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INCREASING RESIDENTS' PREPAREDNESS AND PLANNING FOR NATURAL HAZARDS

Annual project report 2017-2018

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Cover: Planning for emergencies is integral to emergency management. Photo: South Australia SES (CC BY-NC-SA 2.0)



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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 have been addressed within the context of bushfires and floods.

Since July 2017, this project has undertaken the following:

- We finalized two technical reports based on the community culture studies. These studies addressed Problem Statement 3, and examined the role of perceived community culture in motivating residents to engage with resilience building initiatives and preparedness activities. The first study examined this in the context of bushfires, and the second does so in the context of floods.
- In addition, a Hazard Note/short report was prepared based on the findings of the community culture studies.
- Finally, this was the final year of activity for this project, and project findings were summarized in a synthesis report.



END USER STATEMENT

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

The 'Improving Household Level Preparedness for Natural Hazards' project began in 2014 by measuring household preparedness for bushfires and floods and measuring 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 in 2016 developed community based engagement strategies such as community led approaches on household preparedness.

Since July 2017, the project team has developed

- Two technical reports on community culture and how preparedness for bushfires and floods is shaped by social norms, ability and attitudes.
- A Hazard Note on the role of community culture in preparedness for bushfires and floods.
- A synthesis report that summarizes the project findings across 2014-2018.

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. 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 focused on identifying key barriers and motivators for residents' engagement with disaster resilience building activities. In other words, the Phase 3 study examined 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 was examined within the context of community culture. More specifically, two studies examined the role of different community norms and attitudes and their influence on residents' motivation to prepare. This allowed for the identification of ways in which current strategies may be improved.



PROJECT ACTIVITIES SINCE JULY 2017

RESEARCH ACTIVITIES JULY 2017 – JANUARY 2018

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 two studies that examined the role of community culture, specifically community attitudes and social norms, in motivating residents to engage in resilience building activities related to bushfires (study 1) and floods (study 2). Results from these studies are presented in two Technical Reports.

END-USER ENGAGEMENT JULY 2017 – JANUARY 2018

A summary of key contact moments with our end-users since July 2017, the purpose of the contact, and its outcomes has been provided below:

- Early August 2017: Two technical reports based on the community culture studies were sent out to end-users for feedback. Feedback was received and integrated and reports were finalized in September 2017.
- Mid September 2017: A Hazard Note/short report based on the community culture studies was sent out to end-users for feedback. This report was then finalized for submission to the BNHCRC.
- Late October 2017: Final feedback was sought and received in relation to a synthesis report that covers the main project findings between 2014 and 2017.



PROJECT RELATED PUBLICATIONS

Below is an overview of the four 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. (2016). Development and preliminary validation of the CUWQ: A measure of individual differences in constructive vs. unconstructive worry. *Psychological Assessment*, 28, 1368-1378.

[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.]



4. McNeill, I.M. & Ronan, K. (2017). Children in disasters: the role of household preparedness. *Natural Hazards*, 89(3), 1239-1254.

[To increase children's resilience to disasters, it is important to expand our understanding of what increases their vulnerability. One household factor that has been tied to disaster resilience in general is the extent to which households have prepared themselves. In the context of wildfire preparedness, the current study examined whether households with very young, young, or teenage children differ in the extent to which they prepare their household compared to childless households. A two-wave survey study among Australian residents of wildfire prone areas ($N_{\text{wave1}} = 998$, $N_{\text{wave2}} = 514$) found that households with young (under twelve) and very young (under six) children had prepared their properties less for wildfires compared to childless households at the start of the wildfire season, but they had caught up in property preparedness by the end of it. However, households with younger children also performed fewer disaster planning actions than childless households. This difference remained significant throughout the season. The former group also reported lower motivation to prepare, greater perceived difficulty in preparing, and greater lack of time to prepare than childless households. The majority of these findings were explained by the younger age of the adult parents rather than the presence of younger children per se. An exception was that those with young and very young children reported a greater lack of time to prepare than childless adults of a similar age. We discuss practice and public policy implications that follow from this research.]

In addition, the following papers have come out of the project by our PhD student Cathy Cao:

- Cao, Y., Boruff, B.J., & McNeill, I.M. (in press). Towards personalised public warnings: harnessing technological advancements to promote better individual decision making in the face of disasters. *International Journal of Digital Earth*. (2015 Impact factor = 2.76)
- Cao, Y., Boruff, B.J., & McNeill, I.M. (2016). Is a picture worth a thousand words? Evaluating the effectiveness of maps for delivering wildfire warning information. *International Journal of Disaster Risk Reduction*, 19, 179-196. (2015 Impact factor = 1.24)
- Cao, Y., Boruff, B.J., & McNeill, I.M. (2016). Defining Sufficient Household Preparedness for Active Wildfire Defense: Toward an Australian Baseline. *Natural Hazards Review*, 17.



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. (2016). Development and preliminary validation of the CUWQ: A measure of individual differences in constructive vs. unconstructive worry. *Psychological Assessment*, 28, 1368-1378. (Based on BNHCRC data; Impact factor = 2.75)
- McNeill, I.M. & Ronan, K. (2017). Children in disasters: the role of household preparedness. *Natural Hazards*, 89(3), 1239-1254. (Based on BNHCRC data; Impact factor = 1.83)

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.
- McNeill, I. M., Boldero, J. M., & Vargas-Saenz, A. (2017). Community culture and bushfire preparedness: The role of attitudes and social norms.
- McNeill, I. M., Boldero, J. M., & Vargas-Saenz, A. (2017). Community culture and flood preparedness: The role of attitudes and social norms.
- McNeill, I., Howe, P., Handmer, J., Johnston, D., & Boldero, J. (2018). Synthesis Report.



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 (deceased 23rd September, 2017).
- Ms Adriana Vargas-Saenz (Research Assistant) – The University of Melbourne. Adriana joined our team as a part-time casual staff member in April 2017

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
- A/Prof Piers Howe – The University of Melbourne (Piers joined our team in October 2017)

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 (COMPLETED)

- Yinghui (Cathy) Cao – The University of Western Australia. Cathy finished her PhD thesis in early 2017.



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.
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- 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*.