Economic impacts of fires
Key Topics:

- decision making [2]
- multi-hazard [3]
- optimisation [4]

Improved decision support for natural hazard risk reduction [5]
What if an earthquake hit central Adelaide? A major flood on the Yarra River through Melbourne? A bushfire on the slopes of Mount Wellington over Hobart?

'What if?' scenario modelling through this project is helping government, planning authorities and emergency service agencies think through the costs and consequences of various options on preparing for major disasters on their infrastructure and natural environments and how these might change into the future.

The research is based on the premise that to reduce both the risk and cost of natural disasters, an integrated approach is needed to consider multiple hazards and a range of mitigation options.

Project: detail Notabs

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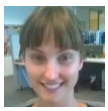

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Description

What if an earthquake hit central Adelaide? A major flood on the Yarra River through Melbourne? A bushfire on the slopes of Mount Wellington over Hobart?

‘What if?’ scenario modelling through this project is helping government, planning authorities and emergency service agencies think through the costs and consequences of various options on preparing for major disasters on their infrastructure and natural environments and how these might change into the future.

The research is based on the premise that to reduce both the risk and cost of natural hazards, an integrated approach is needed to consider multiple hazards and a range of mitigation options.

A case study for Adelaide and surrounding regions is now complete, while case studies for Melbourne and surrounding regions, along with Tasmania, are well developed. An additional case study in Western Australia is in the process of being scoped out.

Taking into account future changes in demographics, land use, economics and climate, the modelling will be able to analyse areas of risk both now and into the future, test risk reduction options, identify mitigation portfolios that provide the best outcomes for a given budget, and consider single or multiple types of risk reduction options, such as land use planning, structural measures and community education.

The results for greater Adelaide highlighted the variability in regional risk based on variability of the drivers into the future. They also showed the importance of effective planning of new regional developments to ensure a safer future. It is hoped that more integration of this scenario work can build strategic capacity across agencies in the understanding of future risk.

CRC partners, along with local governments, have been engaged in the entire process, from direction on the hazards to include and feedback on process, to advice on how the modelling will be used when complete and by whom.

The approach taken through this project is the only study that compares different natural hazards and their mitigation options, while also taking into account long term planning. The ultimate aim is to develop a decision support framework and software system that is sufficiently flexible to be applied to large and small cities around Australia, helping planners from local councils through to state treasury departments answer the vital question on mitigation options that balance cost and impact: ‘what is the best option for us?’ Training materials will be developed, along with courses for end-users to enable ongoing use of the system.

This project is an outstanding example of the collaborative process that the CRC is all about, and incorporates findings from other CRC work on recognising non-financial benefits of management and policy for natural hazards, for example, the economic, social and environmental benefits of prescribed burning, the vulnerability of buildings to hazards, such as how they can be made more resilient through cost-effective retro-fitting for improved safety, and the benefits and understanding of community resilience efforts like improved warnings, community engagement, education, volunteering and community resilience.

Related News

15 DEC 2021

CRC researcher wins biennial medal for modelling research

DECISION MAKING, MULTI-HAZARD

[49]

18 JUN 2021

Queen’s Birthday Honours for CRC end-users

CAPABILITY, EMERGENCY MANAGEMENT

[50]

14 MAY 2021

Making better use of research

CAPABILITY, EMERGENCY MANAGEMENT

[51]

16 NOV 2020

New online - November 2020

COMMUNICATION, EMERGENCY MANAGEMENT

[52]

05 FEB 2020

Student research supporting EM sector

EMERGENCY MANAGEMENT, MODELLING

[53]

13 DEC 2019

New online – December 2019

COMMUNICATION, EMERGENCY MANAGEMENT

[54]

11 DEC 2019

Special edition Monographs share AFAC19 science

EMERGENCY MANAGEMENT, LAND MANAGEMENT

[55]

09 SEP 2019

UNHaRMED makes waves in SA

DECISION MAKING, FLOOD

[56]

24 JUL 2019

New online - July 2019

EMERGENCY MANAGEMENT, FIRE

[57]

27 JUN 2019

Flood research on show

DECISION MAKING, ENGINEERING

[58]

22 FEB 2019

New online - February 2019

EMERGENCY MANAGEMENT, FIRE

[59]

