

Annual Report 2012-2013



Victorian Centre for Climate Change Adaptation Research

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About VCCCAR

The Victorian Centre for Climate Change Adaptation Research (VCCCAR) was established in 2009. It is a partnership between Deakin, La Trobe, Melbourne, Monash, and RMIT Universities. The aim of the centre is to improve decision-making capacity regarding future climate risks within different levels of government in Victoria.

Research projects involve researchers from a range of disciplines across the partner universities and participants from state and local governments. VCCCAR is funded through a base contract of \$1 million per year for five years, with in-kind contributions from university partners (estimated at \$2 million in the last year) and additional funding from state government and other sources for specific projects.

VCCCAR provides new knowledge, methods and tools to address challenges associated with managing future climate risks. Through our project workshops, think tanks, annual forums and other 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 and joint projects with CSIRO, the Bureau of Meteorology, the National Climate Change Adaptation Research Facility and other partners, are extending our research nationally and internationally, and our work is being presented at national and international conferences and workshops. This report details our activities and achievements in the 2012-2013 financial year.

2012–2013 highlights

VCCCAR research

- Publication of framing adaptation case study reports, an adaptation guide for local government decision-makers, a report outlining decision principles for the selection and placement of green infrastructure, a multi-scale assessment of urban heating in Melbourne during an extreme heat event, and the development of draft base maps of the Barmah-Millewa for integration of Indigenous and conventional knowledge.
- Release of the final policy brief from the Resilient Urban Systems project.
- Submission of the final outputs from the Framing Adaptation and Learning from Indigenous and Traditional Community Knowledge projects.
- Good progress and products from continuing research projects on integrated land management in a changing climate, managing green infrastructure to reduce urban heat island effects, enhancing water infrastructure provision and designed decision support.
- Submission of the first reports from the Decision Taking in Times of Uncertainty, Governance Models for Adaptation and Natural Disaster Risk Management and Implementing Tools to Increase Adaptive Capacity projects.
- Initiation of a new project to examine and test approaches to engagement between researchers and policy makers that facilitate cogeneration of knowledge and evidence-influenced policy development in climate change adaptation.

- Three papers from VCCCAR research were accepted for publication in peer-reviewed journals.
- Sixteen presentations from VCCCAR research were presented at international and national conferences.

Visiting fellow

- VCCCAR's 2012 Visiting Fellow, Dr Kate Lonsdale, provided a report based on her contribution to the Implementing Tools to Increase Adaptive Capacity in the Community and Natural Resources Management Sectors project, and undertook a review of VCCCAR communication activities. The report drew on her experience of working on the UK Climate Impacts Program (UKCIP) and with projects in Europe, and looked at how VCCCAR and its projects can support adaptation efforts in Victoria. Based on her work on the Implementing Tools to Increase Adaptive Capacity in the Community and Natural Resource Management Sectors project key findings included: allowing time for reflection, considering and questioning current power relations and encouraging projects that allow second order learning.
- More than ten public presentations and significant collaborative interaction with researchers in different institutions from VCCCAR's 2013 Visiting Fellow, Professor Jonathan Overpeck.

Think tanks

- Climate Services for Adaptation in Victoria, conducted jointly with the

Bureau of Meteorology, brought together experts from BOM, CSIRO, universities, state and local government to discuss better ways to present climate and weather information to facilitate adaptation.

- Climate Change and Risk Management: The Role of the Financial Services Sector, attended by 40 experts from the insurance, financial management, government and academic communities.
- Regional Resilience through Strong City Centres, addressed approaches to urban design, planning and construction for resilience with local and state government, industry and academics.

Annual forum

- The new Parliamentary Secretary for the Environment, the Hon. Brad Battin MP opened the 2013 VCCCAR Annual Forum in Geelong on 13 May. Over 130 people were involved in events associated with the 2013 forum.

Communication and outreach

- The VCCCAR website continues to receive a high degree of usage and has been redesigned to facilitate access to information and resources. There were over 16,000 visits to the VCCCAR site in 2012-2013 and a total of 20,476 page views at an average of 2.19 pages per visit.
- VCCCAR researchers published two articles in *The Conversation*, one of Australia's largest independent news and commentary websites.

Introduction by the Chair of the VCCCAR Advisory Board

I am pleased to introduce the third Annual Report of the Victorian Centre for Climate Change Adaptation Research (VCCCAR) and, on behalf of the Advisory Board, to commend the centre on its achievements during 2012-2013.



John W Zillman AO FAA FTSE
Chair, VCCCAR Advisory Board

The role of the Advisory Board is to provide strategic advice and direction to the centre and the Director. 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). We were very pleased that Deakin University agreed to join the VCCCAR consortium during the year.

During its first four year of operation, VCCCAR has developed into an extremely effective mechanism for linking the research capabilities of the Victorian Universities with the climate change adaptation needs of the Government and the Victorian community. Our early achievements have been summarised in our previous Annual Reports.

In its fourth year of operation, the centre commissioned one new research project (bringing the total to 12), held its 2013 Annual Forum in Geelong, hosted Dr Kate Lonsdale and Professor Jonathan Overpeck as international visiting fellows and sponsored three think tanks. Perhaps the most important achievement of the centre in the past year has been the increasing effectiveness of the 'community of practice' in climate adaptation research and policy in Victoria.

VCCCAR'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 Government's Adaptation Research Centre Investment Panel (ARCIP) endorsed research activities which reflected a shared approach to strategic aspects of VCCCAR research.

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 members of ARCIP for their insight into priority needs for adaptation research, and to staff within the Environmental Policy Division of the Department of Environment and Primary Industries for their support of the VCCCAR concept – especially Kate Houghton, Kate Wood and John Houlihan. And finally, the Board wishes to acknowledge the outstanding leadership of VCCCAR Director, Professor Rod Keenan, and Executive Officer Doug Scobie, as well as the excellent work of all the project leaders and VCCCAR staff that has enabled the centre to achieve so much in its first four years of operation.

This Annual Report provides an account of VCCCAR activities in the twelve months ending June 2013. It follows the positive responses to the publication of our previous two reports. I hope you find the information it contains both interesting and valuable.

Director's report

The past year has been one of significant activity for the centre. The research program has consolidated, with a total of 12 projects commissioned and six now completed. In the three and half years since we began commissioning projects, VCCCAR partners have developed a best practice model for Australia that builds on Victoria's research strengths in the tertiary education sector to create major new capacity to assist government decision making.



Professor Rod Keenan
Director, VCCCAR

In partnerships with State and local governments, the VCCCAR research program has informed policy and strategy development in the Victorian government and practice across a range of local governments. It has also generated published outputs and enabled the development of additional research capacity, collaboration and funding across the universities' partners.

A second independent Monitoring and Evaluation Assessment was completed for the government project managers, now the Department of Environment and Primary Industries, in October 2012. This report concluded that the centre 'can be pleased with its development and growth over these first three years, but still should maintain its momentum of continuous improvement'. Key areas where the VCCCAR initiative is performing well include the research program, think tanks, which promote awareness and increase knowledge on location specific and thematic issues, annual forums which are well attended and are seen as a valuable mechanism for promoting VCCCAR outputs, and the involvement of our high calibre visiting fellows.

The report found that VCCCAR has been very successful in building an adaptation research community in Victoria, enabling the researchers who are active in the field to be part of a community of interest and growing potential for a stronger 'interface' on adaptation issues for decision makers and government. The collaborative management structure was seen as a strength, with government and universities working together to develop a clear sense of outcomes-driven research with good monitoring and consultation.

Areas for improvement included addressing barriers to research uptake and communicating research knowledge in a user-friendly format, more efficient processes to review, publish and disseminate research project outputs, and creating opportunities for greater informal interaction between research project leaders and participants to facilitate uptake. More explicit clarification of VCCCAR's intermediate outcomes, through identification and description of its knowledge transfer pathways, would not only improve the ability of the initiative to demonstrate its successes and achievements, but also its efforts to target knowledge transfer.

