- an analysis of the different options for addressing those impacts.

⁴ J Barnett and S O'Neill, 'Maladaptation' (2009) 20 *Global Environmental Change* 211; Intergovernmental Panel on Climate Change (IPCC), *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation - Special Report* (Cambridge University Press, 2012), p 55.

⁵ Victorian Government, *Adaptation Plan*, p 12.

⁶ Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2001: Impacts, Adaptation and Vulnerability: Contribution of Working Group II to the Third Assessment Report of the IPCC*, Glossary of Terms (Cambridge University Press, 2001).

⁷ See generally, IPCC, *Managing the Risks of Extreme Events*, above n 4. Cities and countries across the world are planning for the impacts of climate change: see for example, Benjamin Preston, Richard M Westaway and Emma J Yuen, 'Climate adaptation planning in practice: an evaluation of adaptation plans from three developed nations' (2011) 16 *Mitigation and Adaptation Strategies for Global Change* 407; JoAnn Carmin, Nikhil Nadkarni, and Christopher Rhie, *Progress and Challenges in Urban Climate Adaptation Planning: Results of a Global Survey* (Cambridge, 2012).

⁸ Victorian Government, *Adaptation Plan*, p 6.

⁹ D. Farber, 'Rethinking the role of cost-benefit analysis' (2009) 76 *The University of Chicago Law Review* 1355, pp 1394-5.

In addition, researchers have identified the need to clearly articulate responsibilities in particular domains, such as emergency management, in order to deal most effectively with climate risks and extreme events, to establish frameworks for monitoring and coordination of adaptation efforts; and to undertake on-going review and evaluation.¹⁰

Inherent in each of these elements is a considerable challenge. To begin with, there is a significant degree of **uncertainty** about the specific effects of climate change and the precise consequences they will have in any given location. Scientific evidence has indicated that events such as flooding and heat waves will be influenced by climate change,¹¹ but as the Victorian Government has acknowledged,¹² varying degrees of scientific uncertainty exist about the exact magnitude, geographical distribution and timing of these kinds of events.¹³ Furthermore, there are some impacts that may be largely unforeseeable due to a lack of precise scientific knowledge of these future events at the current time.¹⁴

One source of this uncertainty is the **complexity** of the systems affected – due to the connections and relationships between various sectors, feedback loops and tipping points – which means that the exact consequences of a particular climate event or impact can be difficult to predict. Cascading, or ripple effects, can occur due to the interdependencies between systems.¹⁵ For example, flooding may damage roads, which has flow-on economic and social effects, for example for agricultural communities needing to transport their products.

In sum, adaptation is a challenge because it is difficult to predict

- what the precise effects of climate change will be in any given area, and
- what impact or consequences those effects may have, especially where the effects are cumulative.

The impacts of extreme events and disasters are felt at diverse scales and transect all sectors in the community. The adaptation challenge is compounded by the number of actors across both public and private sectors which are variously involved in decision making or affected by decisions around climate change impacts. Therefore research has identified that adapting to a changing climate requires strategic and integrated responses across all sectors, including the community, to ensure that efforts are effective.¹⁶

The Victorian Adaptation and Sustainability Partnership is an example of an initiative to enhance collaboration between the state and local governments. Through the Partnership the Victorian Government will fund local adaptation projects, an adaptation mentoring program for local governments and facilitate information sharing between state and local governments. This project can assist more generally by identifying existing laws and governance arrangements relevant to climate change adaptation and in the management of extreme events and assisting in identifying opportunities and options for the development of more effective and strategic responses.

¹⁰ IPCC, *Managing the Risks of Extreme Events*, above n 4, p 17; Preston et al, above n 7.

¹¹ Victorian Government, *Report on Climate Change and Greenhouse Gas Emissions in Victoria - as required under Section 17 of the Climate Change Act 2010* (2012), p 23. See also Climate Commission, *The Critical Decade: Extreme Weather* (2013).

¹² Victorian Government, *Adaptation Plan*, p 6.

¹³ See Roger N Jones and Benjamin L Preston, 'Adaptation and Risk Management' (2011) 2 *WIREs Climate Change* 296; Ross Garnaut, 'The Science of Climate Change' (Garnaut Climate Change Review – Update 2011, Update Paper 5, 2011), p. 12.

