Defining Floodwater

Expert and Public Perspectives

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Australian Government
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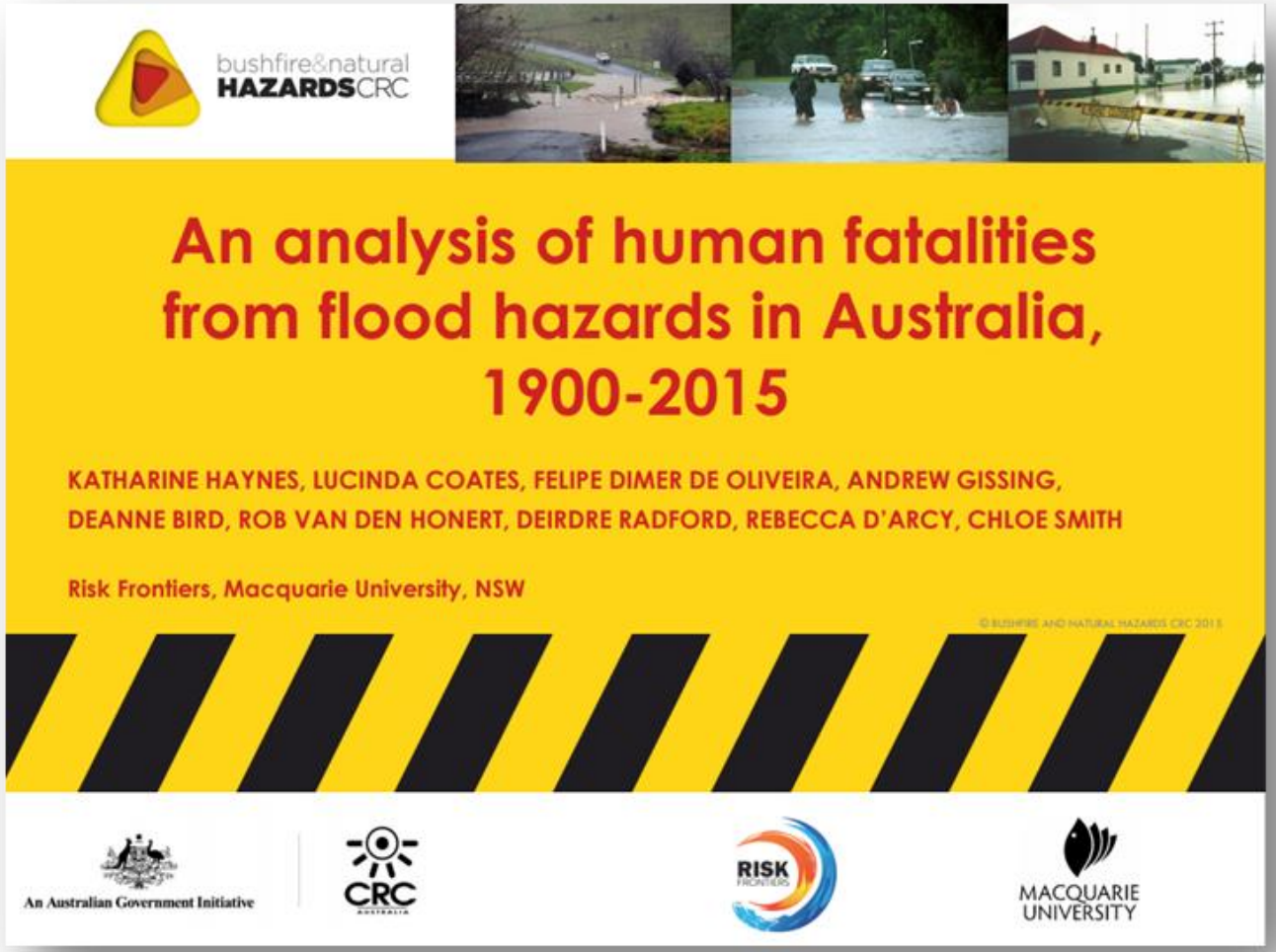
Business Cooperative Research Centres Programme

Flood Risk Communication - project foundation



- Highest risk behaviours
  - Entering floodwater in a vehicle
  - Recreating in floodwater