12 FEB 2019

Flood authority set to benefit

EMERGENCY MANAGEMENT, MULTI-HAZARD

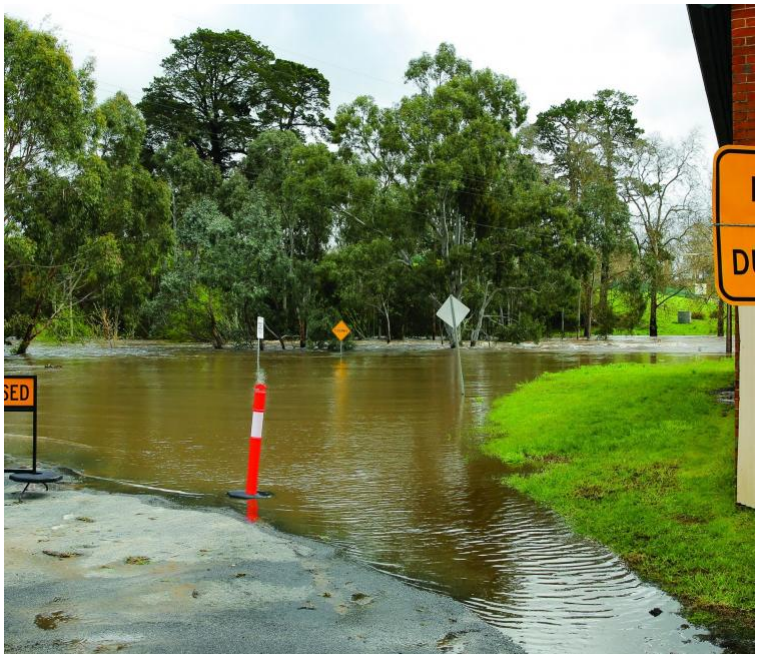
[60]

18 DEC 2018

New online - December 2018

EMERGENCY MANAGEMENT, MODELLING

[61]



12 DEC 2018

"What if" questions drive future policy

DECISION MAKING, MULTI-HAZARD

[62]

07 DEC 2018

Preparing for the future focus of magazine

CYCLONE, EMERGENCY MANAGEMENT

[63]

06 DEC 2018

Research benefits flowing

DECISION MAKING, FIRE

[64]

15 NOV 2018

New online – November 2018

EARTHQUAKE, MODELLING

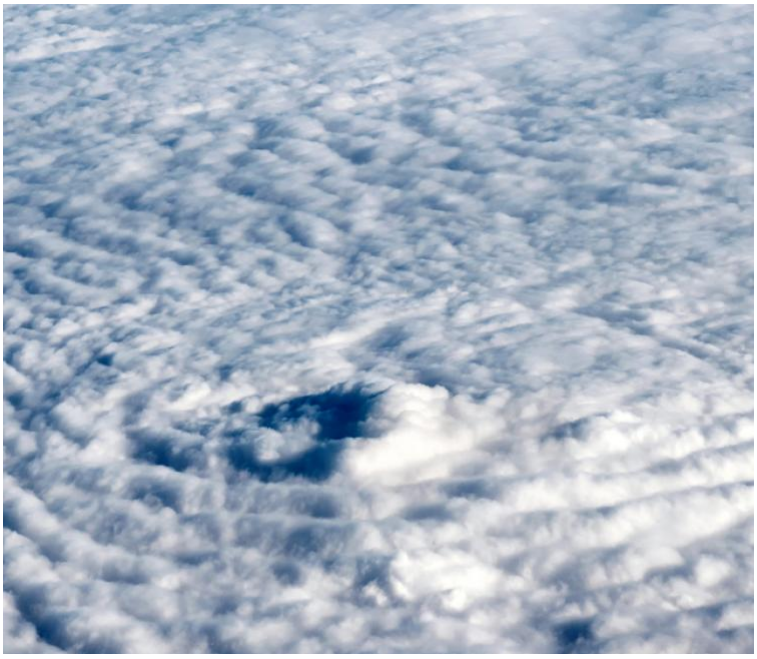
[65]

18 SEP 2018

Conference papers available online

EMERGENCY MANAGEMENT, MULTI-HAZARD

[66]



