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INCREASING RESIDENTS' PREPAREDNESS AND PLANNING FOR NATURAL HAZARDS

Annual project report 2015-2016

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The University of Melbourne
Bushfire and Natural Hazards CRC





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Cover: A NSW Rural Fire Service brigade member educating community members about property defence during a bushfire. Photo by Damien Ford, NSW Rural Fire Service.



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EXECUTIVE SUMMARY

This project addresses the following problem statements: 1) what measures can best be used to capture individuals' preparedness and planning for natural hazards?, 2) how effective are traditional strategies, such as community engagement groups vs. brochures vs. websites vs. advertising in increasing preparedness and planning by residents of hazard prone areas?, and 3) what are some of the key barriers and motivators for residents' engagement with disaster resilience building activities, and how can strategies be improved to increase preparedness for natural hazards? All problem statements are being addressed within the context of bushfires and floods.

Over the past 12 months, this project has undertaken the following:

- We finalised addressing Problem Statement 2, and have presented the key findings for bushfires and floods in two Technical Reports ^{1,2}.
- The key findings addressing Problem Statement 2 were presented at the AFAC BNHCRC conference in Adelaide³, and at the 2nd International Symposium on Disaster Management⁴.
- To address Problem Statement 3, we developed and conducted a large survey study amongst residents of flood prone areas, with data collection initiated in September 2015. Unfortunately, this study had to be abandoned due to an exceptionally low response rate at Wave 1 (September 2015). Potential reasons for the low response rate have been presented in a report⁵.
- In response to the low response rate of the September 2015 study, a revised approach to address Problem Statement 3 was developed and presented to end-users in a teleconference in November 2015. The outline for this new study was presented in more detail at the Research Advisory Forum in Hobart. This study will examine the role of perceived community culture in motivating residents to engage with resilience building initiatives and preparedness activities. Data collection for this study is planned to commence in September – December 2016.
- In addition to the above, this year saw the publication of three project related papers in high quality peer-reviewed journals: one on the role of people's expectations and values in their intended response to bushfires⁶, one on the role of indecisiveness and anxiety in preparing for bushfires⁷, and one on the role of constructive and unconstructive worry in preparing for bushfires⁷.
- Finally, discussions have been initiated with end-users around the potential development of an all hazards household preparedness tool, similar to the bushfire household preparedness tool that was developed under the old Bushfire CRC. This tool would be developed in a utilisation stage (i.e., not included in current project).



END USER STATEMENT

Andrew Richards, *New South Wales State Emergency Service, NSW*

The 'Improving Household Level Preparedness for Natural Hazards' project began by measuring householder preparedness for bushfires and floods and measure the effectiveness of traditional strategies to increase householder preparedness.

This project shifted its focus in response to end-user feedback in 2015 to incorporate the influence of community culture and recently developed community based engagement strategies such as community led approaches on household preparedness. The researchers have since undertaken a survey study in NSW to examine the influence of Community Led Planning on household preparedness for floods, but unfortunately the selected communities for the surveys yielded an insufficient sample size to be effective, which has prompted a redesign of the survey methodology. The project team have since responded to survey participants thanking them for their input and feedback in early 2016.

An additional challenge to the approach taken in NSW was revealed as the research team found there were inherent differences in programs that would make it difficult to aggregate findings. To overcome these challenges, the project team was able to identify a few potential processes that agency projects and programs share, and then adapt survey questions to further explore the issues of individual alignment with community beliefs and norms, and their impacts upon the motivation to prepare. The project team also sought input from end users regarding the contributors to success for each program.

In 2015 -16 Jennifer and Ilona have pursued interactions with end users as part of one-on-one agency briefings, the Hobart Research Advisory Forum, and a project teleconference.

