

# Annual Report

## 2011-2012



Victorian Centre for Climate Change  
Adaptation Research

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*Cover Photo*  
*Credit: Anton Malishev and City of Melbourne.*

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# About VCCCAR

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## Who we are

The Victorian Centre for Climate Change Adaptation Research (VCCCAR) was established in 2009 as a partnership between La Trobe, Melbourne, Monash and RMIT Universities. Deakin University became a member in 2012.

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## What we do

VCCCAR undertakes research on Victorian climate adaptation issues. Centre researchers work closely with all levels of government and the community to ensure that our research results make a difference to policy and practice.

The Centre's research program involves multi-disciplinary and multi-institutional research teams to address priorities identified by the Victorian Government. VCCCAR also sponsors regional think tanks, stages an annual forum and supports a visiting fellowship program.

## Our objectives

VCCCAR aims to improve decision-making capacity regarding future climate risks within different levels of government in Victoria. Projects involve researchers from a range of disciplines across the partner universities and participants from state and local governments.

The Centre provides new knowledge, methods and tools to address challenges associated with managing future climate risks. Through our research and communication activities, we are building a 'community of practice' in adaptation that can facilitate the social learning required to address climate risks. Activities such as the international fellowship program, joint projects with CSIRO, the Bureau of Meteorology, the National Climate Change Adaptation Research Facility (NCCARF) and other partners and presentations of VCCCAR research at local and overseas events is extending our research nationally and internationally.

## Our partners

VCCCAR's partners span a wide range of interests.

In the research area, VCCCAR's primary partners are La Trobe, Melbourne, Monash, RMIT and Deakin universities. NCCARF and CSIRO are also important collaborators. In addition, VCCCAR continues to develop linkages with other Victorian universities, in particular Victoria and Ballarat universities.

The Centre seeks to engage with government agencies at the state and local level. Of particular importance are those Victorian Government departments involved in the development, oversight and implementation of VCCCAR's research program. These include the departments of Premier and Cabinet, Health, Transport, Sustainability and Environment, Primary Industries, Business Innovation, Justice, Human Services and Planning and Community Development.

The Centre also works closely with the Office of the Commissioner for Environmental Sustainability and the Environmental Protection Authority (EPA) and has developed close ties with a range of local governments and cross-local government groups such as regional climate alliances.

Priority areas for stakeholder engagement include Commonwealth Government agencies, such as the Department of Climate Change and Energy Efficiency, and peak body organisations representing key private sector industries including transport, utilities and primary industries.

# 2011-2012 highlights at a glance

## Research

- Publication of major reports on the design of resilient urban systems and framing climate adaptation provide a basis for improved government decision-making that takes climate risks into account.
- Release of the Adaptation Navigator to 'proof of concept' stage which, once fully developed, will become a valuable aid to assist state and local governments in adaptation planning.
- A review of adaptation to flood risk under climate change from Visiting Fellow, Professor Rob Wilby, provides useful guidance for managing future flood risks.
- Outputs from research projects on integrated land management in a changing climate, managing green infrastructure to reduce urban heat island effects, design-led approaches to adaptation, and improved floodplain management.
- Initiation of projects on managing risk and uncertainty in climate change adaptation; legal and regulatory arrangements for managing climate risks; and implementing adaptation in community and natural resource management sectors to build capacity for managing risks and opportunities presented by future climates.
- New project funding of \$700 000 for a Comprehensive Carbon Assessment Program to assess above-and below-ground carbon sequestration in the forests of northeast and north-central Victoria.
- Six papers from Centre research were accepted for publication in peer reviewed journals.
- Nine presentations from Centre research were presented in national and international conferences.

## Communication and outreach

- Think tanks on floodplain management in Kerang, regional business risk management in Bendigo, challenges and opportunities arising from climate change in Gippsland, adaptation in housing in urban fringe areas in Frankston, and managing risks from extreme events in urban environments in Melbourne were attended by over 200 people.
- Over 11 000 visits to the Centre web site in 2011-12.
- Four events in the Council Conversations series involved over 160 local government planners and asset managers in discussion about responses to potential risks due to climate change.

- Over 170 people participated in the VCCCAR Annual Forum and associated events in June 2012.
- Centre researchers published five articles on the new universities' web site, *The Conversation*.

## Administration, management and governance

- Deakin University requested to join the partnership in 2012.
- Centre governance was streamlined through joint meetings of the VCCCAR Advisory Board and the State of Victoria's Adaptation Research Centre Investment Panel.

# Introduction by the Chair of the VCCCAR Advisory Board

I am pleased to introduce the second Annual Report of the Victorian Centre for Climate Change Adaptation Research (VCCCAR) and, on behalf of the Advisory Board, to commend the work of the Centre during 2011-2012, as a vital input into the Victorian Government's climate change adaptation strategy.

The Advisory Board consists of senior representatives of the VCCCAR partner universities (Deakin, La Trobe, Melbourne, Monash and RMIT) along with the heads of the CSIRO Adaptation flagship and the National Climate Change Adaptation Research Facility (NCCARF). Its role is to provide strategic advice and direction to the Centre and the Director.

In its third year of operation, the Centre commissioned three new climate adaptation research projects, held its Annual Forum in conjunction with NCCARF's biennial national conference, hosted Professor Rob Wilby from Loughborough University as the third visiting fellow and sponsored five think tanks in metropolitan Melbourne and regional Victoria. The Centre also hosted an inaugural Research Showcase as part of its dissemination and outreach activities. In addition to fostering an inter-disciplinary and multi-institutional research model to develop timely and relevant research that has secured strong engagement

from local and state government, the private sector and a range of peak body non-government organisations, perhaps the most important achievement of the Centre in the past year has been to broaden its focus to the development of a 'community of practice' in climate adaptation research and policy in Victoria.

The Centre's management and governance arrangements were reviewed during the year and improvements introduced to ensure its research and related activities best meet the research and policy needs of the State of Victoria. Joint meetings of the VCCCAR Advisory Board and the State Government's Adaptation Research Centre Investment Panel (ARCIP) were established to endorse research activities and to share thinking on strategic aspects of VCCCAR research activities. The Government commissioned its second external review of the VCCCAR project. I am pleased that Deakin University agreed to join the VCCCAR consortium last year.

On behalf of the VCCCAR Advisory Board, I wish to acknowledge the vital role of the Victorian Government in funding the Centre, the chair and ARCIP members for their insight into priority areas for adaptation research and to staff within the Environmental Policy Division of the Department of

Sustainability and Environment for their support of the VCCCAR project — especially Paul Smith, Mike Gooley, Kate Wood, Kate Houghton and John Houlihan. And, finally, the Board wishes to acknowledge the continuing leadership of the VCCCAR Director, Professor Rod Keenan, and the excellent work of all the project leaders and VCCCAR staff that has enabled the Centre to achieve so much in the first three years of operation.

This Annual Report provides an account of Centre activities in the twelve months ending June 2012. It follows the positive responses to the publication of last year's inaugural report. I hope you find it of interest and value.



**John W Zillman AO FAA FTSE**  
Chair, VCCCAR Advisory Board

# Director's report: 2011–2012 in review

The past year has been one of significant activity for the Centre. The research program has consolidated, with 11 projects initiated in total and three now completed. These have produced significant research outputs that are being well received by adaptation practitioners and government decision-makers. Partnerships created through think tanks and other communication activities are continuing the formation of a community of practice between researchers, policy makers and those implementing adaptation actions across the State. Our research focuses on producing new knowledge, methods and tools to support improved governance arrangements, decision-making under uncertainty and urban resilience and liveability.

Local government is often at the forefront of many adaptation challenges and Centre researchers are working actively with local government partners on a number of projects. Building on the local government focus of the 2011 Annual Forum, activities such as the Council Connections program have provided the opportunity for greater interaction between those managing risks to people and assets in local government and researchers and adaptation policy staff in state government.

The policy environment for climate change adaptation in Victoria continues to develop and change. Much of the national policy focus remains on reducing greenhouse gas emissions to support international efforts to mitigate climate change. The Productivity Commission undertook a review of the barriers to adaptation to climate change. Their draft report indicated different ways in which government could address many of the challenges of climate change, but there is continuing debate about the role of government in adaptation and the responsibilities of different levels of government for particular adaptation policy measures.

The Victorian Government is focusing more on adaptation issues. Their response to the review of the *Climate Change Act* is to be released in 2013. Policies relating to improved liveability and community resilience require a consideration of future climate risks and the Centre plays a major role linking researchers to government to support improved policy development.

The Centre sponsored five think tanks involving small and medium enterprises in Bendigo; local and state government staff, natural resource management authority representatives, researchers and agriculture, agribusiness and transport company representatives in Gippsland; floodplain managers and community members in Kerang; property developers, local government and planners to discuss adaptation challenges for outer metropolitan areas in Frankston; and designers of the built environment and emergency

management specialists to consider disaster risk management in urban areas in Melbourne (a joint event with the NCCARF Settlements and Infrastructure network).