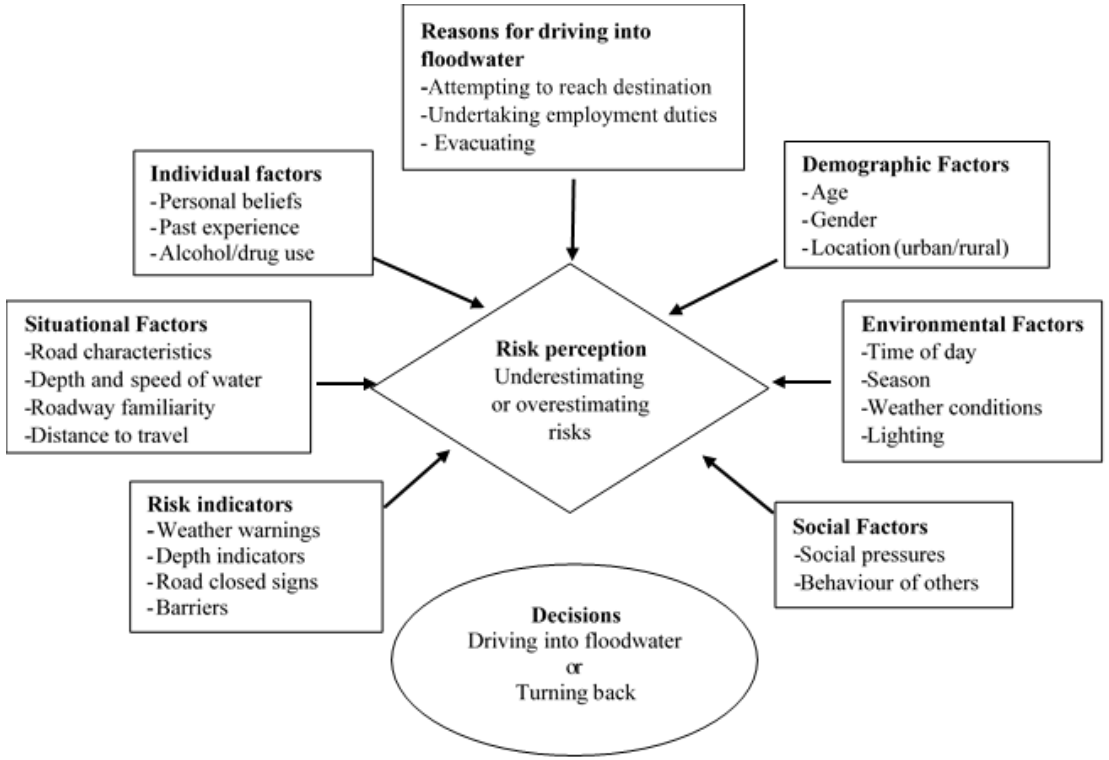
Project outline – Driving into floodwater

1. Understanding behaviour in and around flood water

- Survey Research (Driving into floodwater)
- Experimental Research (Cue utilisation)
- Scenario-based decision-making (Lo-Fi simulation)

2. Evaluating and adapting flood risk communication materials e.g. 15toFloat https://www.youtube.com/watch?v=t4ilUbMXZAQ

Driving into floodwater – complex behaviour



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Driving into floodwater: A systematic review of risks, behaviour and mitigation

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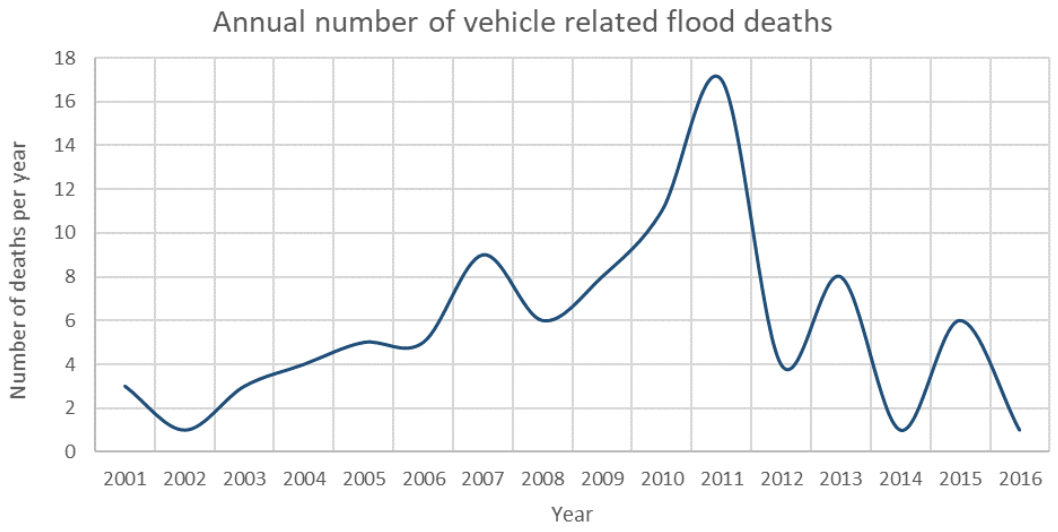
ABSTRACT