Utilisation of this project will provide agencies with:

- a) evidence-based feedback about the effectiveness of their current strategies that motivate people to prepare and plan for natural hazards;
- b) evidence to assist agencies to improve the effectiveness of existing engagement strategies;
- c) stakeholder briefings, hazard notes and technical reports;
- d) the groundwork for the transformation of the Bushfire Household Preparedness tool into an industry standard tool and measures for floods and other hazards.



INTRODUCTION

The increasing frequency and complexity of natural hazards poses a challenge for community resilience. Communication and education of risk mitigation strategies play an essential role in building and maintaining resilience through preparation by residents. However, before the start of this project, relatively little was known about the effectiveness of existing hazard communications and education strategies in increasing preparedness and planning. Also, we identified a need to determine what some of the key barriers and enablers to preparedness are to improve the baseline effectiveness of these community engagement strategies.

This project combines expertise in communication, social and consumer psychology, and disaster and emergency management. It is designed to aid the development of evidence-based strategies that motivate appropriate action during the prevention and preparedness phases of disasters. More specifically, it will address the following problem statements: 1) what measures can best be used to capture individuals' preparedness for hazards?, 2) how effective are existing traditional strategies such as community engagement groups vs. brochures vs. websites vs. advertising in increasing preparedness by residents of hazard prone areas?, and 3) what are some of the barriers and enablers in residents' preparedness for hazards, and how can the existing strategies used to increase preparedness for hazards be improved?

These problem statements will be examined through quantitative survey-based studies across Australia, with individual/household level preparedness for bushfires and floods as the main outcome variables of interest.

By addressing these problem statements, this project will provide evidence-based recommendations for end-users about how to improve the effectiveness of strategies that aim to increase preparedness amongst residents of hazard prone areas.



PROJECT OVERVIEW

The first stage of the project started in January 2014 and will continue until June 2017, with a potential second stage continuing until June 2020. The 3 phases that form a part of Stage 1 are outlined below:

PROJECT PHASES STAGE 1 (2014 – 2017)

Phase 1

In the first phase, the focus was on the development of the key dependent measures for the studies, namely measures of preparing for bushfires and floods. These measures needed to cover a variety of preparedness types, so as to form a basis on which to compare individual households on how prepared they are for response to and recovery from bushfires and floods.

Phase 2

In the second phase, we used these dependent measures to examine the relative effectiveness of traditional communication strategies that are currently being used, such as the availability of community-based information sessions, providing information through websites and brochures, and the use of advertising campaigns in increasing preparedness for bushfires and floods.

Phase 3

In the third phase of the project, we will focus on identifying key barriers and motivators for residents' engagement with disaster resilience building activities. In other words, the Phase 3 study will examine why some individuals or households prepare more so than others, and why some individuals or households engage with disaster resilience building programs in their community more so than others. This will allow for the identification of ways in which current strategies may be improved.



PROJECT ACTIVITIES SINCE JUNE 2015

RESEARCH ACTIVITIES JUNE 2015 – JUNE 2016

Reports addressing Problem Statement 2

Over the past 12 months we have written reports covering the two studies that were conducted to address the Phase 2 problem statement “How effective are existing communication strategies such as community engagement groups vs. brochures vs. websites vs. advertising campaigns in increasing preparedness by residents of hazard prone areas?”. To address this problem statement, we gathered data amongst residents of bushfire and flood prone areas, and measured both their active use of information sources, such as community-based information meetings, brochures, and websites, and their passive awareness of TV-based advertising on bushfire and flood preparedness. We also captured the extent to which these residents had performed a variety of preparatory actions (as determined in Phase 1). This allowed us to statistically examine whether residents who had actively used information sources and/or were aware of advertising campaigns ended up preparing more or less than those who did not use any of the information sources and/or were not aware of the advertising on TV.

Key findings for bushfires (from the technical report¹):

[...even after controlling for bushfire risk perceptions, people who access and engage with information sources are better prepared for bushfires than those who do not. The report notes, however, that the majority of people are not accessing information on how to prepare their household for bushfires, despite being at risk of this occurrence.]