The Centre's Visiting Fellow for 2011, water resources expert Professor Rob Wilby of Loughborough University, had a short but very productive stay in July and August 2011. Rob gave seminars and briefings to federal, state and local governments, universities and regional groups and was the keynote speaker at the VCCCAR think tank on floodplain management. In June 2012 Dr Kate Lonsdale of the Stockholm Environment Institute was appointed as the 2012 Visiting Fellow. The high calibre of applicants for the 2012 round of fellowships enabled VCCCAR to appoint the 2013 fellow from the same round. Professor Jonathan Overpeck from the University of Arizona was appointed the 2013 Visiting Fellow.

A priority for 2011-2012 was to broaden our conversations with industry, large enterprises and small businesses. This process began with a breakfast round table involving business, government and researchers at the 2012 Annual Forum in June chaired by Anne Barker, CEO of City West Water, and continued with our first 'Executive conversation' with senior government decision-makers in July 2012.

Other key challenges pursued by VCCCAR in the 2011-2012 year have included:

- increasing the uptake of research into policy and practice. Working with policy research experts from the University of Melbourne’s Centre for Public Policy, we have initiated processes to seek guidance from the policy community on how to improve the relationship between research and policy.
- making the case for further investment in adaptation research in a highly constrained and heavily contested funding environment at both state and

federal levels, and identifying and accessing new sources of funding. This could include co-investment from federal or local government and industry.

Of the \$5 M provided by the Victorian Government for the Centre, \$3 M is allocated to the research program. \$2.76 M has now been committed to research projects to date, with the longest funded project running through to May 2014. \$1.5 M from the project budget is allocated to meeting administration costs. Of this, \$989 406 has been allocated to administration as at 30 June 2012 (the bulk of which comprised the salaries of the director, executive officer and support staff).

Of the \$500 000 allocated to meeting think tank, annual forum and visiting fellow expenditure over the life of the project, \$201 198 has been spent to date. In the first three years of the Centre’s operation to the end of June 2012, the total expenditure has been \$2.49 M, or 49 per cent of the total budget. The estimated in-kind from university partners in 2011–2012 is \$1.925 M.

### VCCCAR income and expenditure, 2009–2013 (cumulative totals)

	2009–2010	2010–2011	2011–2012
<b>Income</b>	<b>\$1 045 000</b>	<b>\$2 045 000</b>	<b>\$3 045 000</b>
<b>Expenditure</b>			
Administration	\$217 605	\$609 829	\$989 406
Research program	\$0	\$455 765	\$1 295 414
Think tanks	\$3432	\$33 197	\$84 890
Annual forum	\$8165	\$11 899	\$28 993
Visiting fellowship	\$127	\$42 851	\$87 225
<b>Total expenditure</b>	<b>\$229 329</b>	<b>\$1 148 911</b>	<b>\$2 486 018</b>
<b>Cumulative balance</b>	<b>\$815 671</b>	<b>\$896 089</b>	<b>\$558 982</b>



The Centre actively pursues co-investment in projects from government agencies and new funding options for adaptation research, including from federal and international sources. During 2012, \$700 000 was committed by the Department of Sustainability and Environment (DSE) to a new project to assess above- and below-ground carbon sequestration in the forests of north-east and north-central Victoria in order to comply with requirements of the Commonwealth's Carbon Farming Initiative (CFI).

In an effort to streamline governance arrangements and increase interaction between Centre Investment Panel members from the State Government and the Universities Advisory Board, we initiated joint meetings of these two bodies.

This annual report describes progress in Centre activities in the third year of operation, to 30 June 2012. It provides a critical review of what has worked and what needs improvement as the Centre moves into its fourth year.

I would like to thank all those involved in the progress of the Centre in the last 12 months, including the members of the Advisory Board (in particular the Chair, Professor John Zillman), the Centre Implementation Committee (including the Deputy Director, Professor Darryn Mc Evoy of RMIT University), members of the Adaptation Research Centre Investment Panel and leaders of research projects and think tanks. Special thanks go to VCCCAR's Executive Officer, Mr Doug Scobie, for his continued diligence and

commitment to managing the Centre's activities in a complex and continually changing organisational environment.



**Professor Rod Keenan**  
Director, VCCCAR



*2012 Annual Forum participants. Credit: Phoebe Bond*

# VCCCAR research overview 2011–2012



A developing project will provide recommendations on communication processes to address climate-related risks.

In the **Resilient Urban Systems** theme, three Centre projects are investigating the development of more resilient urban planning and design for future climates. One, led by the Centre for Design at RMIT University (*Resilient Urban Systems: A Socio-Technical Study of Community Scale Climate Change Adaptation Initiatives*), was an analysis of two case studies of 'distributed' community-scale water and energy systems. It found that these systems have the potential to increase community resilience through their capacity to avoid, absorb and adjust to climate-related impacts.

A second project, involving researchers at Monash University and the University of Melbourne (*Responding to the Urban Heat Island: Optimising the Implementation of Green Infrastructure*), is investigating the effectiveness of green infrastructure for cooling urban landscapes. It is developing a systematic guide for urban land managers to optimise the selection and implementation of green infrastructure through analysis of policy, cost and management. The third project, *Design-led Decision Support for Regional Climate Adaptation*, utilised processes based on *charrette* design principles to develop future visions of more resilient communities in urban and regional settings to assist planners and community members.

The goal of the Centre’s research program is to support decision-makers in identifying the potential climate impacts, assessing adaptation options and investigating approaches to decision-making and implementation. Research is organised around four key themes: (1) Governance, Framing and Implementation, (2) Resilient Urban Systems, (3) Investment Decision-Making Under Uncertainty and (4) Natural Resource Management in a Changing Climate.

In the **Governance, Framing and Implementation** theme, RMIT University researchers led a major project titled *Framing Multi-Level and Multi-Actor Adaptation Responses in the Victorian Context* with the aim of developing an improved basis for a decision-making for adaptation policy and practice by local and regional authorities in Victoria. The results include the Adaptation Navigator, some of the first estimates of the costs to industry and the community of climate events such

as bushfire, and preferred narratives that people in exposed urban and regional communities used to discuss climate change

The *Implementing Adaptation* project is taking this work further by investigating the needs, barriers, issues and opportunities for applying adaptation tools in agencies responsible for delivering services to the Victorian community, such as community service organisations, primary health care partnerships and catchment management authorities.

Legal, financial and institutional arrangements are being investigated in case studies in land use planning, catchment management, natural resource management and infrastructure development to support improved adaptation planning, policy development and implementation (*Governance Models for Adaptation and Natural Disaster Risk Management: Legal, Regulatory, Institutional and Financial Assessment*).

In the theme **Decision-making Under Uncertainty**, the University of Melbourne-led *Scenarios for Climate Adaptation* project (completed in June, 2011) found that scenario-based approaches are a valuable tool for addressing climate change adaptation objectives in Victoria. This finding supports a shift from 'enhanced prediction' to 'robust decision-making' under uncertainty and provides a powerful platform for exploring and integrating diverse sources of knowledge and stimulating imaginative ideas and responses.

Managing uncertainty in capital investment decisions through application of 'real options' theory is being investigated in a project led by La Trobe University (*Enhancing Water Infrastructure Provision with Climate Change Uncertainty*). The key insight of the approach is that there is a case for deferring a project even when the project's expected benefits, calculated now, are positive because there is an options value placed on improved information in the future. If this value is ignored, implementing standard cost-benefit approaches can lead to over-investment with infrastructure built before it is required. Capital projects could include this approach as part of their assessment tools for large scale long term investments.

Psychological and social factors important in decision-making are being investigated in a project, *Decision Taking Under Uncertainty*, in the School of Social and Political Sciences at the University of Melbourne. Researchers are using Gippsland regional planning processes to analyse how the knowledge of climate change, its impacts and adaptation options, is negotiated and used in decision-making.

The **Natural Resource Management in a Changing Climate** theme has three projects. *Policies and Governance to Support Integrated Landscape Management in a Changing Environment*, led by Deakin University, looked at barriers and enablers to more integrated approaches to management across land tenures and land uses in both urban and rural landscapes. The project found that collaboration through integrated landscape management (ILM) can play a key role in helping land managers adapt to climate change in Victoria. Use and management of landscapes is constantly fluctuating in response to a range of social, economic and environmental drivers. This requires clear goals and learning based on a commitment to review outcomes and revisit management decisions. Barriers to more integrated management include the costs of increased communication and engagement, lack of information, hierarchical and fragmented decision-making, unequal power relations and uncertainty in leadership.

A project led by Monash University (*Learning from Indigenous and Traditional Community Knowledge for Improved Natural Resources Management in the Barmah-Millewa and Wider Murray Floodplain*) aims to learn how to integrate the large body of Indigenous and traditional knowledge of the Australian climate and landscapes, and the capacity for Indigenous landscape management practices. It will develop a comprehensive community mapping process to enhance and protect knowledge and information held by the Yorta Yorta Nation for the Barmah-Millewa region along the

Murray River. This mapping will provide a policy development resource for biodiversity conservation and co-management and ongoing consultation for Victoria's State of the Environment report.

As a new undertaking for VCCCAR, the *Comprehensive Carbon Assessment Project* is assessing above- and below-ground carbon stocks to improve carbon accounting in Victoria's managed native forest estate and to analyse drivers of carbon dynamics (such as fire) and the implications for climate change adaptation.