¹⁴ Timothy R Carter, Roger N Jones and Xianfu Lu, *Impacts, Adaptation and Vulnerability: Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on climate Change* (Cambridge University Press, 2007) 779, p 799.

¹⁵ See for example, IPCC, *Managing the Risks of Extreme Events*, above n 4, p 39.

¹⁶ See for example, IPCC, *Managing the Risks of Extreme Events*, above n 4, p 27; Catrien Termeer et al, 'The Regional Governance of Climate Adaptation: A Framework for Developing Legitimate, Effective, and Resilient Governance Arrangements' (2011) 2 *Climate Law* 159, p 163.

Governance arrangements for managing climate risk

Given the number of actors involved in the adaptation challenge, the relationships between them and the different processes and mechanisms governing their behaviour – including legal, regulatory and financial factors – it is appropriate to talk about *governance arrangements* for adaptation. More specifically, this report refers to governance arrangements for *managing climate risks*. This view of the problem is consistent with Victoria's Adaptation Plan and national policy statements and inquiry reports which frame the challenge of adaptation as one of managing risks.¹⁷

Risk management has partly evolved as a technique to incorporate and manage uncertainty in decision making. The *Climate Change Act 2010 contains guiding principles which have also been used in the development of the Climate Change Adaptation Plan. These are principles for informed decision making and one of the principles is risk management.* More generally, risk management approaches have been adopted to support government operations, evident for example, in the inclusion of the ISO 31000 Risk Management Standard in the Victorian Government Risk Management Framework (2011). The Victorian Government has committed to implementing a 'risk-based approach' to the management of bushfire and flood.¹⁸

It is beyond the scope of this report and project to identify the parameters of climate risks in Victoria. Instead, this report seeks to highlight particular issues that arise in the process of seeking to manage the risks associated with the effects of climate change, in conjunction with other sectors in society. Industries and sectors such as agriculture, infrastructure, finance and insurance have always operated and made decisions under conditions of uncertainty due to the necessity of managing risk. These sectors have developed tools and systems to facilitate risk management that could provide potential models for planning adaptation responses.

In order to develop potential models and options for managing climate risks and extreme events, this project examines selected Victorian laws and governance arrangements to assess their pertinence for adaptation efforts.

It will assist relevant actors to identify:

- existing management strategies and governance models for the management of climate risks of selected extreme events, such as flood and storm surge;
- relevant private law rules and principles from Courts and Tribunals (e.g. in negligence law and contract law);
- the way in which various institutional structures such as the adoption of corporations can influence how risks are managed.

The project will identify a range of options and opportunities for managing those risks in relation to selected legal and institutional frameworks to encourage adaptive decision-making.

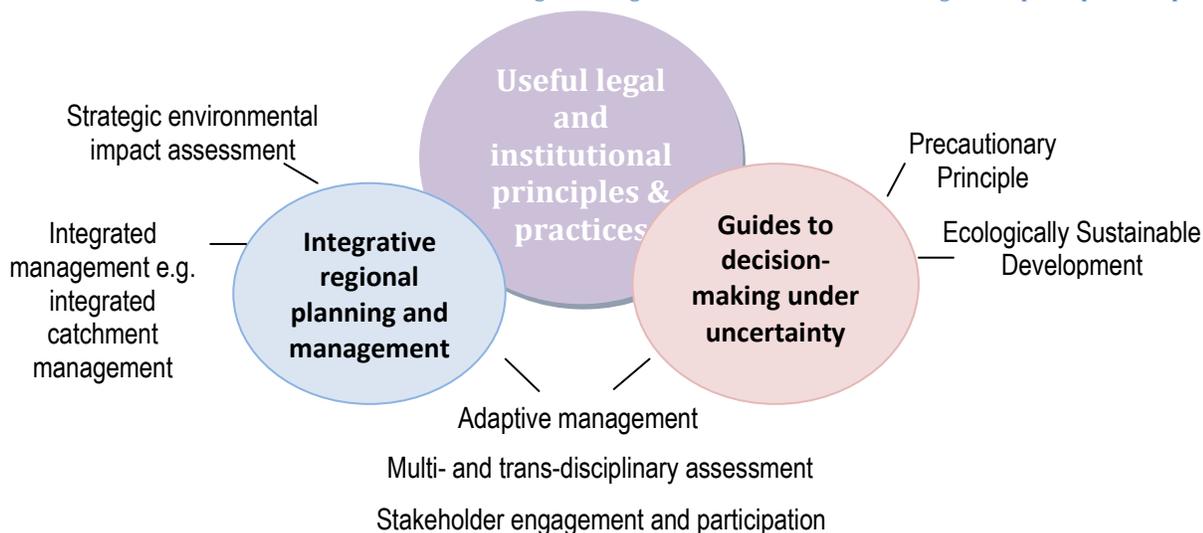
While the uncertainty and complexity associated with climate change impacts pose considerable challenges to legal and regulatory frameworks, the law has developed specific principles to guide decision-making under conditions of uncertainty, such as the precautionary principle. The theory and practice of adaptive management also can provide a framework for decision-making under conditions of uncertainty. The growing use of strategic impact assessment to develop regional planning in other