Our research projects have been developed in conjunction with staff from State Government agencies and we continue to try and work on models that involve collaborative production of knowledge between researchers, policy makers and practitioners. Local government continues to be at the forefront of many adaptation challenges and VCCCAR researchers work actively with local government partners on both current and new projects. Recently commissioned projects are working more actively with government service providers and with regional bodies.

These activities have built on VCCCAR engagement activities such as the 2013 Annual Forum (held in Geelong, with a strong focus on regional adaptation challenges and opportunities) and our continued support for the Council Connections program.

The policy environment for climate change adaptation in Victoria continues to develop. The first Victorian Climate Change Adaptation Plan (VCCAP), released in March 2013, identified six key strategies to build Victoria's climate resilience and provide a new framework for adaptation planning across the Victorian Government:

- manage risks to public assets and services
- manage risks to natural assets and natural resource-based industries
- build disaster resilience and integrated emergency management
- improve access to research and information for decision making
- support private sector adaptation
- strengthen partnerships with local government and communities.

The plan highlighted the adaptation activities being undertaken in Victoria's regions, and the roles of state and local government and the private sector to build climate resilience. VCCCAR activities and outputs received extensive reference in the VCCAP. The centre was highlighted as a key part of the Government's climate adaptation strategy. Research outputs on framing climate, economic impacts and local government engagement activities were presented as informing strategy development.

Three VCCCAR sponsored think tanks held during 2012-2013, covered the following topics and stakeholder involvement:

- Improving Climate Services in a Changing Climate - Bureau of Meteorology, Victorian State Government departments, local government, research and academic institutions and industry users
- Financial Sector Adapting to Climate Change - financial sector, government and policy makers, climate scientists and academics
- Robust Regional Cities under Climate Change - local government and business, community interests, practitioners from a spectrum of professions, educators and researchers.

The centre's Visiting Fellow for 2012, Dr Kate Lonsdale from the Stockholm Environment Institute, had a very productive stay from October to December. In addition to meetings with a range of stakeholders and giving seminars to government staff and climate researchers, including those sponsored by DEPI, NCCARF and the Monash Sustainability Institute, Kate contributed to the VCCCAR funded research project; Implementing Tools to Increase Adaptive Capacity in the Community and Natural Resources Management Sectors. Kate's expertise in building effective research collaborations for adaptation, and the development of learning approaches to adaptation research, made a valuable contribution to the project team's ability to effectively engage with the natural resource management, primary health and community welfare sectors. Kate's report, including recommendations to improve VCCCAR's role in making adaptation research usable and relevant, is available on the VCCCAR website: www.vcccar.org.au/publications

Professor Jonathan Overpeck from the University of Arizona was the 2013 fellow from January to April. As with earlier fellows, 'Peck' undertook a busy schedule of meetings, workshop

and seminar presentations and other interactions with climate scientists and decision-makers. He also provided a keynote presentation at the 2013 VCCCAR Annual Forum. His fellowship report will be available on the VCCCAR website once finalised.

We look forward to welcoming Dr Ben Preston as our fifth Visiting Fellow in early 2014. Ben is the Deputy Director of the Climate Change Science Institute at Oak Ridge National Laboratory (USA), where his research focuses on the assessment of climate risk to human systems and the role of adaptation in risk management. His prior appointments have included work with CSIRO's Climate Adaptation Flagship and the Pew Centre on Global Change in Washington, DC.

In the last year VCCCAR continued to broaden our conversations with industry, both large enterprises and small businesses. This process began with a breakfast round table involving business, government and researchers at the 2012 Annual Forum and focused more specifically on the Barwon southwest region in the 2013 Annual Forum.

Key challenges for VCCCAR in the year ahead include:

- ensuring there is a wider understanding in the broader policy making, planning and practice communities of the centre's activities and outputs. We conducted a conversation between senior executives, policy research experts from the University of Melbourne's Centre for Public Policy and researchers to seek advice and guidance from the policy community on how to improve the relationship between research and policy. We will give briefings and other activities and work through the 'knowledge co-production project' to develop these ideas further

- demonstrating the need for further investment in adaptation research based on a sound analysis of priorities and the benefits of investment in research.

VCCCAR's financial arrangements are in good shape. Sixty per cent of the \$5 million provided by the Victorian Government for the centre is allocated to the research program. Some \$2.91 million has now been committed to research projects, running through to May 2014. Thirty per cent of the project budget is allocated to meeting administration costs. Of this, \$1.26 million has been allocated to administration as at 30 June 2013 (the bulk of which comprised the salaries of the Director, Executive Officer and support staff). Of the ten per cent (\$500,000) allocated to meeting think tank, annual forum and visiting fellow expenditure over the life of the project, \$325,815 has been expended to date. In the first four years of the centre's operation to the end of June 2013, the total expenditure has been \$3.74 million,

or 75 per cent of the total budget. The estimated in-kind from University partners in 2012-13 is \$1.49 million, a decrease of approximately \$450,000 from last year, owing to the completion of several research projects and fewer think tanks involving staff from partner universities.

The centre is actively pursuing co-investment in projects from government agencies and new funding options for adaptation research, including from federal and international sources. VCCCAR is a member of a consortium led by the University of Tasmania that secured over \$900,000 in Commonwealth funding to establish the Southern Slopes Climate Adaptation Research Partnership (SCARP) to support adaptation planning by Natural Resource Management bodies in Southern Victoria, Tasmania and south east New South Wales.

This Annual Report describes progress in VCCCAR activities in the fourth year of operation, to 30 June 2013. As the

centre moves into its fifth and final year under the current funding agreement with the State of Victoria, this report provides a critical review of the centre's activities and achievements to date, along with an outline of adaptation issues and needs beyond June 2014.

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 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 Executive Officer, Mr Doug Scobie, for his diligence and commitment to managing the centre's activities in a complex and continually changing organisational environment.

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

	2009-2010	2010-2011	2011-2012	2012-2013
Income	\$1,045,000	\$2,045,000	\$3,045,000	\$4,045,000
Expenditure				
Administration	\$217,605	\$609,829	\$989,406	\$1,256,855
Research program	\$0	\$455,765	\$1,295,414	\$1,989,826
Think tanks	\$3,432	\$33,197	\$84,890	\$122,019
Annual forum	\$8,165	\$11,899	\$28,993	\$53,524
Visiting fellowship	\$127	\$42,851	\$87,225	\$150,271
Total expenditure	\$229,329	\$1,153,541	\$2,485,928	\$3,572,495
Cumulative balance	\$815,761	\$891,459	\$559,072	\$472,505

VCCCAR research: informing policy

Strategic overview: The VCCCAR contribution to Victorian Government adaptation strategies

Over the past four years VCCCAR has commissioned 11 research projects and conducted 12 think tanks. Outputs from research projects have the capacity to assist in dealing with a number of adaptation strategies identified in the Victorian Climate Change Adaptation Plan (VCCAP), released in March 2013. The strategies and relevant research are summarised in the following sections.

1. Managing risks to public assets and services

The Victorian Government provides essential services and manages a \$170 billion portfolio of assets, including government-owned buildings and infrastructure. All government agencies apply a common Risk Management Framework. This brings together information on governance policies, accountabilities and roles and responsibilities and is used to identify and manage climate-related risks to public assets and services.

Government agencies working in health, human services, education, transport, energy and water sectors are continuing to plan for climate risks and

any compounding effects. Issues to be considered in planning for continued management of a range of government services and assets include:

- what impact climate risks will have on demand for services (e.g. emergency management services, health services) and the implications for service planning; and
- what changes may be required to the design or management of buildings and infrastructure (e.g. public housing, roads and bridges).