## Governance, Framing and Implementation

### Framing Adaptation Responses in the Victorian Context

Chief Investigator: Professor Darryn McEvoy, RMIT University  
Value of project: \$349 000

Understanding current and future climate change impacts, and how best to respond, are major challenges for Australian communities. Decision-makers need to consider the range of potential impacts climate might have in the future, where and when these may occur, and how different industries or parts of the community might respond. Such complex challenges are best addressed using collaborative approaches involving shared learning across institutions.

Framing occurs when people with different knowledge, experiences and personal backgrounds consider an activity or a challenge. Framing is a way of making sense of a topic (like climate change) from an individual

perspective, but it can also be used to arrive at a shared meaning and sense of purpose in addressing the challenge. This project aimed to develop and test an operational framing of adaptation that could provide the basis for a decision-making 'roadmap' for adaptation policy and practice by local and regional authorities in Victoria. The project was structured into four work packages: development of an overarching framework for adaptation; preliminary economic analysis of climate change impacts and adaptation; an exploration of local narratives; and testing of these research outputs in three case study locations in Victoria.

**Outputs**

Highlights from the project include:

- The Adaptation Navigator, a web-based application that has been developed to proof-of-concept stage. Built on constructive, active collaboration with UKCIP, the Navigator provides an innovative framework and information portal for adaptation planning. It has been well-received in the policy and practice community in local government in Victoria and interstate. The response has indicated options for further development, testing and end-user application beyond the lifetime of the current project.

- Completion of a Local Adaptation Guide in collaboration with DSE staff. The purpose of the guide is to assist decision-makers considering climate change impacts when developing and delivering policy. The Guide contains a suite of processes and methods to assess and respond to existing and potential climate change impacts on Victoria's natural and built assets and communities.
- Strong engagement of local government partners, in particular the cities of Melbourne and Greater Bendigo. The project gathered important research information and built internal momentum for climate change adaptation through a series of focus group discussions and in-depth interviews on the framing of adaptation, social narratives of climate change, and adaptation planning processes. The outcomes of this engagement have been presented in case studies on adaptation for Bendigo and Melbourne.
- Working papers on the costs of climate change and costing adaptation options.

All project outputs have been submitted and the project is due for completion by 30 June 2013.

[vcccar.org.au/publications](http://vcccar.org.au/publications)

**Implementing Tools to Increase Adaptive Capacity in the Community and Natural Resource Management Sectors**

Chief Investigator: Dr Hartmut Fünfgeld, RMIT University  
Value of project: \$325 000

This project is undertaking a structured analysis of the application of tools and guides for climate change adaptation in regional and metropolitan community service and catchment management sectors. 'Real-world' barriers, issues and opportunities will be assessed through participatory research with key partners, including sector peak bodies. A range of analytical tools and approaches will be trialled and the results used to guide the development of improved risk management procedures and practices. Results will also provide a better understanding of the usefulness of different types of information approaches in other sectors.

**Outputs**

- sector-specific adaptation needs analysis reports
- report on adaptation tools' barriers and opportunities
- climate change adaptation engagement report
- report on the application of an Adaptation Evaluation Matrix (AEM).

The project is due for completion by 30 November 2013.

[vcccar.org.au/research-projects](http://vcccar.org.au/research-projects)

### Governance Models for Adaptation and Natural Disaster Risk Management: Legal, Regulatory, Institutional and Financial Assessment

Chief Investigator: Professor Lee Godden, University of Melbourne  
Value of project: \$251 100

This project is investigating Victorian legal, financial and institutional frameworks for managing the risks of extreme events and natural disasters and make recommendations for decision-making given the uncertainty introduced by climate risk. Working closely with government partners, it will identify options for knowledge transfer to support decision-making through accessible practitioner and policy-related publications.

#### Outputs

- workshops with government and other stakeholders
- scoping paper report
- preliminary analysis report
- final report.

The project is due for completion by 31 May 2014.

[vcccar.org.au/research-projects](http://vcccar.org.au/research-projects)

### Resilient Urban Systems

#### Resilient Urban Systems: A Socio-Technical Study of Community Scale Climate Change Adaptation Initiatives

Chief Investigator: Professor Ralph Horne, RMIT University  
Value of project: \$100 000

Community-scale systems have both advantages and limitations in comparison with conventional centralised systems. Integrating centralised and distributed system models may maximise advantages and minimise limitations associated with both models. An integrated system comprising linked provision infrastructure at multiple scales may offer the best way to build resilience at all levels – from resource producer to resource user. The final report of this project identified the following highlights for policy makers:

- The resilience of community-scale infrastructure systems, such as water supply or energy generation, results from the interaction of diverse and context specific technical, institutional and social 'enablers'.
- Climate change poses few direct short-term threats to the local energy and water systems examined. However, both developments also depend on larger energy grid and reticulated water systems subject to indirect threats from climate events and future change.
- Climate adapted infrastructure requires integration of technical, institutional and social resilience. Where uncertainty exists regarding future operating conditions, institutional and social enablers may prove to be particularly important in ensuring resilience.

- There has been an emphasis on technical resilience in the design of novel infrastructure systems at the expense of community and institutional enablers of resilience. This may place certain communities at risk from climate change and other disturbances, particularly where social capital is weak, and where system designers and investors have limited ongoing responsibility for the functionality of systems.
- Victoria's current regulatory landscape poses few direct barriers to the replication of the systems examined but it does restrict innovation in community-scale infrastructure systems.

#### Outputs from the project comprised:

- two policy briefs
- a final report.

The project was completed in January 2013.

[vcccar.org.au/publications](http://vcccar.org.au/publications)



## Responding to the Urban Heat Island: Optimising the Implementation of Green Infrastructure

Chief Investigators: Dr Nick Williams, University of Melbourne and Dr Andy Coutts, Monash University  
Value of project: \$400 213

Integrating Green Infrastructure (GI), such as street trees, lawns, green roofs and walls, into the urban landscape has the potential to cool the urban microclimate by providing shade and evapotranspirative cooling while reducing heat storage. Irrigating green infrastructure with safe and sustainable water sources (storm water, recycled water) will further improve vegetation health and cooling effectiveness. While there are a variety of GI options available, the effectiveness of different options is poorly understood. There is also little guidance for urban land managers on selection and implementation of GI elements for the greatest cooling effect and the policy and institutional requirements for expanding GI in urban environments.

### Outputs from the project in 2011-12 included:

- A report, *Approaches to airborne thermal remote sensing for analysis of the urban heat island*, which identified the advantages of such an approach, including excellent spatial coverage of high resolution (1-5 m) urban surface temperatures.
- A literature review, *Responding to the Urban Heat Island: A Review of the Potential of Green Infrastructure*. International research demonstrates that green infrastructure can reduce surface and ambient temperatures at the micro-scale. However, there is

limited research that determines the magnitude of cooling and energy-saving benefits at local-to city-wide scales, particularly for green roofs and walls. The greatest thermal benefits are achieved in climates with hot, dry summers, particularly if water is available.

- A draft report, *Institutional barriers and opportunities for increased uptake of urban green space*, analyses current policy and planning arrangements for green infrastructure and identifying institutional, technical and social barriers to establishing and managing green infrastructure.

The project is due for completion by 30 June 2013.

[vcccar.org.au/publications](http://vcccar.org.au/publications)

## Design-Led Decision Support for Regional Climate Adaptation

Chief Investigator: Professor Ralph Horne, RMIT University  
Value of project: \$289 000

This project takes a new approach to climate change adaptation at the local government level, using a design process to address the question 'What could a "climate-proof" future look like?'. When tackling problems with inherent future uncertainty and risk, a design approach encourages new ideas and a departure from incremental approaches. Design 'charrettes' (a form of intensive workshop) are central to this exercise and have been developed and organised for two case study regions.

Charrettes were conducted in Bendigo and Sea Lake during the year. These engaged a range of community members, local

government and state government staff, and academics in an intensive process of envisaging and designing alternative futures for their regions based on an understanding of local conditions and potential future climate conditions.

### Outputs from the project include:

- reports from the Bendigo Sea Lake charrettes
- a policy brief
- a process engagement report on the charrettes
- a decision support framework for policy makers
- a project manual.

All project outputs have been submitted and the project is due for completion by 30 June 2013.

[vcccar.org.au/research-projects](http://vcccar.org.au/research-projects)

## Decision-making under Uncertainty

### Enhancing Water Infrastructure Provision with Climate Change Uncertainty

Chief Investigator: Professor Harry Clarke, La Trobe University  
Value of project: \$268 290

This project is aimed at applying alternative approaches of economic analysis that incorporate uncertainty to a range of Victorian water infrastructure investment projects to assess appropriate policy options for water utilities, regulators and other government agencies. Analytical approaches include real options theory (ROT), which aims to account for the value of deferring an investment until more information becomes available. This involves balancing the value of

potential losses, should investment go ahead and unforeseen issues arise, against the potential benefits foregone by delaying the investment. The aim is to improve the provision of water supply infrastructure by accounting explicitly for the prospects of climate change.

**Key activities from the project in 2011-2012 include:**

- presentations at La Trobe University's Water Infrastructure Forum held in Wodonga in July 2011
- a symposium on Urban Water Planning with a Risky Climate at the AARES Annual Conference in Perth in February 2012.