Key findings for floods (from the technical report²):

[...even after controlling for flood risk perceptions, people who access and engage with information sources are better prepared in some ways for floods than those who do not, especially with respect to planning their response. The report notes, however, that the majority of people are not accessing information on how to prepare for floods, despite being at risk of this occurrence.]

Problem Statement 3: Study 1

Objective and Method. To address the problem statement attached to Phase 3, namely ‘What are some of the barriers and enablers in residents’ preparedness for hazards, and how can the existing strategies be improved?’, we designed a study to evaluate the effectiveness of Community Led Planning Initiatives (CLPIs) undertaken by NSW SES in increasing residents’ preparedness and planning for floods in New South Wales. The study method also allowed for the identification of potential mechanisms underlying the effectiveness of such programs and of possible barriers to the effectiveness of these programs to help improve them.



The study was designed as a longitudinal study with multiple waves of data collection. Each wave would follow 6 months after the last. The first wave of data collection was designed to take place in September 2015. Upon completion of the survey drafts, we sought and integrated feedback from our end-users, and then submitted the final drafts to the Human Ethics Sub-Committee of the University of Melbourne. The study was approved by the committee before data collection was initiated in September 2015. Copies of the final surveys are available upon request.

Further details on the method of data collection have been copied from the technical report⁵ below:

[The round of data collection in September was conducted in several communities that were to undergo a CLPI and in several communities that were to serve as control communities. The September data would then serve as a baseline measure of household preparedness for floods, community culture around flood preparedness, and perceived responsibilities in these communities.

Invitations to participate in the Wave 1 study were sent out to 9373 households in these communities. In addition, 800 surveys were sent out to be distributed through door knocking in these communities by SES NSW volunteers. Also, a media release was sent out to promote the study in these communities. Finally, participation in the first wave of data collection was rewarded by being entered into a prize draw, with 13 prizes totalling a value of \$1500.]

Results. Unfortunately, the data collection phase for the first wave resulted in a very low response rate of less than 1%, with 78 completed surveys. We sought feedback from NSW SES and used feedback from the volunteers that helped distribute the survey in the construction of a report on possible reasons for the low response rate⁵. This report also provides potential suggestions for how these issues might be prevented in future studies.

Problem Statement 3: Study 2

In response to the low response rate of the September 2015 study, a revised approach to address Problem Statement 3 was developed and presented to end-users in a teleconference in November 2015. The outline for this new study was presented in more detail at the Research Advisory Forum in Hobart. This study will examine the role of perceived community culture in motivating residents to engage with resilience building initiatives and preparedness activities. Data collection for this study is planned to commence in September – December 2016.

END-USER ENGAGEMENT JUNE 2015 – JUNE 2016

To ensure our project continues to complement the other projects in our cluster, and remains as relevant as possible to our end-users, we have continued to



engage in telephone conferences attended by all project leaders in our cluster and our cluster lead end-user. In addition, we have had regular contact moments with our end-users, by phone, email, and face-to-face meetings and workshops. A summary of key contact moments with our end-users over the past 12 months, the purpose of the contact, and its outcomes has been provided below:

- July 2015: Final feedback was sought and received in relation to the first study (Study 1) that was developed to address Problem Statement 3.
- September 2015: The AFAC/BNHCRC conference in Adelaide provided us with an opportunity to meet with some of the researchers from our cluster and some of the end-users. In addition, it provided us with an opportunity to share a summary of the findings in relation to Problem Statement 2 with a larger audience.
- November 2015: We organised a teleconference for our end-users to discuss the results of the September 2015 study, and discuss the way forward, including the revision of study approach for Study 2.
- January 2016: Individual phone meetings were arranged with several end-users who were unable to attend the November 2015 teleconference.
- January 2016: We finalised a draft of the two Technical Reports addressing Problem Statement 2. In January, these drafts were sent out to our end-users for feedback. This feedback was integrated into the final versions of the reports, which were submitted to the CRC in March 2016.
- February 2016: We finalised a draft of a Hazard Note covering the findings in relation to Problem Statement 2. This draft was sent out to our end-users for feedback. The feedback was integrated into the Hazard Note, which was submitted to the CRC in March 2016.
- May 2016: An overview of project findings to date, plus an outline for the second study to address Problem Statement 3 were presented to end-users at the Research Advisory Forum in Hobart. The forum enabled us conduct a 2-hour workshop with our end-users. This workshop was mainly used to discuss the potential need for additional utilisation products stemming from the research in Phase 1 and Phase 2.