Critical infrastructure with a long life often involves major investment decisions and, in some cases, it is sited or designed to operate within particular climate conditions (e.g. water supply, bridges). In addition to climate, other factors to consider include population trends, patterns of urban development and economic structure. This requires decision-makers to actively engage with a range of change possibilities and consider a wide range of potential futures.

Relevant VCCCAR research

VCCCAR research outputs to assist decisions on the management of assets and services include:

- guidance material to assist stakeholders develop a clearer collective understanding of climate futures

- new types of economic analysis to improve investment decisions in capital projects that are potentially impacted by climate change uncertainty
- guidance material for improved regional planning under climate change
- governance approaches to risk management under climate change and increased frequency and intensity of extreme climate events.

Research Projects

- » Building common understanding of scenario based strategies to inform climate change adaptation
- » Enhancing water infrastructure provision with climate change uncertainty
- » Decision taking under uncertainty in regional planning
- » Governance models for adaptation and natural disaster risk management: legal, regulatory, institutional and financial assessment

2. Managing risks to Victoria's natural assets including natural resource-based industries

This policy priority includes addressing climate risks to biodiversity, soils, waterways and land, coastal and marine ecosystems. Through Environmental Partnerships, the government is aiming to improve the environmental condition of Victoria's waterways and achieve integrated, multiple outcomes for land, water and biodiversity. A key delivery mechanism is the Regional Catchment Strategies developed by the ten catchment management authorities across Victoria.

Central to thinking about the changing landscape in response climate change is the need to increase resilience and connectivity across the landscape by supporting community-driven landscape restoration, increasing connectivity and linking areas of ecological value across all land tenures, better understanding of the links between biodiversity and landscape resilience and improved approaches to managing threatened species.

Relevant VCCCAR research

VCCCAR research is informing government policy in the management of the natural resource base. Outputs include:

- Guidance on approaches to Integrated Landscape Management under climate change through greater collaboration, engagement and information sharing between stakeholders
- Improved capability and capacity building in regional adaptation planning and management
- Demonstration of the opportunity for improved land management through the incorporation of comprehensive community mapping and the protection and appropriate deployment of indigenous knowledge
- Improved knowledge of the carbon stocks and management opportunities in the landscape

Research Projects

- » Policies and governance to support integrated landscape management (ILM) in a changing environment
- » Implementing tools to increase adaptive capacity in the community and natural resource management sectors
- » Learning from Indigenous and traditional community knowledge
- » Comprehensive Carbon Assessment Project (CCAP)
- » Climate Change Impacts and Adaptation Planning for the Southern Slopes NRM Regions project (SCARP)

3. Building disaster resilience and integrated emergency management

Policy objectives in the plan affirm the importance of supporting the community to become more resilient and building the capability of the emergency management sector and establishing governance structures to improve accountability and efficiency and drive reforms to emergency management arrangements.

Relevant VCCCAR research

VCCCAR research is supporting disaster resilience and emergency management through:

- Analysis of the legal instruments and tools that can be used to reduce exposure and vulnerability to extreme events in Victoria's planning system and
- Providing guidance on role of scenario planning in assisting disaster response organisations prepare and practice responses and test systems under simulated environments.

Research Projects

- » Governance models for adaptation and natural disaster risk management: legal, regulatory, institutional and financial assessment
- » Building common understanding of scenario based strategies to inform climate change adaptation

4. Improving access to research and information for decision making

The plan identifies that research and information are essential for effective climate change adaptation. Individuals, businesses, government and community organisations require robust, reliable and accessible climate science and risk information to provide a better understanding of potential risks and to develop appropriate responses. In particular, the Government is committed to ensuring that research is responsive and action-oriented and facilitates knowledge sharing between researchers, government, community and business stakeholders.

While individual departments and agencies in the government sector will continue to deal with their own specific 'business' adaptation research needs, the government has supported VCCCAR as a multi-disciplinary research program addressing climate adaptation priorities identified by the Victorian Government. This approach provides advice to deal with strategic gaps in adaptation knowledge and potential interactions or trade-offs between sectors, while building on and complementing the growing body of adaptation research occurring within government and the research sector. VCCCAR links the Government with five partner Victorian universities and provides an important ongoing mechanism for collaborative multi-disciplinary research and knowledge transfer for decision makers in government, the community and the private sector.

The plan aims to support coordination and collaboration on research efforts, across the three levels of government, with the research sector and within the Victorian Government, to avoid duplication of effort, improve the consistency, quality and dissemination of research and ensure it meets user needs.

The Victorian Government's objectives in research are to:

1. Provide 'public good' information on climate risk and responses to allow all Victorians to decide on the best way to build their climate resilience (much of this research is too costly for individual councils, businesses and communities to generate themselves); and
2. Inform government planning and decision-making on responsibilities for disaster resilience and risk management for service delivery and asset maintenance and planning.

4.1 Relevant VCCCAR research

The establishment of VCCCAR and centre activities are generally an example of the support being provided for this strategy.

The centre has also played a key role in facilitating engagement and communication with local governments through sponsoring the 'Council Connections' discussions. These have stimulated thinking in local government about the risks to local government assets and services and consideration of adaptation options.

Research projects have been designed to support a reflective, 'double-loop' learning model and to explore ways in which knowledge to support adaptation can be co-produced between researchers and practitioners.

The think tank program has also supported this role in terms of:

- awareness raising
- information sharing
- assisting the development of key research and data needs.

The visiting fellow program has provided an avenue for knowledgeable researchers from beyond Australia to spend time in Victoria working on local challenges such as statutory planning processes, managing flood risks, creating learning organisations and better use of climate system knowledge for adaptation.

Research Projects

- » [Examining and improving co-production of knowledge between research and policy: learning from VCCCAR](#)
- » [Decision taking under uncertainty](#)

5. Supporting private sector adaptation

The Government's key priority is to further develop policy settings that support appropriate risk allocation and promote business innovation, including providing access to information to assist the private sector to manage its risks. This includes removing barriers to effective adaptation and clarifying insurance arrangements for climate-related risks.

Relevant VCCCAR research

Research outputs to support improved decision making in this strategy have improved understanding of:

- the financial impacts of climate change and approaches to assessing costs of adaptation
- the engineering, social and regulatory factors involved with distributed energy and water generation systems and their potential contribution to resilient housing developments
- the design and location of street trees, parks, green roofs and walls to reduce urban heat and the its impacts on human health and liveability
- regulatory and policy arrangements to reduce vulnerability and the role of measures such as insurance to support risk management, resilience and recovery in the private sector.

Research projects

- » Framing multi-level and multi-actor adaptation responses in the Victorian context
- » Resilient urban systems: a socio-technical study of community scale climate change adaptation initiatives
- » Responding to the urban heat island: optimising the implementation of green infrastructure
- » Governance models for adaptation and natural disaster risk management: legal, regulatory, institutional and financial assessment
- » Decision taking under uncertainty

6. Partnering with local government and communities

The recent experience of drought, floods and bushfires has underlined the risks for regional communities and local governments arising from climate-related events. A key role for government is managing the distributional impacts of these events for particular regions, communities and groups. This involves specific policy responses to address equity concerns.

For example, the current process for developing Regional Growth Plans involves partnerships between the Victorian Government and local government to set out the broad direction for land use and development across regional Victoria. An understanding of natural hazards and opportunities is fundamental to this work, which includes planning for existing and future settlements to be safer from bushfire, floods and sea level rise. Taking a 30-year vision, the plans are intended to be reviewed every 3–5 years, providing the opportunity to make adjustments as new information becomes available, including regionally-specific climate change data and modelling.

The policy goal is to engage with Victorian local governments to develop a Memorandum of Understanding with the Victorian local government sector, outlining the respective and shared climate change adaptation roles and responsibilities, by the end of 2014. This will include ongoing engagement with Victorian councils and their communities.