**Selected key findings to date:**

- With a growing population and likely reductions in inflows due to climate change, key questions are when to invest in a supply capacity expansion and what should be the form and size of the investment.
- Responding to climate-induced uncertainties requires adaptive regulatory and planning institutions. Traditional regulatory regimes have been challenged by new theories such as Real Options Theory. Such theories argue that under uncertainty, delaying investments may be beneficial even though a project may cover its capital costs.
- In this climatically uncertain environment, it is important to reconfigure the institutional settings – regulatory and planning frameworks – to support efficient infrastructure

provision in the urban water sector. It is important that reforms be shaped by sound institutional design principles that enhance efficiency by factoring in risk and uncertainty considerations.

- Clarity in organisational purpose in both regulators and those being regulated is of paramount importance. A reform agenda should consider ways to build institutional learning capacity and address information asymmetries to support infrastructure investment decisions.

**Outputs from the project include:**

- A consolidated set of research papers with a non-technical introduction
- A policy brief.

All project outputs have been submitted and the project is due for completion by 30 June 2013.

[vcccar.org.au/research-projects](http://vcccar.org.au/research-projects)

**Decision Taking in Times of Uncertainty: Towards an Efficient Strategy to Manage Risk and Uncertainty in Climate Change Adaptation**

Chief Investigators: Associate Professor Jens Zinn and Patricia Fitzsimons, University of Melbourne  
Value of project: \$200 000

This project is making use of the Gippsland regional setting to analyse the process of regional planning and how knowledge of climate change impacts and adaptation options is used in decision-making. The project considers both the energy economy and integrated land use planning, both of which need to integrate the needs of a variety of often conflicting interests and develop guidelines for improved regional planning that integrates the need to consider future climate risks.

**Outputs**

- an international literature review on decision-making and planning under uncertainty
- a public presentation of results to the Gippsland community
- a guideline to improve planning and decision-making
- project report and guidelines will be available on the VCCCAR website.

The project is due for completion by 31 December 2013.

[vcccar.org.au/research-projects](http://vcccar.org.au/research-projects)

**Natural Resource Management in a Changing Climate**

**Policies and Governance to Support Integrated Landscape Management in a Changing Environment**

Chief Investigator: Professor Andy Bennett, Deakin University  
Value of project: \$215 000

This project explores barriers and investigates options for successful implementation of integrated land management (ILM) across a transect of landscape types, uses and management from highly modified peri-urban to natural ecosystems. It will identify barriers to the implementation of ILM through analysis of relevant governance policy and processes at the state level and determine how these are interpreted and implemented at the local scale, with respect to landscape values such as provision of ecosystem services, production of goods and commercial services, social functions, and environmental functions. The project will explore how collaboration through integrated landscape management (ILM) can assist land managers adapt to climate change in Victoria.

Landscapes are the product of centuries of interaction between natural process and human use. People imbue landscapes with meaning and aim to conserve these embedded meanings. Demands on the landscape are driven by factors such as population growth, increasing affluence, and changing cultural norms and technologies. Landscapes have always been subject to local and broader political influences. Climate change is likely to mean that the interactions between people and nature will be more dynamic in the future and this will require a greater degree of flexibility and a more integrated approach to landscape management. This project aims to develop an improved version of ILM, including information on likely barriers and enablers, and to investigate these across a study transect from peri-urban Melbourne to the Grampians, using interviews and conversations with relevant stakeholders.

**Outputs to June 2012**

- a policy brief on integrated landscape management (released March 2012) and a working paper defining key terms
- conduct of in-depth interviews with a range of landholders in peri-urban areas and those involved with land use governance in the southwest study area.

The project is due for completion by 30 June 2013.

[vcccar.org.au/publications](http://vcccar.org.au/publications)

**Learning from Indigenous and Traditional Community Knowledge for Improved Natural Resources Management in the Barmah-Millewa and the Wider Murray Floodplain**

Chief Investigator: Professor Dave Griggs, Monash University  
Value of project: \$217 000

This project addresses how research based on the deep knowledge of Country can inform an understanding of the competing demands on finite and diminishing water resources to satisfy social, economic, legal, environmental and cultural outcomes in the Murray-Darling Basin.

The project has gathered knowledge of the ecological, climatic, cultural, legal and policy environment of the region within a geographic information system and an image and text-based community map. The project will also appraise the institutional barriers and bridges to sustainable management in the Barmah-Millewa Forest. The results will provide a resource for policy development in biodiversity co-management, an entry point for ongoing consultation in the region, and a source of data and analysis for the 2013 *State of the Environment* report.

Activities completed during the year included development of the GIS, data capture, interviews with key knowledge holders, training of younger community members and finalising intellectual property principles.

**Outputs include:**

- briefings to Victorian Government personnel on Indigenous IP Issues
- a scene setting report
- development of an Indigenous IP document

- a working paper on the development of draft base maps of the Barmah-Millewa region
- a preliminary regional stakeholder workshop report
- a report on the mapping of temporal data in the Barmah-Millewa region
- development of an Indigenous GIS with protections
- a final project report.

The project is due for completion by 30 June 2013.

[vcccar.org.au/publications](http://vcccar.org.au/publications)

**Learnings from the research program 2011–2012**

Research projects have generally proceeded well in the last year. In some cases it has been challenging to maintain the involvement of government participants, given changing roles and shifts in policy priorities during the year. In addition, project staffing has not always been constant, with the loss of some project members through illness, leave or resignations. This has affecting the delivery of outputs from some projects.

Overseeing a larger and diverse suite of projects has required a greater commitment of management and administration time.

There are potentially greater synergies between activities in different projects. However, there are relatively few opportunities for researchers from the different projects to interact and share ideas and findings.

Ensuring government uptake and application of research outputs remains a priority.

## Responding to the learnings from the research program, 2012–2013

- A more efficient process was implemented for review, publication and dissemination of project outputs. More support and resources were directed to research leaders and think tank proponents to enable them to produce outputs that more directly address the needs of government and other stakeholders. VCCCAR implemented a 'fast track' approval process for literature reviews and other technical outputs to ensure they can be disseminated in a more timely manner. VCCCAR will continue to direct additional resources to support its communication and research dissemination activities.
- **More effort was directed to packaging and presenting research for key government audiences.**

The Centre held the first of a series of 'executive conversations' with senior government representatives in July to introduce VCCCAR research outputs and to facilitate knowledge exchange opportunities between climate adaptation researchers and senior state government decision-makers. The appointment of Celeste Young as VCCCAR's Stakeholder and Engagement Coordinator was extended to build on the stakeholder engagement opportunities that arose from the 2012 Annual Forum, the release of key research outputs in the past year and the regional think tanks. VCCCAR will explore additional events to showcase

research activities and outputs. The VCCCAR web site was modified in September 2012 to improve user accessibility to VCCCAR research.

- **Opportunities will be created for greater informal interaction between research project leaders and potential research users.** VCCCAR will continue to provide opportunities for climate adaptation researchers to interact with stakeholders in local and state government and the not-for-profit and private sectors to facilitate the development of a climate adaptation 'community of practice', identify future research opportunities and disseminate VCCCAR research.
- **Creating opportunities for researcher interaction.** VCCCAR will establish a seminar series to encourage researcher interaction and sharing of ideas.

## Potential research needs and directions for 2012–2013 and beyond

With the approval of three new research projects in December 2011, uncommitted funds from the current agreement are limited. Amongst the options considered for future research funding, a priority identified for development in 2012–2013 was a project examining and testing approaches to engagement between researchers and policy makers that facilitate cogeneration of knowledge and evidence-influenced policy development in climate change adaptation. Workshops and other activities will take place in the second half of 2012 to determine the focus, desired outcomes and project participants.

The issue of longer term research needs has been discussed with government representatives and other stakeholders. Guided by the priority areas outlined in Victoria's Climate Change Adaptation Plan, potential climate adaptation research questions include:

### Government services and infrastructure

- Assessing the potential impact of climate change on government service delivery to the Victorian community and development of mechanisms for building resilience and self-reliance in the community to prepare for and respond to climate related risks when services are not available.
- Factors influencing effective awareness and action in the community in the face of climate change.
- Managing current and future climate risks for existing public infrastructure investment decisions.
- Incorporating risks from potential future climate change into public investment in new infrastructure and planning decisions. Review and analyse different adaptation options, including changes to physical infrastructure, financial risk management arrangements such as insurance.
- Development and testing of principles for cost sharing of adaptation actions between the public and private sector.

**Industry**

- Define and describe the different risks that are likely to affect different types of small and medium enterprises in different geographic locations in Victoria. Assessment of risk management options, for example changes to business practice and behaviour (e.g. changing the timing of activities during the day or the course of the year) and responses to warning systems.
- Understand the motivation of small to medium sized business owners in regional Victoria related to climate change adaptation and identification of barriers to successful adaptation. Documenting and analysis of industry-specific examples of small to medium sized businesses in regional Victoria who have successfully incorporated climate change adaptation into their business.
- Determining thresholds for action for industry transformation in response to future shifts in climate. This would include analysis of common information needs of regional stakeholders and mechanisms to share

information in a meaningful way to achieve resilient regional growth under a changing climate.

- Analysis and development of complementary mitigation and adaptation responses approaches for regional communities and industries

**Planning and urban development**

- Investigating systematic approaches to decision making in planning and urban/ peri-urban development under climate change and testing theories and models that address gaps in urban design and policy, such as supply-demand or technology-behaviour relationships and assessments of the roles of multiple actors in shaping housing expectations and aspirations.