31 AUG 2018

CRC modelling highlighted as key to managing risk

PLANNING, RISK ANALYSIS

[67]

19 DEC 2017

New online - December 2017

EMERGENCY MANAGEMENT, LAND MANAGEMENT

[68]

18 DEC 2017

"What if" questions drive future policy

DECISION MAKING, MULTI-HAZARD

[69]

17 NOV 2017

New online - November 2017

[70]

20 OCT 2017

Briefing to enhance policy

EMERGENCY MANAGEMENT, POLICY

[71]

18 SEP 2017

Outstanding achievements recognised

EMERGENCY MANAGEMENT, MULTI-HAZARD

[72]

13 SEP 2017

New online - September 2017

[73]

27 JUN 2017

New mitigation research in Western Australia

DECISION MAKING, ECONOMICS

[74]

15 FEB 2017

Models for 'what if?' scenarios

DECISION MAKING, ECONOMICS

[75]

08 FEB 2017

New online - February 2017

[76]

16 NOV 2016

Watch our science

EMERGENCY MANAGEMENT, LAND MANAGEMENT

[77]

26 OCT 2016

Journal publishes important research

[78]

16 AUG 2016

New online - August 2016

[79]

09 AUG 2016

Reducing hazard impacts with smarter spending

ECONOMICS, MITIGATION

[80]

09 AUG 2016

Mitigation economics, fire modelling and student experiences in focus

ECONOMICS, FIRE WEATHER

[81]

24 JUN 2016

Important research insights

ECONOMICS, FLOOD

[82]

20 MAY 2016

Networking, connections and career opportunities

EMERGENCY MANAGEMENT

[83]

15 APR 2016

New online - April 2016

[84]

11 FEB 2016

Does it need to be there?

EXPOSURE, PLANNING

[85]

14 DEC 2015

Turning the corner on decision support

DECISION MAKING, POLICY

[86]

11 DEC 2015

Plenty of action on decision support

MODELLING, SCENARIO ANALYSIS

[87]

17 JUN 2014

Mitigation blog

DECISION MAKING, PLANNING

[88]