Relevant VCCCAR research

VCCCAR research in this area has been extensive and Centre researchers have actively engaged with local government partners across Victoria. Some key aspects of the research include:

- Analysis of the varying knowledge, experience and understanding of climate change in different types of communities.
- Development of guides and tools for local government and community service providers and testing of these tools in action research
- Guidance on planning and policy arrangements to local and state governments to facilitate increased green infrastructure in public and private realms to reduce urban heating and distributed systems for energy and water generation to increase community resilience and improve liveability.
- New approaches to facilitate stronger community engagement in planning and the development of shared solutions for resilient communities.

Research Projects

- » Framing multi-level and multi-actor adaptation responses in the Victorian context
- » Responding to the urban heat island: optimising the implementation of green infrastructure
- » Implementing tools to increase adaptive capacity in the community and natural resource management sectors
- » Resilient urban systems: a socio-technical study of community scale climate change adaptation initiatives
- » Design-led decision support for regional climate change
- » Decision taking under uncertainty

Operational overview: VCCCAR research activity 2012-2013

Round one projects

These projects were developed to address needs identified by the Victorian Government in 2009. Proposals were reviewed by the VCCCAR Advisory Board and endorsed by the Adaptation Research Centre Investment Panel in March 2010. Of the four projects commissioned, three were completed by June 2013: Building Common Understanding of Climate Adaptation Scenario Approaches and Strategies; Resilient Urban Systems: a Socio-Technical Study of Community Scale Climate Change Adaptation Initiatives; and Framing Adaptation Responses in the Victorian Context – while one project (below) continues into the 2013-2014 financial year.

Integrated Landscape Management

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 identifies barriers to the implementation of ILM through analysis of relevant governance policy and processes at the state level and determined how these are interpreted and implemented at the local scale, with respect to landscape values such as (a) provision of ecosystem services, (b) production of goods and commercial services (c) social functions, and (d) environmental functions.

This project seeks to develop an improved understanding of integrated landscape management, including the 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. VCCCAR worked closely with the project team during 2012-2013 to finalise outputs from the project, including engaging a consultant to develop a project final report, and finalising earlier outputs. The project will be completed by August 2013.

Outputs be finalised by September 2013 include:

- Project report defining Integrated Landscape Management
- Final report entitled: *How does government support Integrated Land Management in regional Victoria under climate change.*

Round two projects

Of the four projects approved for commissioning by VCCCAR, two had submitted all contracted milestones by the end of the 2012-2013 financial year: Learning from Indigenous and Traditional Community Knowledge for Improved Natural Resources Management in the Barmah-Millewa and the Wider Murray Floodplain; and Design-Led Decision Support for Regional Climate Adaptation. The two other projects were still in progress

as of 30 June 2013: Enhancing Water Infrastructure Provision with Climate Change Uncertainty; and Responding to the Urban Heat Island: Optimising the Implementation of Green Infrastructure. Information regarding the value, timelines and milestones for these projects is in tables, 4, 5 and 6 below.

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

This project aimed to produce knowledge of the ecological, climatic, cultural, legal and policy environment of the region within a geographic information system using an image and text based community map. It also appraised the institutional barriers and bridges to sustainable management in the Barmah-Millewa Forest. The results 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 State of the Environment report.

Outputs completed during the year included a report on the development of Indigenous Intellectual Property provisions, a regional stakeholder workshop and a report on the mapping of temporal data in the Barmah-Millewa region. The final report was submitted to VCCCAR in July 2013. Comments were provided to the project team in August.

Design-Led Decision Support for Regional Climate Adaptation

The aim of the project was to explore new approaches to climate change adaptation at the local government scale to address the question 'What could a "climate-proof" future look like?' Design charrettes (intensive workshops) were central to this exercise and were developed and organised for two case study regions. Other work packages supported the charette process by inputting data and synthesising outputs.

The project delivered a range of useful data and outputs despite changes in the membership of the team and delays in conducting charrettes during the year. The project outputs and timelines were renegotiated during 2012-2013 in response to these circumstances. All outputs agreed to under the revised schedule had been delivered by December 2012 (see table 6). After discussions with representatives from the Department of Transport, Planning and Local Infrastructure in July 2013, it was agreed that VCCCAR would prioritise the release of two policy briefs and the final report from the project, with other project materials being made available on a 'case by case' basis. The agreed deliverables will be revised for reconsideration by government by the end of April, 2014.

Enhancing Water Infrastructure Provision with Climate Change Uncertainty

This project aims to apply alternative approaches of economic analysis under uncertainty to a range of water infrastructure investment projects across Victoria to assess appropriate policy options for water utilities, regulators and other government agencies. Analytical

approaches include real options theory (ROT), which accounts for the value of deferring an investment until more information becomes available. This involves balancing the value of potential losses, should an adverse state occur, 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.

A focus of the project in 2012-2013 has been to ensure project outputs meet the research needs of government. Workshop and conference presentations in the latter part of 2012 and early 2013 provided valuable opportunities to present the findings of the research to government and research audiences. In response to these dissemination activities, a revised policy brief was submitted to VCCCAR for consideration, along with a collated set of research papers and a non-technical executive summary. As of July 2013, the policy brief is being reviewed by government representatives. It is anticipated the collated papers will be released in August 2013. The project team have requested an extension of the completed date to January 2014, to enable them to provide a final report incorporating additional research findings and stakeholder feedback.

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

The aim of this project is to assess the effectiveness of different green infrastructure systems for urban cooling and develop decision-making guidance for urban land managers to optimise the selection and implementation of green infrastructure options.

The following outputs were submitted to VCCCAR during 2012-2013:

- A report entitled *A multi-scale assessment of urban heating in Melbourne during an extreme heat event and policy approaches for adaptation*, which assessed the influence of green infrastructure on land surface temperatures and provided an assessment of the practical application of high resolution airborne thermal remote sensing for policy development targeting excess heat mitigation.
- A report on the *Decision principles for the selection and placement of green infrastructure to mitigate urban hotspots and heat waves*, intended to provide a series of guiding principles for land managers at the Local Government Area level in Greater Melbourne for making decisions on how to most effectively implement green infrastructure to cool urban areas during summer daytime conditions.
- A report on the *on The barriers and opportunities to the implementation of green infrastructure*, the key finding of which was that any attempts to genuinely address the urban heat island (UHI) across Melbourne's metropolitan regions will require a coordinated effort between layers of government, businesses and communities and that any initiatives aimed at increasing GI implementation will have to consider policy, legislative and incentive options that include council, private state and crown-owned land.
- A policy brief distilling the key issues arising from the three components of the project.

Research project highlights – round 3 projects

Given the remaining research funds, the Implementation Committee decided, in consultation with DEPI, to adopt a more constrained process for development of research projects for the last two years of the centre (2012-14). The aim was to avoid a large amount of additional work being done within universities to develop proposals that the centre did not have resources to fund.

A workshop to develop project ideas involving representatives from each partner university and from government departments was held in November 2012. In this workshop, five project concepts were agreed for further development. These were taken back to universities, developed into proposals by university collaborators, and presented to a joint meeting of the ARCIP and the Advisory Board in December 2012. For the three projects approved for commissioning by VCCCAR, information regarding the costing, timelines and milestones for these projects is provided in tables, 7, 8 and 9 below.

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

This project examines the complex processes of decision-making in order to develop guidelines for good governance in climate change adaptation.

The project is using Gippsland as a case-study to allow a detailed analysis of (1) how the Gippsland Regional Plan 2010 frames planning in the region, and (2) how technical knowledge provided by the Gippsland Climate Change Impacts and Adaptation Project influences decision-making. The project will focus on subsequent planning processes related to the transition to a low carbon economy and on integrated land use. Both combine different, partly contradicting, interests (e.g. industry, agriculture) and respond to two key drivers of the planning process: carbon pricing and climate challenges.