¹⁷ See for example, Select Committee on Climate Change (SCCC) of the Council of Australian Governments (COAG), 'Roles and responsibilities for climate change adaptation in Australia (for community discussion)' (2012), Productivity Commission, *Barriers to effective climate change adaptation* (2012). On different ways of framing, that is, seeing and understanding climate change adaptation, see Hartmut Fünfgeld and Darryn McEvoy, *Framing Adaptation in the Victorian Context* (VCCCAR Research Paper, April 2011).

¹⁸ Victorian Government, *Environmental Partnerships* (2012), p 17.

contexts offers a useful integrative model that could be investigated for developing responses for climate change adaptation.

Figure 3 Legal and institutional risk management principles and practices



The principle of risk management contained in section 10 of the *Climate Change Act 2010* is an example of a legislated guiding principle or policy designed to facilitate effective and coordinated management of future risks of climate change (for specific decisions as outlined in Schedule 1 the Act). Section 10 draws on the precautionary principle and is one of a suite of guiding principles in the Act that are to guide the development of the Adaptation Plan. Other important guiding principles developed in the legal system include: equity in respect of outcomes for present and future generations, and public participation that promotes engagement with affected communities. These principles, along with other legal and institutional principles and practices, will be the subject of more detailed work under the project.

The Adaptation Plan identifies priority climate hazards and at-risk sectors and sets out a broad framework for the definition of responsibilities and principles to guide adaptation measures (how to manage climate risks). In this sense the Adaptation Plan has laid the groundwork for climate risk governance arrangements in Victoria.

PART B

MANAGING CLIMATE RISK IN VICTORIA

The Victorian legal and regulatory framework

In a number of ways, the Victorian legal system already contains many mechanisms for managing the risks of extreme events and disasters. These take a number of forms, as outlined in **Figure 4**. ‘Purpose built’ legislation and policy may provide specific models of governance and management for adaptation to climate change. Alternatively, obligations to require certain actions to be taken in relation to climate change impacts, or which require consideration by decision-makers of matters that will be affected by climate change, may be imposed through express or implied provision in legislation or regulation. In the ‘private’ or civil law arena general legal duties such as those prescribed in the tort of negligence can apply to attribute cause and fault in specific circumstances.

Civil law also plays a role in regulating the interaction between groups and individuals in the government, business and community sectors; for example through the allocation of risk and liability between contracting parties. Thus many legal rules of general application potentially will apply to the management of climate risk and extreme events.

Generally, therefore, adaptive responses to climate-induced extreme events and disasters have not developed into a purpose-built legal framework designed to address climate risks specifically. Rather, adaptation measures to date have typically developed through the legal system generally; underscoring the importance of measures such as the Victorian Government’s specific planning response in the Adaptation Plan.