Publications

Year	Type	Citation
2022	Report	Jeanneau, A. [89], Zecchin, A. [10], van Delden, H. [16], McNaught, T. [90] & Maier, H. [6] **Mapping how outputs from various Bushfire and Natural Hazards CRC projects could be combined to a**
2022	Report	Jeanneau, A. [89] *et al.* **Opportunities for alternative fuel load reduction approaches - summary report** [95]. (Bushfire and Natural Hazards CRC, 2022). Google Scholar [96] BibTeX [97] EndNote X
2021	Report	Jeanneau, A. [89], Zecchin, A. [10], van Delden, H. [16], McNaught, T. [90] & Maier, H. [6] **Guidance framework for the selection of different fuel management strategies** [99]. (Bushfire and Natural
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2021	Report	Jeanneau, A. [89], Zecchin, A. [10], van Delden, H. [16], McNaught, T. [90] & Maier, H. [6] **Influence of climate change and fuel management on bushfire risk in Western Australia** [107]. (Bushfire a
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2019	Conference Paper	Pikusa, E. [27] **The mitigation exercise: a long term mitigation planning process, with a coastal flooding case study in Adelaide** [132]. *AFAC19 powered by INTERSCHUTZ - Bushfire and Natura*
2019	Journal Article	Riddell, G. [15], van Delden, H. [16], Maier, H. [6] & Zecchin, A. [10] **Tomorrow's disasters – Embedding foresight principles into disaster risk assessment and treatment** [136]. *International Jour*
2019	Journal Article	Riddell, G. [15], van Delden, H. [16], Maier, H. [6] & Zecchin, A. [10] **Exploratory scenario analysis for disaster risk reduction: Considering alternative pathways in disaster risk assessment** [14
2019	Report	van Delden, H. [16] *et al.* **UNHaRMED framework report: a co-creation approach for the development and use of decision support systems for disaster risk reduction.** [146] (Bushfire and Natu
2018	Conference Paper	Riddell, G. [15] *et al.* **Applying unharmed for risk reduction planning – comparing strategies and long-term effectiveness** [150]. *AFAC18* (Bushfire and Natural Hazards CRC, 2018). Google Scho
2018	Conference Paper	Bates, J. [154] **Research proceedings from the 2018 Bushfire and Natural Hazards CRC and AFAC Conference** [155]. *Bushfire and Natural Hazards CRC & AFAC annual conference 2017* (Bushfir
2018	Journal Article	Riddell, G. [15], van Delden, H. [16], Dandy, G. [14], Zecchin, A. [10] & Maier, H. [6] **Enhancing the policy relevance of exploratory scenarios: generic approach and application to disaster risk re**
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2018	Report	Maier, H. [6] *et al.* **Improved decision support for natural hazard risk reduction: annual project report 2017-18** [168]. (Bushfire and Natural Hazards CRC, 2018). Google Scholar [169] BibTeX [170
2017	Conference Paper	Rumsewicz, M. [172] **Research proceedings from the 2017 Bushfire and Natural Hazards CRC and AFAC Conference** [173]. *Bushfire and Natural Hazards CRC & AFAC annual conference 2017* (B
2017	Conference Paper	Riddell, G. [15] *et al.* **Multi-hazard mitigation planning, combining modelling, scenarios and optimisation: results from South Australia** [177]. *AFAC17* (Bushfire and Natural Hazards CRC, 2017
2017	Journal Article	Newman, J. [19] *et al.* **Review of literature on decision support systems for natural hazard risk reduction: current status and future research directions** [181]. *Environmental Modelling & Softwa*
2017	Report	Maier, H. [6] *et al.* **Improved decision support for natural hazard risk reduction: annual project report 2016-17** [186]. (Bushfire and Natural Hazards CRC, 2017). Google Scholar [187] BibTeX [188
2017	Report	Riddell, G. [15] *et al.* **Futures Greater Adelaide 2050: An exploration of disaster risk and the future** [190]. (Bushfire and Natural Hazards CRC, 2017). Google Scholar [191] BibTeX [192] EndNote X
2016	Conference Paper	Rumsewicz, M. [172] **Research proceedings from the 2016 Bushfire and Natural Hazards CRC and AFAC conference** [194]. *Bushfire and Natural Hazards CRC & AFAC annual conference 2016* (B
2016	Conference Paper	Riddell, G. [15] *et al.* **A spatial decision support system for natural hazard risk reduction policy assessment and planning** [198]. *AFAC16* (Bushfire and Natural Hazards CRC, 2016). Google Scho
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2016	Report	Maier, H. [6] *et al.* **Natural hazard mitigation decision support system: Annual project report 2015-2016** [207]. (Bushfire and Natural Hazards CRC, 2016). Google Scholar [208] BibTeX [209] EndN
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2015	Conference Paper	Newman, J. [19] *et al.* **A decision support framework for multi-hazard mitigation planning - non peer reviewed extended abstract** [215]. *Adelaide Conference 2015* (2015). Google Scholar [216] E
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2014	Report	Newman, J. [19] *et al.* **Literature Review on Decision Support Systems for Optimising Long-term Natural Hazard Mitigation Policy and Project Portfolios** [231]. (2014). Google Scholar [232] Bib

Presentations & Resources

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27 Mar 2014	Decision support system for assessment of policy and planning investment options for optimal natural hazard mitigation [237]	634.1 KB
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15 Dec 2021	Identifying future bushfire hotspots and risk mitigation opportunities: a Western Australian case study [299]	228.6 KB

Posters

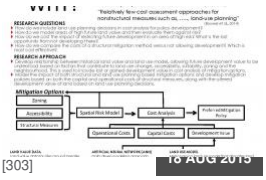
[301]

Understanding How Dynamic Exposure Affects Risk by Using a Land Use Model

[301]

MODELLING [255], RISK ANALYSIS [302]

Building on the evaluation of risk: incorporating the evolution of hazard risk over time with dynamic...



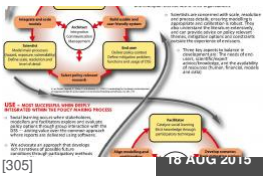
[303]

Including Land Value in Hazard Mitigation Planning

[303]

ECONOMICS [239], LAND MANAGEMENT [304]

Land use policies hold the greatest long-term risk reduction potential but are under-utilised.