Milestones achieved in 2012-2013 include the successful stakeholder engagement workshop held in March 2013 and the submission of a literature review, which had been approved for release. The project is due to finish in May 2014.

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

This project investigates Victorian legal, financial and institutional frameworks for managing the risks of extreme events and natural disasters and makes recommendations for incorporating decision-making under the uncertainty introduced by climate risk. It identifies specific risk management mechanisms in land use planning, catchment management, natural resource management and infrastructure development. The project will work closely with government partners to identify options for knowledge transfer to support decision-making through accessible practitioner and policy related publications.

Milestones reached during 2012-2013 include completion of phase 1 workshops to scope the project, submission of a scoping paper arising from the workshops, targeted interviews with senior government decision-makers and other stakeholders, and the submission of a policy brief. The project is due to finish in May 2014.

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

Improving capacity for managing climate risks and building community resilience is an identified priority for the Victorian Government. This project will undertake 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.

Milestones completed during 2012-2013 include the submission of two reports comprising literature reviews and analysis of institutional context and organisational needs for adaptation for the natural resource management and Primary Health and Community Welfare sectors.

Comprehensive Carbon Assessment Project (CCAP)

The Comprehensive Carbon Assessment Program (CCAP) project aims to provide improved knowledge and understanding the carbon carrying capacity and implications of management on carbon stocks in Victorian ecosystems as a basis for better managing carbon stocks in a changing climate. The project is assessing above and below ground carbon sequestration in forests representative of those found in north-east and north-central Victoria.

CCAP milestones completed in 2012-2013:

- A summary report on the assessment of aboveground biomass in the Rushworth State Forest and implications for the broader program of analysis.
- A report on soil carbon sampling and protocols and their ability to inform carbon accounting.
- A summary report on the initial belowground biomass assessment and associated standard operating procedures that will be used to complete the analysis across additional sites.
- A scientific paper on soil carbon analysis protocols to assess forest soil carbon fractions.

The project is due for completion in September 2014.

Research projects – round 4 projects

Examining and Improving Cogeneration of Knowledge between Research and Policy: Learnings from VCCCAR

This project will examine and test approaches to engagement between researchers and policy makers that facilitate cogenesis of knowledge

and evidence-based policy development in climate change adaptation.

Using action research, the project will analyse experiences from past NCCARF, CSIRO and VCCCAR projects and design co-generation activities within current projects to test different models in the adaptation policy context. The project consists of four components:

1. Identifying effective knowledge cogenesis in policy development (e.g. in health, welfare, transport, utilities) and analysing the successes and failures of different methods based on participatory engagement between research, VCCCAR and policy. A literature review will be conducted along with consultation with key policy and research organisations, including CSIRO and NCCARF.
2. Describing and reviewing approaches to researcher-policy maker interaction in VCCCAR research projects and assessing, independently and objectively, the nature and impact of these interactions, and the strengths and weaknesses of the different approaches. This will take into account the findings of VCCCAR's *third-year monitoring and evaluation report*.
3. Deep-dive case study analysis of four projects that have been found to be the most effective in knowledge cogenesis and impact.
4. Testing the effectiveness of different modes of knowledge cogenesis and dissemination based on four in-depth case studies, using recently completed VCCCAR projects or those being completed in 2013 and 2014.
5. The research proposal was approved for commencement in July, 2013. Research agreements between the University of Melbourne and La Trobe and Monash universities are

currently under development and the project will formally commence once these are executed. It is anticipated the project will be completed by May 2014.

Research project management and review

Research project activities are managed in three ways.

- a) A project agreement is developed between the University of Melbourne and different institutions managing project components. This specifies deliverables, milestones and payment timetables. Where there are multiple partners receiving funds, it is administratively simpler for the University of Melbourne to have multiple agreements, rather than have sub-contracting arrangements.
- b) Monthly meetings are held with project leaders or their representatives and the Implementation Committee. At these meetings the committee reviews progress and the group facilitates interaction and engagement across VCCCAR research projects. Project leaders report on recent or upcoming project activities, forthcoming outputs and any interactions or issues with government or other partners.
- c) Quarterly meetings are held with a Government Project Reference Group. This includes representatives of all government agencies on the Adaptation Research Centre Investment Panel and other agencies (e.g. staff from the Office of the Commissioner for Environmental Sustainability). These meetings are an opportunity for project leaders to present progress, discuss the implications of research with policy officers from across government and gain feedback on progress and potential for application in government.

Learnings from the research program in 2012-13

While research projects have generally proceeded well in the last year, there have been challenges in maintaining involvement of government participants, given workforce pressures and machinery of government issues. Also, despite improvements in the dissemination of technical outputs and literature reviews from VCCCAR funded projects, the increasing requirement for input from government collaborators and reviewers to ensure that other research outputs meet the needs of decision makers has slowed the release of these outputs.

VCCCAR held an 'executive conversation' with senior government representatives in August 2012 to introduce VCCCAR research outputs and to facilitate knowledge exchange opportunities between climate adaptation researchers and senior state government decision-makers. This provided valuable advice on engagement with government. The commencement of a series of four think tanks in August 2013 to analyse future research needs in adaptation research (refer 2.11 below) will build on the success of the 'executive conversations' model and the achievements of VCCCAR research to date to identify and inform future research needs.

What will be done differently in 2013-2014

VCCCAR's primary focus for this year is packaging and presenting research for key government audiences.

We will finalise the remaining research outputs under the funding agreement with the State of Victoria. VCCCAR researchers have worked closely

with government representatives on knowledge transfer approaches to ensure that VCCCAR is packaged in ways that best meets the needs of key government audiences.

The implementing adaptation project is working actively with government participants and Victorian Government service providers in the community and health sectors to assess their needs for adaptation and to work with them to test appropriate tools for assisting their decision making.

We have commissioned a new project, commencing in August 2013, on co-production of knowledge for adaptation. This project uses the learnings and outputs from the suite of commissioned projects, and other related adaptation research in Victoria, to assess the most effective ways of engaging and involving government counterparts in research to generate research knowledge to inform and change policy and practice. It is proposed that this will include testing of a number of approaches to co-production and co-generation of knowledge in a designed way.

Targeted briefings will be provided to different government departments on projects of major interest and staff will be involved in a discussion about how this research might best be applied.

Potential research directions for 2013-2014 and beyond

The release of the first Victorian Climate Change Adaptation Plan in March 2013 provided a framework analysis of future research needs.

Key Strategy 3.4 in the plan indicates that the Government's strategic priority for research and information is to continue to build a model that:

- supports coordinated, action-oriented research and facilitates the exchange of knowledge between researchers and policy makers across government; and
- increases the availability and accessibility of research and information to build Victoria's climate resilience by facilitating local government, business and community risk management.

The plan states that the centre provides a strong foundation for delivery of this priority. To inform decisions in future research, VCCCAR is sponsoring four think tanks from August–October 2013 on priority themes identified in the Adaptation Plan:

1. *Managing Risks to Public Assets and Services*
2. *Managing Risks to Natural Assets and Natural Resource Based Industries*
3. *Supporting Private Sector Adaptation*
4. *Supporting Partnerships with Local Government and the Community*

A fifth priority: *Building Disaster Resilience and Emergency Management Capacity* is being covered in the Bushfire and Natural Hazards CRC, where a range of government departments or agencies are represented.

Two priorities from last year's Annual Report: *a framework for governance of climate risks and adaptation options in Victoria and assessment and management of climate change impacts in vulnerable communities* are partly being addressed in current research projects. Key needs in relation to the other priority, *climate risk assessment and management for government infrastructure*, will be considered in future discussions of adaptation research priorities.



Two delegates discuss climate change adaptation at the 2013 VCCCAR Annual Forum.