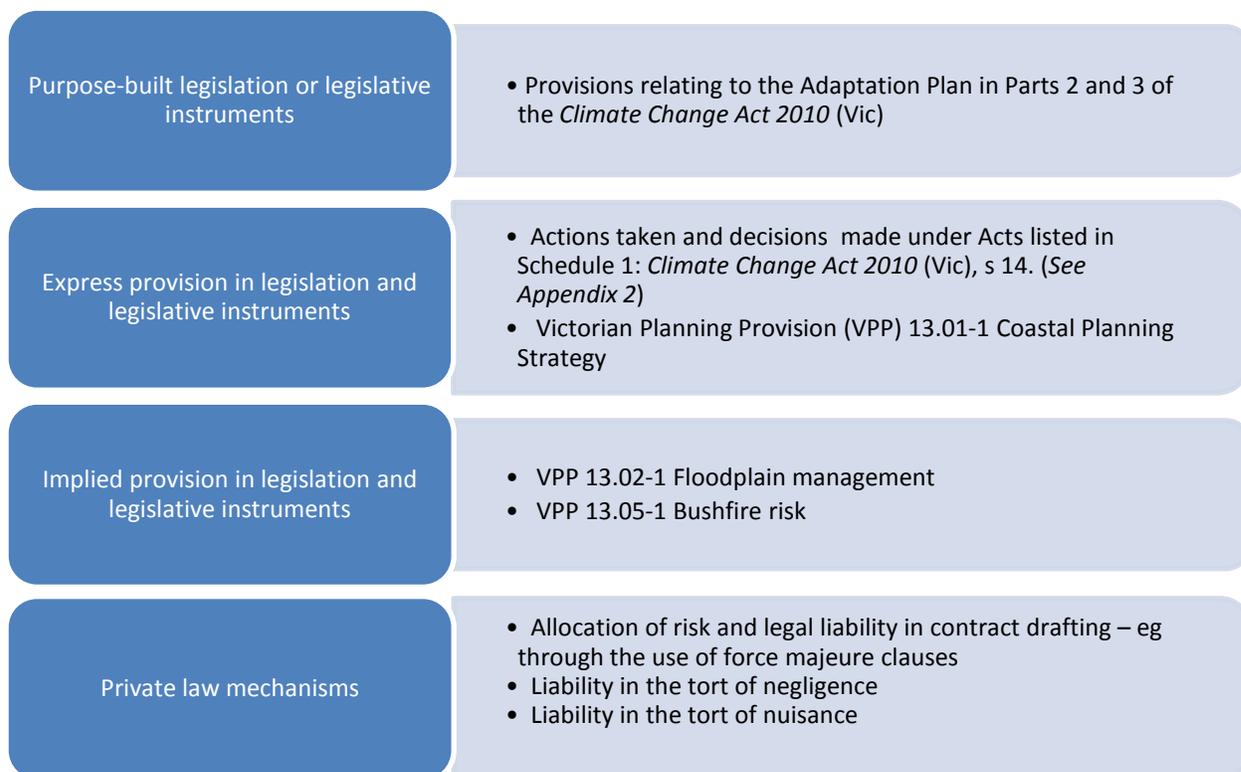


Figure 4 Legal mechanisms relevant to adaptation

The role for state government

The Victorian Government has an important role to play in taking measures itself, and in facilitating other actors to meet the challenge of adapting to a changing climate in Victoria. The Adaptation Plan articulates six key strategies to define the Victorian Government's critical roles and responsibilities.¹⁹

Adaptation strategies for the Victorian Government contained in the Adaptation Plan

Managing risks to public assets and services managed by the Victorian Government – including embedding climate change considerations into risk management and business planning for assets and critical service delivery.

Managing risks to Victoria's natural assets and natural resource-based industries – including developing overarching policy settings and direction for addressing climate risks to biodiversity, soils, waterways and land, coastal and marine ecosystems.

Building disaster resilience and integrated emergency management – including reviewing and reforming emergency management arrangements.

Improving access to research and information for decision-making – by supporting coordinated research and information provision to assist all parties to adapt.

Supporting private sector adaptation – by developing policy settings that support appropriate risk allocation, remove barriers to effective adaptation and promote business innovation.

Partnering with local government and communities – including providing a basis for ongoing engagement with Victorian councils and their communities

The Victorian Government, as part of the COAG Select Committee on Climate Change (SCCC) adopted a Statement of Understanding. According to this statement, state governments are responsible for managing the risks to state-owned assets and to the services they provide. The Victorian Government faces risks to its own assets, for example dealing with the impacts of flooding or bushfire on national parks and on Crown land more generally.