**Data and information**

- Research around how data collection and forecasting for emergencies/ climate events has changed over the years, from observational data to automated data collection, and how this impacts the community.

**Managing climate-related disasters**

- Investigation of the effectiveness of different forms of community consultation or debriefing methods following a natural disaster. This would include the participating organisations, governments and departments as well as the value of the outcomes and their usefulness for future events.
- Analysis of how cross-border management of flood waters throughout a catchment might reduce the potential impacts of floods.
- Looking across extreme events such as fires and recent flooding, researching the health impacts on individuals and the community. Exploring related issues of drug and alcohol use in post disaster-affected areas and combining this research with some of the preplanning policy and strategy for disaster management.
- Approaches for managing chronic disease during emergencies.

**Expenditure on current and approved research projects and balance of funds remaining**

	2009-10	2010-11	2011-12	2012-13	2013-14	Total
<i>Budget allocation</i>	\$600 000	\$600 000	\$600 000	\$600 000	\$600 000	<b>\$3 000 000</b>
<i>Round 1 expenditure and commitments</i>	\$0	\$523 075	\$232 175	\$158 500	\$0	<b>\$913 750</b>
<i>Round 2 expenditure and commitments</i>	\$0	\$0	\$631 653	\$399 450	\$43 400	<b>\$1 074 503</b>
<i>Round 3 expenditure and commitments</i>	\$0	\$0	\$0	\$538 700	\$237 900	<b>\$776 600</b>
<i>Balance for future research</i>	\$0	\$0	\$0	\$0	\$235 147	<b>\$235 147</b>
<i>Cumulative balance</i>	\$600 000	\$676 925	\$413 097	-\$83 553	\$235 147	<b>\$0</b>



# Think tanks

Under the agreement with the Victorian Government the Centre is required to co-ordinate and deliver at least four regional or thematic think tanks per annum.

## Objectives

The purpose of the Centre's think tanks is to:

- facilitate the understanding of potential climate change impacts and the development of adaptation and resilience in different regions or thematic areas
- present research relevant to a region and its adaptation challenges
- discuss climate change adaptation issues and strategies with local decision-makers
- share learning across sectors and communities
- inform the development of agreed research priorities and projects specific to different regions or thematic areas.

## Round 2 think tanks

Five think tanks were staged in 2011–2012: Three were held in regional Victoria, one in south-eastern Melbourne and one in the Melbourne CBD. Reports for all five think tanks are available from the VCCCAR web site.

[vcccar.org.au/publications](http://vcccar.org.au/publications)

### Regional Business Development in a Variable and Changing Climate: Strategies for Central Victoria

Bendigo, 12 July 2012

The Think Tank facilitated a conversation between regional business leaders, government officials and academics aimed at enhancing innovative ways to adapt and take advantage of future climate change.

#### Key findings

- Climate change and climate related risks will impact on different types of industries in different ways. Messages about climate change adaptation planning should recognise the diverse nature of interests of small- to medium-sized businesses in regional Victoria and the variety of potential climate hazards they may face.
- Given many business owners do not have a good understanding of their potential risks, there is a need for government investment in improved climate risk assessment tools such as mapping of flood, wind, hail, heat, fire or other hazards and in improved warning systems for different types of hazards.

#### Research needs

Further research is required to:

- better define and describe the different risks that are likely to affect different types of small and medium enterprises in different geographic locations in Victoria

- review and analyse different adaptation options, including changes to physical infrastructure; financial risk management arrangements (such as insurance); changes to business practice and behaviour (e.g. changing the timing of activities during the day or the course of the year); and capacity to respond to warning systems
- understand the beliefs and motivations of small- to medium-sized business owners in regional Victoria related to the barriers to successful adaptation
- develop industry-specific examples of small- to medium-sized businesses in regional Victoria that have successfully incorporated climate change adaptation into their business.

#### Policy needs

- Government policy should focus on programs and actions to support small- to medium-sized businesses in regional Victoria in both mitigating climate change (including increasing energy efficiency and reducing greenhouse gas emissions) and adapting to changing climate risks. The distinction between mitigation and adaptation needs to be made clear.
- Likely potential climate risks and opportunities and options for adapting to climate change in different types of businesses should be incorporated into business assistance, education and training programs.

### Towards a Gippsland Climate Change and Adaptation Study

Warragul, 9 August 2011

The goal of the Think Tank was to stimulate discussion on required research and to promote collaboration on how the region might be more resilient to future climate and structural change.

#### Key finding

- For long term, sustainable regional growth, a 'closed loop' is required where resources are used repeatedly, whether it be water, nutrients or social or economic capital.

#### Research needs

- Determining information needs common to regional stakeholders in order to develop mechanisms to share information to achieve resilient regional growth.
- Examine the flow of biophysical and social resources in Gippsland in order to determine how these could be directed to a 'closed loop' economy that can amplify regional growth and adapt to climate variability and structural adjustments.

#### Policy needs

- The current level of information and knowledge exchange between industry sectors and communities of interest in Gippsland needs to be improved to enable robust decisions to drive regional economic growth while responding to the new environments caused by structural adjustment and climate change.

### Climate Change and Floodplain Management in Victoria

Kerang, 15 August 2011

The Think Tank reviewed current approaches to considering climate change in flood risk assessment and management. It also looked at responses to flood management, based on recent events, taking into account changing demographics, urban settlement patterns and land use.

#### Key findings

Many of the tools for managing flooding under climate change are already available. State, national and international examples of good practice in flood plain management include:

- having the right enabling factors in place, including appropriate policies and laws and flood hazard mapping
- ensuring effective planning controls and enforcement are in place to deter construction of housing or infrastructure in flood risk zones
- using 'safety margins' to upgrade building standards and flood defences for specified amounts of climate change (in heavy rainfall and peak river flows for example)
- providing insurance policy incentives to encourage people to take steps to reduce their vulnerability to flooding through measures such as temporary defences or water resilient construction

- establishing real time river monitoring systems that capture data from remote gauges and convey flood levels in meaningful and accessible ways to the public.

#### Research needs

Some research ideas from this Think Tank overlapped with recent inquiries into flood management, particularly the *Review of the 2010–11 Flood Warnings and Responses*.

Other research ideas arising from the Think Tank were potentially outside the terms of reference of the above mentioned review, but have been covered in other emergency reviews, and include:

- research around how data collection and forecasting has changed over the years, from observational data to automated data collection, and how this impacts the community
- investigation of the effectiveness of different forms of community consultation or debriefing methods following a natural disaster. This would include the participating organisations, governments and departments as well as the value of the outcomes and their usefulness for future events
- analysis of how cross-border management of flood waters throughout a catchment might reduce the potential impacts of floods

- researching the health impacts on individuals and the community in the wake of extreme events such as fires and recent flooding, including drug and alcohol use, and combining this research with some of the preplanning policy and strategy for disaster management
- reviewing how chronic disease is managed during emergency situations.

#### *Policy needs*

State and Federal governments need to develop policy responses to complex emergency coordination issues such as (cross-border) evacuation and emergency management.

#### **Adapting Aspirations and Expectations on the Coastal Suburban and Regional Fringe**

Frankston, 24 November 2011

This Think Tank stimulated dialogue between local and state government, academics, communities and the housing industry around the changing aspirations and expectations associated with residential development and highlighted the complexities associated with adapting these aspirations and expectations to increase community resilience to climate change.

#### *Key findings*

- The trend in housing towards larger detached energy-intensive dwellings in poorly serviced low-density urban fringe locations leaves governments, households and communities vulnerable to the impacts of climate change.
- The planning and design of new outer urban areas, and the retrofitting of existing ones, affects the extent to which communities can adapt to changing climactic conditions.

#### *Research needs*

- Urban design and policy that addresses gaps existing between factors such as supply-demand and technology-behaviour relationships. Research strengthening theories and models that address these as well as developing methods to assess the role that multiple actors play in shaping housing expectations and aspirations should be encouraged.

#### *Policy needs*

- Building standards, housing and urban design should anticipate future changes in climate and the need for current and future homes to be increasingly efficient in water and energy use.
- Adapting to a variable and changing climate presents significant problems for current models of planning and housing delivery in growth areas. These can be addressed through stronger regulation of the urban growth boundary, incentives to increase housing densities (while maintaining open space and urban 'green infrastructure'), offering a variety of housing types and provision of infrastructure and services.
- House pricing policy and claims of improved 'affordability' need to reflect the long-term running costs of housing as well as cost of land development and construction.

- Planning and policy development by state and local governments needs to involve collective engagement with the community in its broadest sense (general public, developers, investors, householders, etc.) to meet challenges presented by climate change.

## Round 3 think tanks

### **Building Resilience to Climate Emergencies in the Built Environment**

Melbourne, 8-9 May 2012

The Think Tank, held in conjunction with the Australian Climate Change Adaptation Research Network for Settlements and Infrastructure, sought to identify the breadth of research being undertaken around the themes of emergency management, resilience building and adapting to climate disasters and how this research contributes to building climate change adaptation capacity for settlements and infrastructure.