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

	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	Total
Budget allocation	\$600,000	\$600,000	\$600,000	\$600,000	\$600,000	\$3,000,000
Round 1 expenditure and commitments	\$0	\$455,765	\$202,175	\$202,060	\$53,750	\$913,750
Round 2 expenditure and commitments	\$0	\$0	\$566,733	\$391,776	\$115,994	\$1,074,503
Round 3 expenditure and commitments	\$0	\$0	\$0	\$283,850	\$492,750	\$776,600
Round 4 commitments and other research activities	\$0	\$0	\$0	\$0	\$235,147	\$235,147
Balance	\$600,000	\$744,235	\$575,327	\$297,641	\$0	\$0

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. These think tanks will:

- 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.

Three think tanks were held in 2012-13.

- Climate Services for Adaptation In Victoria
- Climate Change and Risk Management: The Role of the Financial Services Sector
- Regional Resilience through Strong City Centres

These topics were nominated by university researchers in response to the initial research priorities provided by the Victorian Government. Reports for the 2009-2010, 2010-2011 and 2011-2012 think tank rounds are available from the VCCCAR website at www.vcccar.org.au/publications. An additional think tank approved in the 2012-2013 round was originally scheduled for February 2013 but was delayed due to changes in the organising committee; it will be held in September 2013.

What was done differently in 2012-2013?

A major development in this year was stronger partnerships with non-university actors in think tanks development and operation. The Bureau of Meteorology was a major partner in the Climate Services think tank and the report has been influential in discussions at the global level as the World Meteorological Organisation and other partners develop a new Global Framework for Climate Services.

The financial services think tank, conducted in partnership with the Australian Centre for Financial Studies brought together a range of players in the financial services sector with people from government and the research community to discuss the implications of climate change for investment decisions and role that financial services industries can support improve risk management.

The regional cities think tank, led by Deakin University, was conducted in partnership with a range of local governments and involved extensive input from decision makers and practitioners from across Victorian local governments and even nationally.

Key messages

Climate Services for Adaptation in Victoria

Research needs

- Improved understanding of how research can help practitioners deal with complex climate change adaptation challenges.

- Improved 'literacy' within the broader community about climate change adaptation.
- Improved communication skills to translate research findings into widely accessible forms.

Policy needs

- Build integration across respective stakeholder groups and institutions.
- Improve the development and sharing of knowledge and skills.
- Ensure on-going funding and flexibility for future adaptation decision-makers.
- Increase community participation within climate change adaptation.

Regional resilience through strong city centres

Research needs

- Quality data on current activity and behaviour patterns in regional cities and trends over time.
- Identification of emerging and potential areas of vulnerability – ranging from environmental threats to economic shocks or risks to community self-confidence.
- Quantified value of concentrated multi-functional city centres (including economics of agglomeration) and the direct and indirect costs and implications of dispersal of functions upon environmental, social and economic health and resilience to climate-generated (or other) changes.

Policy needs

- Policy support for concentration of activities, including government agencies, within regional multi-functional hubs (city centres) that are well connected with their hinterlands and with major cities by transport options that minimise dependency upon private motor vehicle usage.
- 'Risk ownership' and transparency – more explicit matching of potential costs with present choices (e.g. insurance reflecting risk of flood or fire)
- Awareness-raising across governments, professions and the national community of the important economic and demographic role played by regional capitals.

Think tanks for 2013-14

The major focus of the 2013-14 round of think tanks will be to identify potential future climate adaptation research needs on the basis of the following four objectives identified in the Victorian Climate Change Adaptation Plan:

1. managing risks to public assets and services

2. managing risks to natural assets
3. supporting private sector adaptation, including resource based industries
4. supporting partnerships with local government and the community.

(Building disaster resilience and emergency management capacity is also a priority in the plan, but this is being addressed in the Bushfire and Natural Hazards CRC.)

A series of workshops will be held in August-October 2013 addressing the above themes.

Key learnings from think tank and processes

- Thirteen think tanks have been held to the end of June 2013: one in 2009-2010; three in 2010-2011; five in 2011-2012; and four in 2012-2013. Five are planned for 2013-2014.
- Expenditure on the think tank program is behind that indicated in the centre's agreement. As agreed in 2011, the budget from think tanks not staged (about \$40,000) will be used for communication products and other events aimed at presenting research results to policy

makers (e.g. policy briefs, 'executive conversations' and development of short courses or seminars/workshops to ensure knowledge transfer of key project outputs).

- Think tanks continue to be a valuable way of engaging with a wider audience on different aspects of adaptation to climate change and for identifying research needs.
- General feedback on think tanks continues to be very positive.
- VCCCAR research projects are hosting workshops and other activities, providing other opportunities for interaction with those interested in climate change adaptation issues.
- 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.

Expenditure on current and approved think tanks and balance of funds remaining

	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	Total
Budget allocation	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000	\$200,000
Round 1 expenditure and commitments	\$3,432	\$29,765	\$0	\$0	\$0	\$33,197
Round 2 expenditure and commitments	\$0	\$0	\$51,783	\$0	\$0	\$51,783
Round 3 expenditure and commitments	\$0	\$0	\$0	\$35,000	\$11,260	\$46,260
Round 4 expenditure and commitments	\$0	\$0	\$0	\$0	\$68,760	\$68,760
Balance	\$36,568	\$46,803	\$35,020	\$40,020	\$0	\$0

Visiting fellowship

This research element facilitates international collaboration and advice on best practice climate change adaptation in the Victorian context. The annual fellowship is intended to be for up to three months duration in any given year.

The fellow remains an employee of their host institution, but she/he is based with one of the centre's partner universities. The expectation is that she/he 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.

2012 Fellow, Dr Kate Lonsdale

The 2012 VCCCAR Visiting Fellow was Dr Kate Lonsdale from the Stockholm Environmental Institute, Oxford, UK. Kate has worked on adaptation as a researcher, trainer, facilitator, consultant, mentor, and evaluator, and in an advisory capacity for the last 16 years in both developed and developing country contexts. Kate's biographical details are available on the VCCCAR website: www.vcccar.org.au/profile/kate-lonsdale. The report from her fellowship can be viewed on the VCCCAR website: www.vcccar.org.au/publications.



The underlying themes from her work for adaptation in Victoria included recommendations to improve VCCCAR's role in making adaptation research usable and relevant.

Some of the key points arising from her research included:

- Climate knowledge needs to be accessible for those who need it most, through carefully designed yet flexible, iterative learning-reflection tailored to real day-to-day risks, that allows experimentation in practice, and that offers tangible and short-term results.
- Boundary organisations are needed to translate raw data and scientific knowledge, communicating it to different groups and building arrangements for 'co-generation'.
- People with good relational skills (facilitation, trust building, network creating) are needed who understand how the different

functions work together and can bring these necessary skills into play during multi-stakeholder discussions.

- New organisational approaches are needed that involve holistic (rather than partial or linear) thinking, the ability to work across agency boundaries, effectively engage stakeholders and citizens in understanding the problem, and in identifying possible solutions, taking multiple perspectives and recognising that such boundaries are often fuzzy.
- Policy development and practice needs to keep thinking and action in dynamic tension and accept (and embrace) the absence of certainty.

Table 16: 2012 Visiting fellow expenditure summaries.

Budget	\$50,000
Actual	
Reimbursement to SEI for salary	\$10,000
Travel and accommodation	\$14,551.30
Ancillary costs	\$2,500
Total	\$27,051.30



2013 Fellow, Professor Jonathan Overpeck

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.

Jonathan Overpeck, or '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 has published over 130 papers in climate and the environmental sciences, and recently served as a Coordinating Lead Author for the Nobel Prize winning UN Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment (2007). He is the director of The University of Arizona Program in Translational Environmental Research, and commits significant time as principal investigator of the Climate Assessment for The Southwest Project (CLIMAS), one of the several NOAA Regional Integrated Sciences and

Assessment (RISA) programs. In all of his work, Peck promotes interdisciplinary perspectives, and works to enhance the way that knowledge is communicated to, and used by, the public.