In respect of the risks faced by individuals and the private sector, the Adaptation Plan echoes the SCCC Statement of Understanding and the Productivity Commission's *Barriers to Effective Adaptation* Report, in envisaging a supporting role for the Victorian Government. The scope of this role is based on the view that households and businesses are best placed to manage risks to their private assets and activities.²⁰ In this regard, the Victorian Government and COAG have emphasised that disaster resilience is a shared responsibility – involving individuals, communities, the private sector, emergency management and support agencies, and all levels of government.²¹ This approach recognises that individuals have a responsibility for making decisions in relation to their resilience and wellbeing.

The three primary mechanisms by which the Adaptation Plan sees the Victorian Government playing this supporting role are facilitating place-based risk management, setting the right conditions for businesses to adapt and supporting the development of effective insurance markets for climate risk.²² The Adaptation Plan recognises that providing information alone may be insufficient and that it will be necessary to 'build capacity to access and use climate risk information.'²³

¹⁹ Adaptation Plan, p 10.

²⁰ *Review of the Climate Change Act*, p 22; SCCC, 'Roles and Responsibilities for climate change adaptation in Australia – community discussion paper p 2; Productivity Commission, *Barriers to Effective Climate Change Adaptation*, p 11.

²¹ Victorian Government, *Towards a more disaster resilient and safer Victoria: Victoria Prepared*, Green Paper, 2011.

²² Adaptation Plan p 34.

²³ Adaptation Plan p 32.

Providing information about climate risks

Information about climate risks is required to enable government decision makers to make informed decisions (s 8 principle of informed decision making) and to enable households and private sector actors to identify and manage risks to their assets and make their own adaptation decisions.²⁴

Access to and an ability to understand information about climate risks is essential for effective risk management. As prudent risk management increasingly will require robust processes for the production of information and care in the provision of such information to reliably inform decision making and avoid exposure to legal risks.

The inherent uncertainties of climate change impacts and the evolving nature of knowledge about risks, however, mean that care must be taken in the production and representation of information. It underscores the need for improved research capacity to enhance the reliability of that information. The Adaptation Plan recognises the importance of Victorian Government investment in, and institutional commitment to, incorporating research into climate change risks and responses.

At the same time, a lack of access to information about climate impacts and the risks of extreme events can undermine the ability of an organisation to forward plan and effectively manage its specific risks. Gaining accurate information is important for managing risks. It is also important that organisations and entities in the public and private sectors are cognisant of the legal rules governing areas such as negligence that may impinge upon decision-making for adaptation.²⁵

A framework for climate risk management

The role of government in respect of climate risks is multifaceted and operates in conjunction with many other actors. Indeed, a brief review of the Victorian legislative and regulatory framework reveals this diversity.

For example, the Victorian Government:

- **has a legislative requirement in relation to adaptation to climate change impacts** – for example, the Minister for Environment and Climate Change must prepare an Adaptation Plan for Victoria every four years, setting out an assessment of the potential impacts and risks of climate change in Victoria including specific regional impacts; the roles and responsibilities for managing these risks; and the government’s strategic priorities and its adaptation measures and responses.²⁶
- **has a legislative requirement to have regard to matters where climate change considerations are an important factor** – for example, in endorsement of a Coastal Action Plan under section 26 of the *Coastal Management Act 1995*, the Minister for Environment and Climate Change, must have regard to the relevant potential impacts of climate change.²⁷
- **is involved in activities which may be affected by climate change** – for example, Victorian Government-owned facilities used for the provision of community health services may be damaged as a result of extreme events.

²⁴ See also, L. Williams, *Review of the Climate Change Act*, p 23; SCCC, ‘Roles and responsibilities for climate change adaptation in Australia (for community discussion)’ (2012), pp 2, 10; Productivity Commission, *Barriers to Effective Climate Change Adaptation*, pp117-146.

²⁵ See for example: Baker & McKenzie, *Local Council Risk of Liability in the Face of Climate Change—Resolving Uncertainties* (22 July 2011).

²⁶ *Climate Change Act 2010* s 16(1).

²⁷ *Climate Change Act 2010* s 14.