PROJECT RELATED PUBLICATIONS

Below is an overview of the three project related papers that have been published in high standing peer-reviewed journals since the start of the project. Abstracts from each of the papers are copied below.



1. McNeill, I.M., Dunlop, P.D., Skinner, T.C., & Morrison, D.L. (2016). A value and expectancy based approach to understanding residents' intended response to a wildfire threat. *International Journal of Wildland Fire*, 25, 378-389.

[To motivate residents to evacuate early in case of a wildfire threat, it is important to know what factors underlie their response-related decision-making. The current paper examines the role of the value and expectancy tied to potential outcomes of defending versus evacuating upon awareness of a community fire threat. A scenario study amongst 339 Western Australians revealed that residents intending to leave immediately upon awareness of a community fire threat differ from those not intending to leave immediately in both value and expectancy. For one, intended leavers were more likely than those intending to defend their property to have children. Also, the data showed a trend towards intended leavers being less likely to have livestock. Furthermore, intended leavers placed less importance on the survival of their property than those with other expressed intentions. They also reported lower expectancies regarding the likelihood of achieving positive outcomes by defending than those intending to defend or wait and see before deciding what to do. Finally, intended leavers perceived it more likely that they would avoid harm to their pets by evacuating than those intending to defend throughout or wait and see. These findings have important implications for strategies to influence residents' response-related decision-making.]

2. McNeill, I.M., & Dunlop, P.D., Skinner, T.C., & Morrison, D.L. (2016). Predicting risk-mitigating behaviors from indecisiveness and trait-anxiety: two cognitive pathways to task avoidance. *Journal of Personality*, 84, 36-45.

[Objective: Past research suggests the traits indecisiveness and trait-anxiety may both decrease the likelihood of performing risk-mitigating preparatory behaviors (e.g. preparing for natural hazards), and suggests two cognitive processes (perceived control and worrying) as potential mediators. However, no single study to date has examined the influence of these traits and processes together. Examining them simultaneously is necessary to gain an integrated understanding of their relationship with risk-mitigating behaviors.

[Method: We therefore examined these traits and mediators in relation to wildfire preparedness in a two-wave field-study amongst residents of wildfire-prone areas in Western Australia (total N = 223).

[Results: Structural equation modeling results showed that indecisiveness uniquely predicted preparedness, with higher indecisiveness predicting lower preparedness. This relationship was fully mediated by perceived control over wildfire related outcomes. Trait-anxiety did not uniquely predict preparedness or perceived control, but did uniquely predict worry, with higher trait-anxiety predicting more worrying. Also, worry trended towards uniquely predicting preparedness, albeit in an unpredicted positive direction.



Conclusions: *This shows how the lack of performing risk-mitigating behaviors can result from distinct cognitive processes that are linked to distinct personality traits. It also highlights how simultaneous examination of multiple pathways to behavior creates a fuller understanding of its antecedents.]*

3. McNeill, I.M., & Dunlop, P.D. (in press). Development and preliminary validation of the CUWQ: A measure of individual differences in constructive vs. unconstructive worry. *Psychological Assessment*. (Accepted November 5, 2015)