#### *Key findings*

- The quality and consistency of climate adaptation decisions are undermined by the limited capacity for learning within and across relevant agencies and stakeholder groups. Options to address this include:
  - » Improve the transparency of post-disaster review to ensure that effective emergency management decisions can be identified and differentiated from ineffective decisions.
  - » Promote face-to-face interaction between the research, strategy and practitioner communities to develop a common language and for sharing knowledge.

- » Build local knowledge and community participation into research and formulating strategy to improve climate change adaptation.
- Climate change researchers, emergency management practitioners and communities must learn to evolve with one another. However, shifting adaptation 'goalposts' pose major challenges to current institutional structures and planning processes.
- The implication that climate change is amplifying natural disasters has magnified the already politically sensitive area of disaster planning and response, creating constraints on how decision-makers plan for and respond to climate emergencies.
- There is capacity to improve academic and local knowledge about adaptation to climate emergencies. The tools also exist to improve climate-related emergency management and community preparedness.
- researchers, strategists and practitioners fail to recognise and align their conflicting world-views
- bridging skills are needed to translate research findings into widely accessible forms (for example, the 'Climate Change is Elementary' program: [www.climatechangeiselementary.com/index.html](http://www.climatechangeiselementary.com/index.html)).

**Policy needs**

- build integration across respective stakeholder groups and institutions
- improve the development and sharing of knowledge and skills
- ensure flexibility for future adaptation decision-makers
- increase community participation within climate change adaptation.

**Planning for other round 3 think tanks**

In addition to the above think tank, planning progressed during 2011-2012 for the following round 3 think tanks:

- Climate services for adaptation in Victoria (scheduled for July 2012)
- Managing Climate Impacts and Risks: Learning from the Finance Sector (scheduled for December 2012)
- Strong City Centres for Sustainable and Resilient Futures: Practical Actions to Influence Positive Urban Change (scheduled for February 2013)
- Climate Impacts and Adaptation Options for Coastal and Marine Resource Dependent Communities (date to be confirmed in 2013).

**Key learnings from the think tank program 2011-2012**

- Participant evaluation reports support the conclusion that think tanks are a valuable way of engaging with a wider audience on different aspects of adaptation to climate change and for identifying research needs.
- The value of the think tank program for government lies in its ability to showcase relevant policy, to provide an indicator of current and emerging adaptation issues (particularly in regional Victoria), and to provide a forum for canvassing research, policy and information needs based on interactions involving a range of stakeholders.
- Expenditure on the think tank program has varied from that identified in the Centre Agreement. As agreed in 2011, the budget from think tanks not staged (approximately \$40 000) will be used for communicating and presenting research results to policy makers through policy briefs, 'executive conversations' and the development of short courses or seminars/workshops to ensure knowledge transfer of key project outputs.
- Think tanks complement workshops and other activities by VCCCAR sponsored research projects and visiting fellows in providing opportunities for interaction with those interested in climate change adaptation issues.

**Research needs**

Valuable research already exists but it is not well communicated to or adopted by the community. The challenge is to feed existing research into strategies for climate change adaptation and emergency management. Issues that undermine the value and relevance of current research include:

- research is not designed to match needs of practitioners
- practitioners do not understand the capacity of research to address complex climate change adaptation challenges
- the lack of 'literacy' within the broader community about what climate change adaptation means

- The overall funding committed for the think tank program (\$40 000 per year) is appropriate. Think tanks in regional areas generally require more funds than the allocated \$10 000. Metropolitan events can be staged for less. This level of funding generally only covers the cost of facilities and transport. Running the think tanks therefore relies on in-kind contributions from university organisers and participants.

#### Directions for 2012–2013 and beyond

Think tanks selected for round 3 were chosen on the basis of adherence to identified VCCCAR research priority areas. The Centre will make a further call for think tank concepts around priority topics to be determined with State Government partners in 2013. An analysis and synthesis of general findings and experiences from the think tanks will be undertaken in the first half of 2012–2013.

### Expenditure on current and future think tanks and balance of funds remaining

	2009-10	2010-11	2011-12	2012-13	2013-14	Total
<i>Budget allocation</i>	\$40 000	\$40 000	\$40 000	\$40 000	\$40 000	<b>\$200 000</b>
<i>Round 1 expenditure and commitments</i>	\$3432	\$29 765	\$0	\$0	\$0	<b>\$33 197</b>
<i>Round 2 expenditure and commitments</i>	\$0	\$0	\$51 783	\$0	\$0	<b>\$51 783</b>
<i>Round 3 expenditure and commitments</i>	\$0	\$0	\$0	\$40 000	\$0	<b>\$40 000</b>
<i>Round 4 expenditure and commitments</i>	\$0	\$0	\$0	\$0	40 000	<b>\$40 000</b>
<i>Balance for future think tank activities</i>	\$0	\$0	\$0	\$0	\$35 020	<b>\$75 020</b>
<i>Cumulative balance</i>	\$36 568	\$46 803	\$35 020	\$35 020	\$0	<b>\$0</b>



# Visiting fellowship



2011 VCCCAR Visiting Fellow, Professor Rob Wilby from Loughborough University

This research element facilitates international collaboration and advice on best practice climate change adaptation in the Victorian context. It is undertaken for up to three months in any given year.

The fellow remains an employee of their host institution, while based with one of the Centre's partner universities. The fellow works collaboratively across different academic institutions and engages with the state government and the private sector in workshops and meetings in order to disseminate adaptation best practice according to their area of expertise.

## Professor Rob Wilby, 2011–2012 Visiting Fellow

After a process of nomination and review of candidate fellows by the Implementation Committee, Professor Rob Wilby of Loughborough University in the UK was chosen as the Centre's 2011 Visiting Fellow.

Professor Wilby has extensive expertise in:

- scenarios of regional climate variability and change
- climate change impacts on freshwater and urban environments
- climate change adaptation strategies and environmental management
- climate, water and human development in semi-arid regions.

His main research focus is climate variability and change in relation to the management of freshwater environments, with experience in industry, government, consultancy and academia. He was the UK Environment Agency's Climate Change Science Manager, where he contributed to the annex on climate change for *Planning Policy Statement PPS25* and the Department for Environment, Food and Rural Affairs' (DEFRA) guidance on climate change allowances for flood risk management. His current

research is focused on detection time for climate change signals in UK river flow records, which will help identify when and where new assets, guidance and monitoring should be targeted to face the expected challenges of lower summer flows and increased flood risk in winter. Other work is addressing the urgent need to improve access and uptake of climate risk information for adaptation planning in developing regions.

## Achievements

Professor Wilby was based at the Centre from 25 July to 2 September 2011. The aim of his fellowship was to review international approaches to integrating climate variability and change in water resource and floodplain management, with particular reference to Australia. The work identified opportunities for sharing good practice and provided recommendations for further research that could enhance the capacity for adaptation to flood risk in Australia ([www.vcccar.org.au/profile/rob-wilby](http://www.vcccar.org.au/profile/rob-wilby)). Professor Wilby participated in meetings with government representatives, engaged with local researchers, presented at conferences and was the lead speaker at the VCCCAR Think Tank on *Climate Change and Floodplain Management in Victoria*.

## Outputs

Professor Wilby's fellowship report was submitted in January 2012.

## Key learnings from the fellowship process in 2011-2012

While the 2011 Fellow was with the Centre for a relatively short period of time, his stay was highly productive. This came from having a well designed plan for research and engagement (including holding a regional think tank to best utilise his expertise).

As the Centre output and activities have developed there is increasing awareness and interest in participating from leading adaptation researchers. Forty applications were received for the fellowship in response to advertisements in early 2012. While many of these were from early career researchers, about 25 per cent were from highly qualified applicants.

## Round 2 visiting fellow expenditure summary 2011-2012

### Budget



**\$50 000**

### Actual



**\$44 373**

Reimbursement to Loughborough University for salary, travel and accommodation  
**\$33 356**

Travel and accommodation (within Australia)  
**\$8051**

Event registration and report costs  
**\$2966**

## Expenditure on current and future visiting fellowships and balance of funds remaining

	2009-10	2010-11	2011-12	2012-13	2013-14	Total
<i>Budget allocation</i>	\$50 000	\$50 000.00	\$50 000	\$50 000	\$50 000	<b>\$250 000.00</b>
<i>Round 1 expenditure and commitments</i>	\$127	\$42 724	\$0	\$0	\$0	<b>\$42 851</b>
<i>Round 2 expenditure and commitments</i>	\$0	\$0	\$44 373	\$0.00	\$0	<b>\$44 373</b>
<i>Round 3 expenditure and commitments</i>	\$0	\$0	\$0	\$50 000	\$0	<b>\$50 000</b>
<i>Round 4 expenditure and commitments</i>	\$0	\$0	\$0	\$50 000	\$0	<b>\$50 000</b>
<i>Balance for future fellowships</i>	\$0	\$0	\$0	\$0	\$62 776	<b>\$61 126</b>
<i>Cumulative balance</i>	\$49 873	\$57 149	\$62 776	\$12 776	\$0	<b>\$0</b>

## What was done differently in 2011-2012

- Advertising for potential fellows in mailing lists and other types of communication resulted in a significant number of applications in early 2012.
- Given the high quality of the applicants and proposed timing of their visits, it was decided to invite fellows for 2012 and 2013 from the same pool of applicants.