- ***owns and manages assets that may be affected by climate change*** – for example, roads managed by VicRoads, a statutory authority, may be at risk of damage by floods;
- ***may incur responsibilities for managing risks as a result of the application of general legal rules*** – for example, a duty of care under negligence principles to manage flooding events.
- ***has financial responsibilities and accountabilities that will be affected by climate risks and extreme events*** – for example, the management of state insurance regimes.

Our project will consider and make recommendations about how legal frameworks and other relevant institutional and regulatory tools can best assist in developing future adaptive responses. For example, effective adaptation may require new legal rules to be introduced to facilitate effective responses to climate risks, and to resolve competing interests. For instance, one option for consideration is that existing floodplain management rules for waterway management and planning laws could be modified in order to promote overall management of the floodplain under climate change impacts. This option would fit with the broad principles discussed in the Adaptation Plan that land use planning can provide an important foundation to facilitate place based risk management and adaptation and can help ensure development is designed with reference to standards and specifications that match identified risks.²⁸ This process can be assisted by the specific case study methodology to be adopted under the project.

²⁸ Adaptation Plan p 34.

PART C

COMPLEXITY CASE STUDIES

Managing climate risk

Extreme events and disasters can have local, regional, state-wide and even national impacts, creating risks for actors across the public and private sectors. As a result, responsibility for preventing, preparing for, responding to and recovering from impacts is spread and shared.²⁹

Depending on the risk, responsibility for managing risks may be most effectively implemented by:

- a single government agency, department, statutory authority or regulator;
- a private individual;
- between government departments and agencies where responsibility is shared;
- between levels of government (federal, state, local) where responsibility is shared; or
- across the public and private spheres (including individuals, business, industry, non-governmental organisations, the insurance industry etc).

Defining roles and responsibilities is necessary to ensure co-ordinated and effective responses by government agencies and departments (consistent with 'whole of government' and 'all hazards, all agencies' approaches), across sectors and to create clear expectations of individual and private sector responsibilities.

The independent review of the *Climate Change Act* recommended that the division of responsibility for managing the risks of climate change impacts in Victoria be clearly articulated and enshrined in legislation or in the Adaptation Plan. A firm legislative basis that clearly articulates roles and responsibilities of various actors has merit but it needs to be carefully developed and well aligned and integrated across governance structures.

Moreover, the complexity involved in managing the risks of extreme events as outlined in the case study below, cautions against an inflexible approach that relies primarily upon the use of legislation. Adaptation research has identified the need to ensure that precautionary and adaptive, strategic models are incorporated into governance arrangements.³⁰ As indicated above, based on the SCCC Statement of Understanding, the Victorian Government has used the Adaptation Plan, rather than amending the *Climate Change Act 2010*, to articulate the principles for defining roles and responsibilities of the different levels of government and the matters for which private individuals and business retain responsibility.³¹

An optimal approach to managing climate risks accounts for differences in the nature of the risks to be managed so as to ensure that the choice and design of governance arrangements are appropriate. The severity of the impact (for example whether it is of 'disaster' proportions) and the nature of the climate event (bushfire, drought) as well as other factors, such as equity considerations and overall strategic objectives will have a bearing on what will be the most effective configuration of risk management responsibilities and the policy options that are to be considered.

²⁹ The localised effects of climate change were a key reason why the Review of the Climate Change Act identified an important role for state governments in adapting to climate change: See, pp 6, 22.

³⁰ Robin Kundis Craig, 'Stationarity - Long Live Transformation: Five Principles for Climate Change Adaptation Law' 2010 34(1) *Harvard Environmental Law Review* 9; J B Ruhl, 'General design principles for resilience and adaptive capacity within legal systems –with applications to climate change adaptation' (2011) 89 *North Carolina Law Review* 1373.

³¹ Adaptation Plan, pp 9-11.

The Adaptation Plan, for example, recognises that the Victorian Government has important responsibilities in the emergency response and post-recovery arrangements following an extreme event or disaster event,³² while more generally placing an expectation on households and business to be responsible for the climate risks to their assets. Further project working papers will discuss these ideas at the level of specific statutes and institutional arrangements.