Peck commenced a three month fellowship with VCCCAR in January 2013. He aimed to 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. He compared perspectives and experiences from south western North America against those of southern Australia and considered alternative approaches to considering abrupt climate change in policy and planning and the effects of warming and drying on water managers, wildfire, broader land management, and the climate-energy-water-land nexus. Peck gave seminars at VCCCAR partner universities, made presentations to the Victorian Government on Climate change impacts and adaptation in south western USA and to NCCARF and was a keynote speaker at the 2013 VCCCAR Annual Forum. His fellowship report will be submitted to VCCCAR soon.

Key learnings from the fellowship process in 2012-2013

As VCCCAR output and activities have developed there is increasing awareness and interest in participating from leading adaptation researchers. Some 40 applications were received in response to the advertisement in early 2012. While many of these were from early career researchers, there were 10 from highly qualified applicants.

What was done differently in 2013-2014

Based on the success of the 2012 and 2013 rounds, a similar process was adopted for selecting the 2014 visiting fellow. The position was advertised in February 2013 via VCCCAR's database of contacts, website and climate science networks. In addition, the VCCCAR Implementation Committee identified a number of individuals for targeted invitations to apply.

In addition to previous criteria for fellow selection, a priority for the 2014 fellow would be to undertake a review and synthesis of the centre's research program as VCCCAR commences its final 12 months of work under the funding agreement with the State of Victoria.

Table 17: 2013 Visiting fellow expenditure summaries.

Budget	\$50,000
Actual	
<small>(note: not all payments have been processed as at 15 July 2013)</small>	
Reimbursement to University of Arizona for salary	\$24,000
Travel and accommodation	\$12,500
Ancillary costs	\$2,500
Total	\$39,000



2014 Visiting Fellow: Dr Benjamin Preston

After assessing the applications received, the VCCCAR Implementation Committee offered the 2014 fellowship to Dr Benjamin Preston. Ben is the Deputy Director of the Climate Change Science Institute at Oak Ridge National Laboratory, USA, where his research focuses on the assessment of climate risk to human systems and the role of adaptation in risk management. Prior appointments have included work with CSIRO's Climate Adaptation Flagship and the Pew Centre on Global Change in Washington, DC. His research interests include: Human dimensions of global environmental change; frameworks and strategies for climate change

adaptation; methodological approaches to environmental risk assessment and management; managing uncertainty in environmental decision-making; the use of geographic information systems in environmental assessment; and equity issues in environmental policy. Ben will commence a three-month fellowship in January, 2014.

Potential research directions for 2013-2014 and beyond

By April 2014, VCCCAR will have completed the delivery of the Visiting Fellow program as per the terms of the funding agreement with the State of Victoria. VCCCAR's final report to DEPI will include a review of the program, including its success in achieving the stated objectives of the program.

Expenditure on current and approved visiting fellowships and balance of funds remaining

	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	Total
Budget allocation	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$250,000
Round 1 expenditure and commitments	\$127	\$42,742	\$0	\$0	\$0	\$42,869
Round 2 expenditure and commitments	\$0	\$0	\$44,373	\$5,000	\$0	\$49,373
Round 3 expenditure and commitments	\$0	\$0	\$0	\$37,051	\$12,000	\$49,051
Round 4 expenditure and commitments	\$0	\$0	\$0	\$0	\$46,000	\$46,000
Round 5 expenditure and commitments					\$62,707	\$62,707
Balance	\$49,873	\$57,131	\$62,758	\$70,707	\$0	\$0

Annual Forum

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.

The 2013 Annual Forum was held at the Four Points by Sheraton in Geelong on 13 May 2013. The forum program was developed by the VCCCAR Implementation Committee in consultation with DEPI staff.

The Annual Forum was preceded by a Geelong Community Forum on the afternoon of 12 May 2013, which was promoted as an opportunity for residents to join in a conversation about the environmental challenges facing Geelong due to climate change, and the challenges and opportunities that might emerge in the future for the region.

As in 2012, the first event of the Annual Forum was a Business Roundtable Breakfast, held in partnership with Deakin University and supported by the City of Greater Geelong. The breakfast was chaired by Stephen Chappel, National Chair of Economic Development Australia, and Director of the Mornington Peninsula Shire Council's Sustainable Environment program. It was attended by 30 representatives from regional business and utilities, local and state government agencies, and universities. The breakfast was designed to be a 'listening post' for researchers and policy makers to assist understanding with policy and research needs of industry in relation to adaptation in regional Victoria.

The Forum was launched by the newly appointed Parliamentary Secretary for the Environment, the Hon. Brad Battin MP. Keynote presentations were given by professors Roz Hansen, Chair of the Ministerial Advisory Committee for the Melbourne Metropolitan Strategy, and Jonathan Overpeck, 2013 VCCCAR Visiting Fellow. Professor Jean Palutikof, NCCARF Director, also gave a plenary presentation. More than 130 people attended the forum, with a significant presence from state and local government and the private sector.

What was done differently at the 2013 Annual Forum?

- The 2013 Annual Forum reverted to a one-day event to enable people to travel from metropolitan Melbourne and regional Victoria.
- The forum included a Geelong Community Forum to enable residents to join in a conversation about regional adaptation challenges and opportunities.

Key learnings from the 2013 Annual Forum

- The regional setting, in Geelong, was warmly received with strong attendance from the local community and western Victorians. There was also strong participation from metropolitan based people.
- The public forum held the day before was well-attended, providing engagement in climate change adaptation issues with the local community.
- This mix of keynote presentations, a more-interactive government panel session and workshops, and a final plenary session, with opportunities for networking worked well.
- While those who attended were better informed and built stronger networks, the challenge is to take the knowledge to 'people beyond the room'.



From left: Rod Keenan, VCCCAR Director, Roz Hansen, Chair, Ministerial Advisory Committee for the Melbourne Metropolitan Strategy, Brad Battin MP, Parliamentary Secretary for the Environment, and Jonathan Overpeck, 2013 VCCCAR Visiting Fellow at the 2013 VCCCAR Annual Forum.

What will be done differently in 2014

The final Forum will be held in Melbourne in March 2014 to coincide with the visit to Australia by Lord Krebs, Chair of House of Lords Select Committee on Science and Technology; Chairman of the Royal Society's Science Policy Advisory Group; member of the United Kingdom Climate Change Committee; and chair of the UK government's 'Committee on Climate Change'. In addition, the scope of the 2014 will broaden in include Victorian adaptation research from CSIRO, Bureau of Meteorology and non VCCCAR-partner Victorian universities.

Directions for 2013–2014 and beyond

The session with government decision-makers was revised in this year's forum; moving away from the panel 'Q and A' to a workshop format in which State Government representatives facilitated a discussion by forum participants on the topic of how researchers and state and local government could work together to improve access to research and information to support decision-making.

The topics were drawn from the priority areas identified in the Victorian Climate Adaptation Plan, released in March 2013.

Key challenges / research needs that emerged from these discussions:

Managing risks to public assets and services

- challenges included: identifying tools/resources that best suited local needs; lack of expertise; vulnerabilities due to infrastructure interdependencies

- role of research in managing risks to public assets and services included: refining definition of problems to ensure commissioned research directly addresses key needs; assist local government decision-makers with identifying and utilising climate adaptation tools; sharing expertise with local government decision-makers; providing local-regional level data to assist with informed decision-making.

Managing risks to natural assets

- challenges included: embedding adaptation into decision making; translating research into action; improving mechanisms to communicate adaptation research; how to develop and apply appropriate economic tools to identify the true value/benefit of natural assets; decision making and risks - how risks are identified and how this can inform research.

- role of research in managing risks to natural assets included: building relationships between stakeholders and research by 1) funding post-graduate studies, 2) promoting events at which stakeholders and researchers can exchange information; research needs to be commissioned differently so that policy makers, researchers and implementers/practitioners all have input to research questions and process.