## 2012–2013 Visiting Fellows



2012 VCCCAR Visiting Fellow  
Dr Kate Lonsdale

### Dr Kate Lonsdale

The 2012 VCCCAR Visiting Fellow is Dr Kate Lonsdale. Kate has worked on adaptation as a researcher, trainer, facilitator, consultant, mentor, evaluator and in an advisory capacity for the last 16 years in both developed and developing countries. Since 2008 Kate has been working with the UK Climate Impacts Programme. Prior to that (and again since January 2012), Kate has been working with the Stockholm Environment Institute. Kate's fellowship will assess the potential impact of climate change on government service delivery, assess adaptation support needs of service providers and provide recommendations for building

resilience and self reliance and capacity to adapt to climate change in Victorian agencies. To this end she will be involved in the Implementing Adaptation project, undertaking interviews with project stakeholders about their experience of managing existing weather variability and how this might change given the likely trends projected due to climate change. In addition she will undertake a range of seminar and other presentations to facilitate knowledge sharing about UK research. You can find out more about Kate's background and planned activities at [vcccar.org.au/profile/kate-lonsdale](http://vcccar.org.au/profile/kate-lonsdale).

Kate will commence an 11-week fellowship in October 2012.



2013 VCCCAR Visiting Fellow  
Professor Jonathan Overpeck

### Professor Jonathan Overpeck

'Peck' as he prefers to be called, is a founding co-director of the Institute of the Environment at the University of Arizona, as well as a professor of geosciences and a professor of atmospheric sciences. Peck recently served as a Coordinating Lead Author for the UN Intergovernmental Panel on Climate Change (IPCC) *Fourth Assessment* (2007). In all of his work, Peck works hard to promote interdisciplinary perspectives, and also enhance the way that knowledge is communicated to, and used by, the public.

Peck's fellowship will explore the use of climate science in state and

regional planning and decision making in Victoria and compare this to approaches used by regional and state governments in the USA. Peck will contribute to VCCCAR projects, work with local researchers on adaptation issues of relevance to south-eastern Australia and south-western USA, meet with State and Federal Government decision-makers and undertake seminar presentations at the VCCCAR partner universities. For more about Peck's background and planned activities visit [vcccar.org.au/profile/jonathan-overpeck](http://vcccar.org.au/profile/jonathan-overpeck).

Professor Overpeck will commence a three-month fellowship in January 2013.

## Potential research needs and directions for 2012-13 and beyond

The Centre will consider future research needs and directions for the visiting fellowship program prior to the call for applications for the final visiting fellow in March 2013.

# Annual Forum



*Dr Hartmut Fünfgeld, RMIT University, introduces the Adaptation Navigator at the 2012 VCCCAR Annual Forum.  
Credit: Phoebe Bond*

The Annual Forum brings together researchers and policy makers from across adaptation sectors, to showcase and present adaptation research and the outputs of Centre research projects and to identify knowledge gaps and priorities and opportunities for multi-disciplinary or multi-sectoral research

## Overview

The 2012 Annual Forum was held at the Sebel Albert Park on 25 June 2012.

Following her involvement in Bendigo in 2011, Parliamentary Secretary for Sustainability and the Environment, the Hon. Donna Petrovich MP, launched the 2012 Annual Forum. Keynote presentations were given by Anne Barker, Managing Director, City West Water; Karl Sullivan, General Manager, Policy, Risk and Disaster, Insurance Council of Australia; and Professor Tony Wong, Director and CEO designate, CRC for Water Sensitive Cities.

The forum was attended by about 170 people from universities, state and local government, non-government organisations (NGOs) and the private sector. There was a significant interstate and international presence at this year's forum. The forum was held in conjunction with the National Climate Change Adaptation Research Facility's Annual Forum at the same venue.

## What was done differently in 2012?

- The forum was held immediately prior to the NCCARF biennial conference to maximise the opportunities for exposing VCCCAR to a broader audience.
- This year's forum included a VCCCAR industry business roundtable breakfast, which provided an opportunity for industry leaders, government representatives and researchers to discuss the adaptation challenges facing the private sector in Victoria.
- Several workshops were co-sponsored or chaired. Partners included the Municipal Association of Victoria, Environment Defender's Office and the Commissioner for Environmental Sustainability.
- In addition to project-based workshops, this year's forum included workshops addressing particular issues and themes, including a conversation with Victorian Aboriginal people, Adaptation Barriers and Opportunities for Local Government as well as a climate 'hypothetical'.
- A VCCCAR sponsored session at the NCCARF conference explored the challenges of translating adaptation research into government policy and provided an opportunity to showcase VCCCAR's achievements to date and its role as a state-based adaptation research facility.

## Key learnings from the Annual Forum in 2012

- The structure of the event, with a mix of keynote presentations, a government panel session and workshops, together with opportunities for networking, was well received.
- Land management, built environment and industry adaptation challenges were included based on comments from the 2011 forum.
- Suggestions for issues to be addressed in future VCCCAR events included: coastal adaptation challenges; industry adaptation challenges; and the federal government's role in adaptation. In response, VCCCAR agreed to support a think tank on this topic, to be held in 2013; regional industry adaptation challenges will form the basis of the business breakfast to be held as part of the 2013 VCCCAR Annual Forum; and VCCCAR continues to explore options to better engage with Federal Government agencies involved in climate adaptation decision-making.
- It would have been desirable to have a plenary session to conclude the day, but the program was constrained by the need to coordinate with the opening event of the NCCARF conference at the same venue. VCCCAR will include a plenary session in the 2013 Forum.
- The 2013 Forum will be held in May to avoid complications with the end of the financial year and will return to a regional location (Geelong). The program will have fewer workshops and a review and plenary session. The Forum will include more substantive involvement from industry.



# Research outputs and communication activities

Building a community of practice in adaptation research requires strong partnerships across universities and government. One way in which VCCCAR strives to achieve this goal is through effective communication of research findings, other outputs and learnings from our think tanks, forums and other outreach activities.

As a result, there is a growing audience with an increasing awareness of the Centre and its operations within the research community, government and non-government stakeholders and the private sector.

## VCCCAR publications

VCCCAR's publications, including think tank reports, policy briefs and research papers, are available on the Centre's web site. To download or peruse these documents, please visit. Requests for other research outputs are considered on a case-by-case basis.

[vcccar.org.au/publications](http://vcccar.org.au/publications)

## Publications arising from VCCCAR research

Fünfgeld, H., B. Webb and D. McEvoy (2012): The significance of adaptation framing in local and regional climate change adaptation planning initiatives in Australia. In: K. Otto-Zimmermann (ed.): Resilient Cities: Cities and Adaptation to Climate Change. Proceedings of the Global Forum 2011. Heidelberg: Springer.

McEvoy, D., K. Bosomworth and H. Fünfgeld: Resilience and Climate Change: the importance of framing. In: Planning Practice and Research. (Paper accepted for publication.)

Amanda H. Lynch, David Griggs, Lee Joachim and Jackie Walker: Indigenous voices in climate change adaptation: the challenges facing the Yorta Yorta of Australia. Journal of the Policy Sciences, Volume 46, Issue 2, 2012, pp 109-123.

Other papers submitted in this period are under review for publication.

## Think tank reports

*Regional business development in a variable and changing climate: strategies for central Victoria*

John Martin  
ISBN 978 0 7340 4751 9  
July 2011

*Towards a Gippsland regional climate adaptation study*

Graeme Moore, Collin Duffield and Robert Faggian  
ISBN 978 0 7340 4751 9  
August 2011

*Climate change and floodplain management in Victoria*

Rod Keenan, Rob Wilby and Roger Jones  
ISBN 978 0 7340 4747 2  
August 2011

*Adapting housing aspirations and expectations on the coastal suburban and regional fringe*

Susie Moloney, Yolande Strengers and Cecily Maller  
ISBN 978 0 7340 4774 8  
November 2011

## Policy briefs

*Integrated landscape management for a changing climate*

Andy T. D. Bennett, Ruth Beilin, Michael Buxton, Quentin Farnar-Bowers, Ray Ison, Roger Jones, David Lowe, Kevin O'Toole, Philip Wallis  
ISBN 978 0 7340 4422 8  
March 2012

*Assessing resilient urban systems to support long-term adaptation to climate change – Final policy brief*

Che Biggs, Paula Arcari, Yolande Strengers, Ralph Horne and Chris Ryan  
ISBN 978 0 7340 4790 8  
June 2012

## Research papers

*Resilient urban systems: Final Report*

Paula Arcari, Che Biggs, Cecily Maller, Yolande Strengers, Ralph Horne, Chris Ryan  
ISBN 978 0 7340 4785 4  
June 2012

## Other outputs

*VCCCAR Annual Report 2010–2011*

ISSN 1839-9118

## Communication activities

### Workshop-seminar presentations

In addition to the Annual Forum, engagement activities by VCCCAR-funded researchers included presentations by:

- Hartmut Fünfgeld at the Municipal Association of Victoria's Council Connections workshop, Adapting Risk for a Changing Climate, July 2011
- Harry Clarke, John Freebairn and Jayanath Ananda at the AARES Annual Conference, Perth, February 2012
- Hartmut Fünfgeld at the Resilient Cities 2012 – 3rd Global Forum on Urban Resilience and Adaptation in Bonn, Germany, May 2012
- Hartmut Fünfgeld and Sophie Millin at the NCCARF Climate Adaptation in Action: 2012 National Adaptation Conference, June 2012
- Rob Roggema at the World Planning Schools Conference, July 2011, International Urban Design Conference, September 2011 and the International Urban Planning and Environment Symposium, June 2012.