[This article presents a measure of individual differences in the tendencies to worry constructively and unconstructively, called the Constructive and Unconstructive Worry Questionnaire (CUWQ). The measure is based on a control theory perspective of worry, and separates the tendency to worry in a way that facilitates goal-pursuit and threat reduction (Constructive Worry) from the tendency to worry in a way that hinders goal-pursuit whilst sustaining threat awareness (Unconstructive Worry). CUWQ scores were validated in two independent nonclinical samples, including North American (Sample 1, N = 295) and Australian (Sample 2, N = 998) residents. Final scale items were elected based on Sample 1, and the measure showed good model fit through a confirmatory factor analysis in Sample 2. In addition, scores on the two subscales showed criterion-related validity by statistically predicting a variety of outcomes in both samples: Constructive worry was positively associated with punctuality and wildfire preparedness and negatively associated with trait-anxiety and amount of worry. Unconstructive worry, on the other hand, was positively associated with trait-anxiety and amount of worry, and negatively associated with punctuality and wildfire preparedness. The two scale-scores were uncorrelated in Sample 1 and positively correlated in Sample 2, thereby showing that having a tendency to worry in an unconstructive manner does not prohibit one from worrying in a constructive manner as well. Understanding how the two tendencies to worry differ from each other and separating their measurement enables a better understanding of the role of worry in both normal behavior and psychopathology.]



PUBLICATIONS LIST TO DATE

PEER REVIEWED JOURNAL PUBLICATIONS

- McNeill, I.M., Dunlop, P.D., Skinner, T.C., & Morrison, D.L. (2016). A value and expectancy based approach to understanding residents' intended response to a wildfire threat. *International Journal of Wildland Fire*, 25, 378-389. (Based on Bushfire CRC data; Impact factor = 2.51)
- McNeill, I.M., & Dunlop, P.D., Skinner, T.C., & Morrison, D.L. (2016). Predicting risk-mitigating behaviors from indecisiveness and trait-anxiety: two cognitive pathways to task avoidance. *Journal of Personality*, 84, 36-45. (Based on Bushfire CRC data; Impact factor = 2.94)
- McNeill, I.M., & Dunlop, P.D. (in press). Development and preliminary validation of the CUWQ: A measure of individual differences in constructive vs. unconstructive worry. *Psychological Assessment*. (Accepted November 5, 2015; Based on BNHCRC data; Impact factor = 2.75)

TECHNICAL REPORTS

- McNeill, I. M., Boldero, J. B., & McIntosh, E. (2015). Report on the selection of Preparedness and Planning measures for "Improving the Role of Hazard Communications in Increasing Residents' Preparedness and Response Planning for Recurring Natural Hazards".
- McNeill, I. M., Boldero, J. M., & McIntosh, E. (2016). Household preparedness for bushfires: The role of residents' engagement with information sources.
- McNeill, I. M., Boldero, J. M., & McIntosh, E. (2016). Household preparedness for floods: The role of residents' engagement with information sources.
- McNeill, I. M., Boldero, J. M., & McIntosh, E. (2016). September 2015 community led planning study: Lessons Learned in Relation to the Low Response Rate.

CONFERENCE PRESENTATIONS

- McNeill, I., Boldero, J., Handmer, J., Johnston, D., Dudgeon, P., & Wearing, A. (2014). Improving the role of hazard communications in increasing residents' preparedness and response planning. Poster presented at the AFAC and Bushfire and Natural Hazards CRC joint conference, Wellington, New Zealand, September 2-4, 2014.
- McNeill, I. M., Boldero, J. B., & McIntosh, E. (2015). Preparing for fires and floods: The role of different information sources. Presentation at the Disaster and Emergency Management Conference, Gold Coast, May 4-5, 2015.
- McNeill, I., Boldero, J., & McIntosh, E. (2015). Does the use of information sources lead to better hazard preparedness? Poster presented at the AFAC and Bushfire and Natural Hazards CRC joint conference, Adelaide, Australia, September 1-3, 2015.