Supporting private sector adaptation, including resource based industries

- challenges included: lack of clear messages regarding climate risks; little information on the opportunities of climate change; there is a need for clearer messages re. roles of government and private sectors (private businesses are best to judge how they respond to climate change,

but a public role is required to ensure they have sufficient knowledge of the risks that might be coming their way. This suggests a need for more work in moving beyond climate data and actually translating this into business impacts and risk); there is no single 'private sector' – messages need to be tailored for specific audiences.

- role of research in supporting private sector adaptation, including resource based industries included: developing medium-long term scenarios to assist appropriate business and risk management plans; developing common and consistent language for key climate terminology

Supporting partnerships with local government and the community

- challenges included: engagement with local communities; problematic engagement with State Government

(uneven across departments); fragmentation of knowledge/silos in local government;

- role of research in local government adaptation planning included: effective community engagement strategies; research needs to be flexible - whilst focusing on the desired outcomes allow the pathway to achieve those outcomes go where it needs to; provision of research 'brokers' – somewhere to go for assistance and advice when looking for researchers / experts.

Building disaster resilience and emergency management capacity

- challenges included: different types of research and research disciplines for decision-makers to draw on; how to effectively build on existing knowledge, models and processes.



A round table discussion at the 2013 VCCCAR Annual Forum.

Communications

Website and email

The centre website and email newsletters remain the primary vehicles for communicating our activities to partners and collaborators within and outside government.

The website underwent a significant redesign in late 2012 to improve user access to information and resources. Complementing website outreach activities, VCCCAR sends a regular email newsletter to 450 subscribers, with subscriptions growing by approximately 20 per month.

The website now hosts reports from the first three rounds of think tanks, visiting fellowships and research projects plus outputs from a range of engagement activities. There has been a significant increase in usage of the site over the past year: unique visitor numbers to the site grew by 63 per cent compared with 2011-2012; total visits grew by 74 per cent; and page views by 10 per cent. New visits to the site comprised more than 76 per cent of total visits in 2012-2013 compared to around 65 per cent in 2011-2012. Unlike previous years, when peak site usage coincided with major VCCCAR events, such as the annual forum, site visits were more even across the year.

Phoebe Bond continued as VCCCAR's Communications and Marketing Officer on a 0.2 EFT basis (one day per week) in 2012-2013. The role includes website maintenance, research publications support and production of fortnightly email newsletters to VCCCAR subscribers.

Social media

VCCCAR continues to build a community of practice in climate adaptation through the use of social media networks and the development of the VCCCAR blog page on the centre website.

The VCCCAR group on LinkedIn doubled in membership in 2012-2013, while the network of people with a professional interest and engagement with climate adaptation increased to more than 600. VCCCAR activities promoted via these networks and through other LinkedIn groups reach an audience of approximately 60,000 subscribers.

Disseminating research outputs

VCCCAR project outputs have taken various forms, including:

- short papers and policy briefs
- targeted briefings or informal interactions or discussions with policy makers on key adaptation topics
- technical and scientific reports
- peer reviewed journal publications
- public presentations
- facilitation of stakeholder events.

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 although due to work pressures it was not possible to progress arrangements as far as intended.

VCCCAR engagement activities and sponsored events

VCCCAR sponsored and/or participated in a range of events during 2012-2013. Staff involved in VCCCAR funded research presented findings at more than 16 local and international conferences.

Communications aims for 2013-14

- Focus on aligning communication activities with VCCCAR research activities and output with the priority areas outlined in Victoria's Climate Change Adaptation Plan.
- Utilise the final round of VCCCAR think tanks to identify research needs arising from the Victorian Climate Change Adaptation Plan.
- Post regular blogs on the VCCCAR website on current and emerging climate adaptation issues.
- Continue current work to engage with key government and non-government decision-makers as part of a strategy to informing the wider community, local government or 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 VCCCAR partners.
- Continue the executive 'conversations' with senior government decision-makers to foster knowledge transfer of climate adaptation research into government policy.

Management and governance

The centre is managed under an agreement between University of Melbourne and the Victorian Government Department of Sustainability and Environment signed in July 2009. A partnership agreement between Melbourne, La Trobe, Monash and RMIT Universities was signed in October 2009. The partnership agreement provides for expanded membership as appropriate and for participation by researchers from all Victorian universities in all VCCCAR activities. Deakin University joined the partnership 2012.

Professor Rod Keenan continued as Director at 0.5 full-time equivalent (EFT) and Professor Darryn McEvoy from RMIT as Deputy Director in 2012-2013. Funds for centre administration were agreed at 30 per cent over the five year life of the centre. The Executive Officer, Doug Scobie, is employed at 0.7 EFT. The centre currently employs a 0.2 EFT Communications and Marketing Officer and (until 15 June 2013) a 0.4 EFT Stakeholder and Engagement Coordinator. The centre also makes a partial contribution to space charges, IT support and other administrative costs at the University of Melbourne.

Fully funding research (including operating overheads and support costs) is an important policy issue for universities. University partners agreed on a standard project costing model for incorporating university costs in research projects. This was set at 35 per cent of total project costs.

VCCCAR's Advisory Board is made up of representatives from each of the initial university partners: Professor

Rick Roush (Melbourne) Professor Lin Crase (La Trobe), Professor Dave Griggs (Monash), Professor Paul James (RMIT) and Professor Lee Astheimer (Deakin). The only change to the Advisory Board during 2012-2013 was the replacement of Dr Andrew Ash as Climate Change Adaptation Flagship Project Director by Dr Paul Hardisty. Mr John Houlihan of DEPI attends as an observer.

Government consideration and endorsement of the research program and communication, coordination and integration of centre plans across government is facilitated by the Adaptation Research Centre Investment Panel (ARCIP). This includes representatives from eight state government departments.

A joint meeting of the Advisory Board and the ARCIP was held on 13 December 2012. The board met independently on 12 October 2012 and 22 April 2013.

VCCCAR's Implementation Committee supports the development of centre activities. The committee is composed of the Director, Deputy Director and members of La Trobe University (Professor John Martin) Monash University (Professor Nigel Tapper) and Deakin University (Professor Andy Bennett).

The centre relies heavily on in-kind contributions from partner universities to meet its commitments to different activities. In 2012-13, this was valued at approximately \$1.49 million, a decrease of 22% per cent from 2011-12. The decrease was due to the completion of round one and two projects and fewer think tanks.

Government agencies also contribute time and resources to support the centres activities. This has not been costed.

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

Annual review of the operation of the VCCCAR consortium and its membership

Feedback was sought from VCCCAR Advisory Board and Implementation Committee members of the operation of the consortium and its membership in its fourth year. The general conclusion of the Advisory Board and Implementation Committee remains that centre governance arrangements are appropriate, with continued improvements in interaction with government policy and decision-makers. The timing and frequency of board meetings (two per annum plus meetings with the ARCIP 1-2 times per year) addresses comments from last year's review.

What was done differently in management and governance in 2012-13?

- The review of the VCCCAR project commissioned by DEPI was completed in October 2012. Key issues in terms of VCCCAR management and governance included:
 - » The collaborative management structure was seen as a strength, with government and universities working together to develop a clear sense of outcomes-driven research with good monitoring and consultation.
 - » The centre 'can be pleased with its development and growth over these first three years, but still should maintain its momentum of continuous improvement'.
 - » There was scope for VCCCAR to create opportunities for greater informal interaction between research project leaders and government participants to facilitate uptake.

Key learnings

- 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 their working relationships and continued to ensure that all university partners are effectively engaged.

Advisory Board

The Centre's Advisory Board members are:

Professor John Zillman
(Chair)

VCCCAR Director,
Professor Rod Keenan

Professor Lee Astheimer,
Representing Deakin University

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 University

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).

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)

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
(to June 2013)



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