### Web site and emails

The Centre web site has been the primary vehicle for communication of Centre activities to partners and collaborators within and outside government. Complementing web site outreach activities, VCCCAR sends a regular email newsletter to 450 subscribers, with subscriptions growing by approximately 20 per month.

The web site has expanded significantly in the past 12 months to support VCCCAR activities and now hosts reports from the first two rounds of think tanks, visiting fellowships and research projects, plus outputs from a range of engagement activities.

### Social media

In addition to the use of Facebook and Twitter, in the past 12 months VCCCAR has utilised LinkedIn for event promotion and to build a climate adaptation 'community of practice'. A VCCCAR group has been created with 30 members and a network of approximately 300 people with a professional interest and engagement with climate adaptation has been developed. VCCCAR activities promoted via these networks and through other LinkedIn groups reach an audience of approximately 25 000 subscribers.

### Education programs in climate adaptation

Further discussion has taken place to develop education programs to be jointly offered by the partners to meet the needs of different stakeholders. Little progress has been made given pressures of other work but this will advance in 2012–2013.

### Communications in 2012–2013

In 2012–2013 VCCCAR will:

- maintain its engagement with key government and non-government decision-makers as part of a strategy to inform the wider community, local government and different industries about climate change impacts and adaptation options
- continue the development of formal education programs (post-graduate certificate, diploma or masters) in climate change adaptation to be jointly delivered by the VCCCAR partners
- conduct a series of executive 'conversations' with senior government decision-makers to foster knowledge transfer of climate adaptation research into government policy
- continue to support the Council Connections program, which promotes engagement between local government staff and climate adaptation researchers.

# Management and governance

VCCCAR is managed under an agreement signed in July 2009 between the University of Melbourne and the State of Victoria. A partnership agreement between Melbourne, La Trobe, Monash and RMIT Universities was signed in October 2009. The agreement provides for participation by researchers from all Victorian universities in Centre activities and for expanded membership as appropriate. Deakin University expressed interest in joining the partnership and this was agreed to by the VCCCAR Advisory Board during 2011–2012.

Professor Rod Keenan continued as Director, as did Professor Darryn Mc Evoy from RMIT as Deputy Director, in 2011–2012. Fifty per cent of Professor Keenan's time is committed to the Centre. The Executive Officer, Mr Doug Scobie, is employed at 0.7 full time equivalent (EFT). The Centre employs a 0.2 EFT Communications and Marketing Officer and a 0.4 EFT Stakeholder and Engagement Coordinator. The Centre also makes a partial contribution to facilities, IT support and other administrative costs at the University of Melbourne.

The Centre Advisory Board is made up of representatives from each of the initial university partners: Deakin, La Trobe, Melbourne and Monash universities, along with a representative from CSIRO's Climate Adaptation Flagship, an independent Chair and an observer from DSE. Once arrangements are finalised, Deakin University will join the consortium and participate on the Advisory Board. A Memorandum of Understanding between VCCCAR and NCCARF gives the Director of NCCARF observer status on the Board.

The Adaptation Research Centre Investment Panel (ARCIP) comprises representatives from eight government departments and facilitates government endorsement of the research program and communication, coordination and integration of Centre plans across government.

Joint meetings of the Advisory Board and ARCIP were held on 21 July and 19 December 2011. The Board met independently on 19 March 2012.

The Centre's Implementation Committee supports the management of Centre activities. The Committee comprises the Director, Deputy Director and members of La Trobe and Monash universities. Deakin University was represented on the committee from August 2012.

The Centre relies heavily on in-kind contributions from partner universities to meet its commitments to different activities. In 2011–2012, this was valued at approximately \$1.9 million, an increase of 26 per cent from 2010–2011. The increase was due to research projects moving to full implementation, the number of think tanks held in this period and the level of academic engagement with the annual forum.

Other Victorian universities (Victoria, Ballarat) have been actively involved in VCCCAR activities and events.

Government agencies also contribute time and resources to support the Centre's activities.

## What was done differently in management and governance in 2011–2012?

DSE commissioned a review of the VCCCAR project in 2011 which identified four key actions to improve VCCCAR’s governance arrangements, operational processes, and knowledge transfer and communication activities. In response:

- Joint meetings between VCCCAR and ARCIP representatives were held to agree on research priorities and review and rank project proposals.
- The pro-forma for research projects was revised to incorporate knowledge transfer considerations into new project design.
- An Operating Principles document was developed to clearly document management structures and processes. The document addresses streamlined reporting processes, joint decision-making arrangements and reinforces collaboration as an outcome of the Centre.
- DSE and VCCCAR’s communications plans were revised to acknowledge the importance of knowledge transfer, communications and collaboration activities.

## Key learnings

- While the management structure and governance arrangements are considerable for a program of this size and resources, this has the benefit of engaging different levels in all partner institutions and senior personnel in relevant government departments.
- The Advisory Board continues to be a valuable vehicle for strategic advice and for project review.
- The Implementation Committee has strengthened its working relationships and continues to ensure that all university partners are effectively engaged.
- Maintaining involvement and focus of high level managers in government departments is challenging in a changing policy environment.

## Advisory Board

The Centre’s Advisory Board members are:

Professor John Zillman  
(Chair)

VCCCAR Director,  
Professor Rod Keenan

Professor Rick Roush,  
representing the University  
of Melbourne

Professor Lin Crase,  
representing La Trobe University

Professor Dave Griggs,  
representing Monash University

Professor Paul James,  
representing RMIT

Dr Andrew Ash,  
representing CSIRO

Professor Jean Palutikof, Director  
of the National Climate Change  
Adaptation Research Facility  
(observer status)

Department of Sustainability and  
Environment (observer status).



VCCCAR staff: (from left) Professor Rod Keenan, Director, Phoebe Bond, Communications and Marketing Officer, Celeste Young, Stakeholder and Engagement Coordinator and Doug Scobie, Executive Officer.

## Implementation Committee

VCCCAR's Implementation Committee consists of:

Professor Rod Keenan,  
VCCCAR Director

Professor Darryn Mc Evoy,  
RMIT, Deputy Director, VCCCAR

Professor Nigel Tapper,  
Monash University

Professor John Martin,  
La Trobe University, Bendigo

Professor Andy Bennett,  
Deakin University, Geelong  
(from August 2012)

## Engagement with government

The Adaptation Research Centre Investment Panel (ARCIP) facilitates government consideration and endorsement of the research program, and communication, coordination and integration of Centre plans across government. ARCIP includes representatives from eight government departments and a member from the Ministerial Reference Council for Climate Change Adaptation.

## VCCCAR staff

Professor Rod Keenan,  
Director

Mr Doug Scobie,  
Executive Officer

Ms Phoebe Bond,  
Communications and  
Marketing Officer

Ms Celeste Young,  
Stakeholder and  
Engagement Coordinator



# Plans and activities 2012–2013

In 2011-2012 new research ideas have emerged from Centre think tanks, the annual forum and through discussions on adaptation research needs with a wide range of interested people working in policy or research. State, national and international conferences on climate change and natural resource management prompted further discussion of potential research needs. National plans for adaptation research have been completed for a number of sectors through the National Climate Change Adaptation Research Facility (NCCARF). Key activities to be pursued by VCCCAR in 2012-2013 include:

## Annual Forum

Annual Forum to be held in Geelong, May 2013

## Research

Completion of round 1 projects, continued progress on round 2 projects and commencement of round 3 projects

## Think tanks

### Release of reports from round 2 think tanks

#### Conducting round 3 think tanks

##### *Climate Services for Adaptation in Victoria*

Melbourne, 13 July 2012

The Think Tank will examine international developments in climate services and developments in the Bureau of Meteorology in automating and presenting weather and climate information. It will consider examples of information requirements and potential outputs for case studies in agricultural land management, bushfire management and flood risk. The Think Tank is co-sponsored by the Bureau of Meteorology.

##### *Managing Climate Impacts and Risks: Learning from the Finance Sector*

Melbourne, 5 December 2012

This Think Tank will explore the adaptation challenges facing the financial service sectors, in particular, the insurance industry. It is co-ordinated by the Australian Centre for Financial Studies.

##### *Strong City Centres for Sustainable and Resilient Futures: Practical Actions to Influence Positive Urban Change*

Melbourne, 20 February 2013

The Think Tank aims to raise awareness of the value of strong, multi-functional regional city centres, their future sustainability and their contribution to delivering economic prosperity and social objectives. The Think Tank leader is Associate Professor Rod Duncan from Deakin University.

##### *Climate Impacts and Adaptation Options for Coastal and Marine Resource Dependent Communities*

Geelong/Warrnambool, 2013  
(date to be confirmed)

The aim of the Think Tank is to establish a robust communication network and discourse in the Barwon South-Western region about climate change adaptation and to learn from similar regional adaptation approaches.

## Visiting fellowships

Dr Kate Lonsdale – October-December 2012 (Round 3 Fellow).

Professor Jonathan Overpeck – January-April 2013 (Round 4 Fellow).

Selection of Round 5 Visiting Fellow (April-May 2013)





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