- McNeill, I., Boldero, J., & McIntosh, E. (2015). Household preparedness for fires and floods: An empirical evaluation of the role of information sources. Paper presented at the 2nd International Symposium on Disaster Management, Melbourne, Australia, October 12-14, 2015.
- McNeill, I., Dunlop, P. (2016). Introducing the CUWQ: A measure of individual differences in constructive and unconstructive worry. Poster presented at the European Conference on Personality, Timisoara, Romania, July 19-23, 2016.
- McNeill, I., Dunlop, P. (2016). Introducing the CUWQ: A measure of individual differences in constructive and unconstructive worry. Paper presented at the European Conference on Personality, Timisoara, Romania, July 19-23, 2016.



CURRENT TEAM MEMBERS

PROJECT MANAGEMENT/LEAD RESEARCH TEAM

- Dr Ilona McNeill (Project Leader) – The University of Melbourne
- A/Prof Jennifer Boldero (Project Leader) – The University of Melbourne
- Ms Elle McIntosh (Research Assistant) – The University of Melbourne

EXTENDED RESEARCH TEAM

- Prof John Handmer – RMIT University
- Prof David Johnston – GNS Science/Massey University
- Dr Paul Dudgeon – The University of Melbourne
- Emeritus Professor Alex Wearing – The University of Melbourne
- Dr Patrick Dunlop – The University of Western Australia

END-USERS AND ASSOCIATED FEEDBACK PROVIDERS

- Andrew Richards (Lead End-User) – NSW SES
- Amanda Leck – AFAC
- Anthony Clark – RFS NSW
- Fiona Dunstan and Peta O'Donohue – CFS
- Glenn Benham – SA MFS
- Gregory Wild – Fire & Rescue NSW
- Gwynne Brennan and Karen Enbom – CFA
- John Richardson – Red Cross
- Michelle Coombe – SAFECOM
- Phil Canham – ACT ESA
- Sandra Barber – TFS
- Susan Davie – VIC SES
- Suellen Flint and Tracey Leotta – DFES
- Trent Curtin – MFB
- Wendy Kelly – AGD

STUDENTS

- Yinghui (Cathy) Cao – The University of Western Australia



REFERENCES

- ¹ McNeill, I. M., Boldero, J. M., & McIntosh, E. (2016). Household preparedness for bushfires: The role of residents' engagement with information sources.
- ² McNeill, I. M., Boldero, J. M., & McIntosh, E. (2016). Household preparedness for floods: The role of residents' engagement with information sources.
- ³ McNeill, I., Boldero, J., & McIntosh, E. (2015). Does the use of information sources lead to better hazard preparedness? Poster presented at the AFAC and Bushfire and Natural Hazards CRC joint conference, Adelaide, Australia, September 1-3, 2015.
- ⁴ McNeill, I., Boldero, J., & McIntosh, E. (2015). Household preparedness for fires and floods: An empirical evaluation of the role of information sources. Paper presented at the 2nd International Symposium on Disaster Management, Melbourne, Australia, October 12-14, 2015.
- ⁵ McNeill, I., Boldero, J., & McIntosh, E. (2016). September 2015 community led planning study: Lessons learned in relation to the low response rate.
- ⁶ McNeill, I.M., Dunlop, P.D., Skinner, T.C., & Morrison, D.L. (2016). A value and expectancy based approach to understanding residents' intended response to a wildfire threat. *International Journal of Wildland Fire*, 25, 378-389.
- ⁷ McNeill, I.M., & Dunlop, P.D., Skinner, T.C., & Morrison, D.L. (2016). Predicting risk-mitigating behaviors from indecisiveness and trait-anxiety: two cognitive pathways to task avoidance. *Journal of Personality*, 84, 36-45.
- ⁸ McNeill, I.M., & Dunlop, P.D. (in press). Development and preliminary validation of the CUWQ: A measure of individual differences in constructive vs. unconstructive worry. *Psychological Assessment*.