When determining responsibilities for managing climate risks and extreme events, research has identified that it is important to consider the capacity required to manage a given risk in terms of financial resources, human resources, and technical expertise i.e. who has the necessary resources and capacity?³³ Responsibility can also be understood in terms of accountability: who will be held legally, politically and financially responsible if the risks are not appropriately managed? As such, research in our project suggests that a strict and clear delineation of responsibility between public and private sectors to apply in all circumstances may not be possible given the complex of factors to be taken into account.

Selected case studies

This research project utilises a series of case studies to ground the mapping and analysis of the governance arrangements for climate risk in Victoria. The research team is in the process of working with the Victorian Government to identify the case studies of most pertinence in the Victorian context.

The complexity involved in the management of climate risk is highlighted by the following case study on flood risk. This example demonstrates the overlapping statutory duties of government agencies and intersecting private interests in the context of floodplain management that may make it difficult to ascribe clearly bounded responsibility to any particular actor to mitigate risk of harm in the event of flooding.

Multiple actors, overlapping roles and responsibilities: floodplain scenario

Regional Victoria has experienced a series of major floods over the last few years after a long period of drought. The following provides a hypothetical scenario around a flood event.

During a major flood event a reservoir with a limited ability for quick release of water was at threat of overflowing. To avert inundation of townships, the reservoir operators directed water to be pumped into the irrigation channel system. More water overflowed the channel banks and was diverted into the channel system. Water then travelled through the irrigation network to land downstream on a designated floodplain. At the same time, modernised irrigation channel outlets which were not designed to prevent flow of water at these high levels, released water onto properties which would not otherwise have been inundated. Channel systems which run against the natural flow of water directed water onto land not naturally subject to inundation. Mechanisms designed to alleviate or direct flows had been removed during modernisation, and others were not used effectively because water bailiffs skilled in management of flood water had been removed or retired.

Water travelled from a sewerage treatment farm, resulting in contamination of irrigation land and disease in stock. A piggery had been constructed with council approval on a designated floodplain, but conditions of approval including waste disposal had not been met. Waste from the piggery contaminated a municipal water supply. Council approval of township development under relevant planning legislation resulted in inundation of land not previously flooded, damaging other private properties.

³² Adaptation Plan, p 28.

³³ Peter P J Driessen and Helena F M W Rijswijk, 'Normative aspects of climate adaptation policies' 2011 2 *Climate Law* 559, p 567; Helen L Mees, Peter P J Driessen and Hens A C Runhaar, 'Exploring the Scope of Public and Private Responsibilities for Climate Adaptation' 2012) 14 *Journal of Environmental (Policy & Planning* 305, p 314.

In the immediate aftermath State Emergency Service personnel attempted to take control of key irrigation infrastructure to enhance human safety but with limited knowledge of its operation. Modernised irrigation infrastructure could not be controlled centrally, because it was affected by floodwater, and gates were unable to be remotely closed to prevent further flooding. Staff centralisation also meant that skilled staff were unable to assist because they were cut off by floodwater.

Local governments have responsibility for municipal infrastructure and some road networks, building and development approvals and ensuring compliance with approvals. Water authorities, which include Catchment Management Authorities (CMAs), storage managers and urban water and sewerage suppliers, have duties in regard to collecting and communicating information about flood risk, controlling development near waterways and where possible minimising flooding and flood damage when performing their functions³⁴

In flood-prone areas, local governments must refer development proposals to CMAs for their advice as to whether development should proceed. The Environmental Protection Authority has a role in policing compliance with environmental pollution control standards. State government set overall government priorities and planning policies and a state government department has responsibility for main roads. Emergency services are a mixture of volunteer and state government funded organisations. Private interests include local landowners and people operating business in the areas. Local residents in regional towns and rural locations were impacted by the floods.

Multiple forms of damage arose from the flood and its aftermath, including damage to houses, farm infrastructure and stock, economic loss due to lost production, potential physical injury and property loss due to motor vehicle accidents. There was general community disruption and loss of productivity in farmlands. Many of the losses were not covered by the residential and commercial insurance policies.

A flood scenario of this type demonstrates the complexities of risk management, the need for clear articulation of responsibilities where there are multiple roles and the need to develop coordinated responses to climate change impacts.

³⁴ *Water Act 1989* (Vic) Div 4 Part 10.