[305]

Developing and Using a Decision Support System for Mitigation Planning

[305]

DECISION MAKING [2], MITIGATION [242]

[306]

Transforming risk analysis and mitigation planning in Australia

[306]

DECISION MAKING [2], ECONOMICS [239]

We have developed a decision support system with potential to transform planning for risk reduction in...

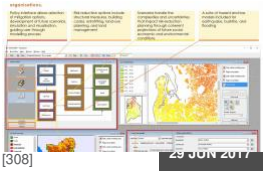
[307]

Tomorrow's disasters - foresight principles, risk assessment and treatment

[307]

DECISION MAKING [2], MULTI-HAZARD [3]

When plans have an over-reliance on what happened in the past, the risk is that one misses the potential for...



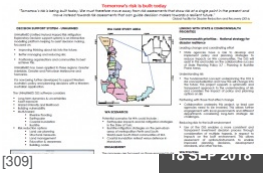
[308]

UNHaRMED: Unified Natural Hazard Risk Mitigation Exploratory Decision Support System

[308]

DECISION MAKING [2], MULTI-HAZARD [3]

UNHaRMED is a spatial decision support system (DSS) for planners and policy makers to assist in the reduction...



[309]

Developing a Decision Support System for Western Australia

[309]

DECISION MAKING [2], MITIGATION [242]

UNHaRMED (Unified Natural Hazard Risk Mitigation Exploratory Decision support system) is an interactive...

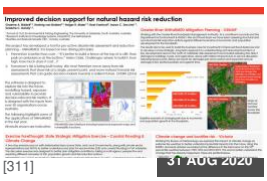
[310]

UNHARMED – Considering futures of risk

[310]

DECISION MAKING [2], MULTI-HAZARD [3]

TWO DRIVING PRINCIPLESPrevention is better than cure - "Better to build a fence at the top of a cliff, than...



[311]

Improved decision support for natural hazard risk reduction

[311]

DECISION MAKING [2], MULTI-HAZARD [3]

Key findings: A flexible approach to understanding and planning risk reduction for different hazards and from...

Linked Projects

Mapping and understanding bushfire and natural hazard vulnerability and risks at the institutional scale [312]

ECONOMICS AND STRATEGIC DECISIONS [313]

Prof Roger Jones
Victoria University [314]

Economics of natural hazards
[315]

ECONOMICS AND STRATEGIC DECISIONS [313]

Dr Veronique Florec
University of Western Australia [316]

[316]

Optimising post-disaster recovery interventions in Australia
[317]

ECONOMICS AND STRATEGIC DECISIONS [313]

Prof Mehmet Ulubasoglu
Deakin University [318]

[318]

Policies, institutions and governance
[319]

GOVERNANCE AND INSTITUTIONAL KNOWLEDGE [320]

A/Prof Michael Eburn
Australian National University [321]

[321]

Scientific diversity and uncertainty in risk mitigation policy and planning
[322]

GOVERNANCE AND INSTITUTIONAL KNOWLEDGE [320]

Dr Jessica Weir
Western Sydney University [323]

[323]

Cost-effective mitigation strategy for building related earthquake risk
[324]

BUILT ENVIRONMENT [325]

Prof Michael Griffith
University of Adelaide [7]

[7]

Cost-effective mitigation strategy for flood prone buildings
[326]

BUILT ENVIRONMENT [325]

Dr Ken Dale
Geoscience Australia [327]

[327]

Improving the resilience of existing housing to severe wind events
[328]

BUILT ENVIRONMENT [325]

Prof John Ginger
James Cook University [329]

[329]

Natural hazard exposure information modelling framework
[330]

BUILT ENVIRONMENT [325]

Dr Krishna Nadimpalli
Geoscience Australia [327]

[327]

Using realistic disaster scenario analysis to understand natural hazard impacts and emergency management requirements
[331]

SCENARIOS AND LOSS ANALYSIS [332]

Dr Matthew Mason
University of Queensland [333]

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

An analysis of building losses and human fatalities from natural disasters [334]

SCENARIOS AND LOSS ANALYSIS [332]

Dr Katharine Haynes
University of Wollongong [335]

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