CONCLUSIONS

As Victoria emerges from another summer of bushfires and record temperatures, the need to respond to the impacts of climate change that have already occurred as well as to prepare for future impacts and risks has never been greater.

This report highlighted a number of issues relevant to the legal and governance arrangements for the management of climate risks particularly in respect of extreme events and disasters.

In discussing the range of the roles and responsibilities of the Victorian Government, we referred to some of the Government's existing legislative duties and obligations, general law principles, national and state policy positions on the topic. We provided an initial analysis of the broader legal context that we believe should be considered.

Specifically, we suggest there is a need to consider how a long-term, strategic and integrated approach, complemented by an appropriate legal and regulatory framework, can enable governments, industry and community to respond to the risks associated with the impacts of extreme events and to facilitate private sector adaptation.

Appendix 1: Project information

This report was prepared as part of the VCCCAR-funded project, *Governance models for adaptation and natural disaster risk management: legal, regulatory, institutional and financial assessment*.

Project team:

- Professor Lee Godden, Centre for Resources, Energy and Environmental Law, University of Melbourne (Co-ordinator)
- Ms Rachel Anne Carter, School of Law, La Trobe University and PhD Candidate Bushfire CRC
- Professor John Handmer, Centre for Risk and Community Safety, RMIT
- Professor Jacqueline Peel, University of Melbourne Law School
- Dr Francine Rochford, School of Law, La Trobe University
- Ms Jude Wallace, Senior Research Fellow, Melbourne School of Engineering

Research team, Centre for Resources, Energy and Environmental Law, University of Melbourne:

- Ms Lisa Caripis, Research Fellow and Project Manager
- Ms Stephanie Niall, Research Assistant
- Mr Tim Baxter, Research Assistant
- Ms Annette Wiltshire, Research Assistant

Stakeholder engagement

The project is informed by a Victorian Government steering committee comprising representatives of relevant state government departments. The team will seek the views of stakeholders from Commonwealth departments and agencies, local government, civil society and business groups, as appropriate.

Project deliverables

The project comprises three phases: a scoping phase, preliminary assessment and final assessment phase. At each stage, the project team will engage with the government steering committee and produce a report. Alongside project reports, the team intends to publish shorter working papers dealing with particular issues raised by their research. The project will conclude with a final report to government including recommendations.

Appendix 2: Climate Change Act 2010 – Schedule 1: Decisions and Actions

Climate Change Act 2010, Schedule 1: Decisions and Actions which must involve regard to potential impacts of climate change	
Name of Act	Decision or action
Catchment and Land Protection Act 1994	An approval or refusal of an approval of a management plan by the Minister, or the return of a plan to the Authority with any recommendations for change, under clause 3 of Schedule 2. The revocation of a management plan by the Minister under clause 7 of Schedule 2.
Coastal Management Act 1995	Consideration by the Minister of a draft Coastal Strategy under section 17. The endorsement by the Minister of a Coastal Action Plan under section 26 .
Environment Protection Act 1970	A recommendation of the Environment Protection Authority under section 16 . A recommendation of the Environment Protection Authority under section 16A. The issue of or refusal to issue a works approval by the Environment Protection Authority under section 19B. A decision by the Environment Protection Authority relating to the licensing of scheduled premises under section 20 .
Flora and Fauna Guarantee Act 1988	The preparation, making and amendment of a Flora and Fauna Guarantee Strategy by the Secretary under section 17 and 18 . The preparation and amendment of an action statement by the Secretary under section 19 . The preparation of a management plan by the Secretary under section 21 . The amendment or revocation of a management plan by the Secretary under section 22 . The review of a management plan by the Secretary under section 24 . The making of an interim conservation order by the Minister under section 26 . The confirmation or revocation of an interim conservation order by the Minister under section 31 . The amendment of a confirmed interim conservation order by the Minister under section 33 . The amendment of an interim conservation order by the Minister under section 35 .
Public Health and Wellbeing Act 2008	The preparation of a municipal public health and wellbeing plan by a council under section 26 . The preparation of a State Public Health and Wellbeing Plan by a person under section 49 .
Water Act 1989	Consideration of a draft Sustainable Water Strategy by the Minister under section 22G.