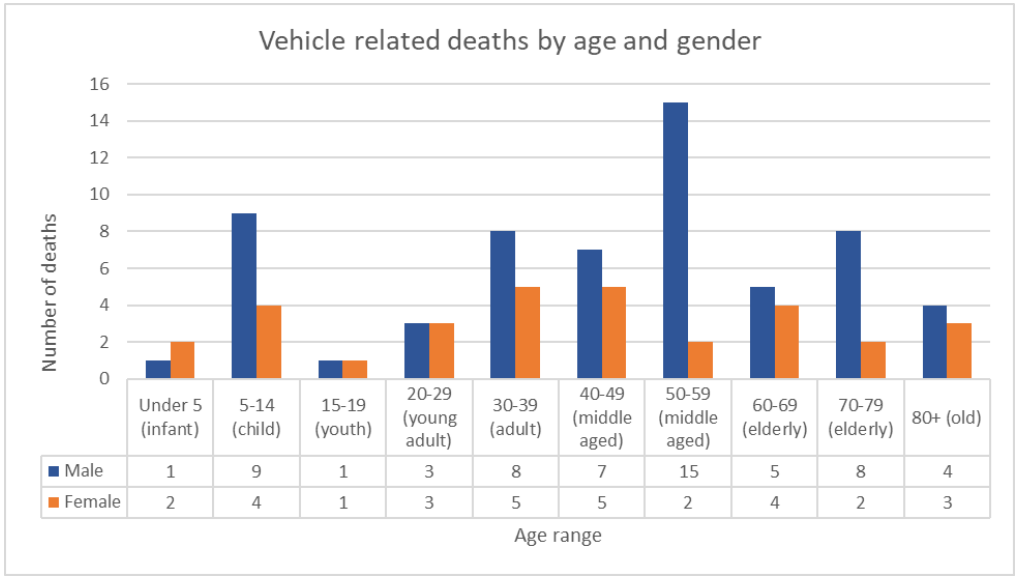
This systematic review summarises the findings of research focused on the risks associated with driving into floodwater. The review aims to compare and document the magnitude of the problem internationally; identifying the risk factors; exploring the application of theories and presence of theoretical models to explain people's risky behaviour; and documenting the intervention strategies utilised or proposed. Literature were searched from a number of databases (e.g. PsycInfo, ScienceDirect, Informit) for publication dates to 31 August 2017, then assessed based on their titles, abstracts and full texts and finally 24 articles were selected. This review compares flood fatality data from four countries (Australia, United States, Greece, and Sweden), groups identified risk factors from these selected studies into seven categories, and proposes a holistic integrated intervention model. The results of the review indicate that studies were predominantly conducted in Australia (10 studies) and USA (7 studies). People's decisions to drive into, or turn back from, floodwater are identified as a consequence of both their risk perception and the combined impact of all other factors (e.g. individual, social, environmental etc.) that interdependently contribute to shape decision-making, The theory of Planned Behaviour (TPB) was the only theory that has been utilised within the literature to understand drivers' willingness to take risks. Improving people's decision-making through educational initiatives, advanced structural mechanisms, regulating existing edicts, and regularly evaluating the effectiveness of current strategies are identified as the best approaches to addressing the challenges in this area. Findings suggest that future studies require data and analysis from a larger range of countries, more comparative analyses within and between countries, an exploration of the relationship between risk factors and their relative level of influence and a greater application of behavioural and decision making theories.

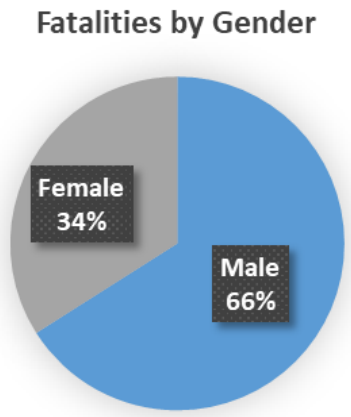
Fatality statistics (Haynes et al., 2017)

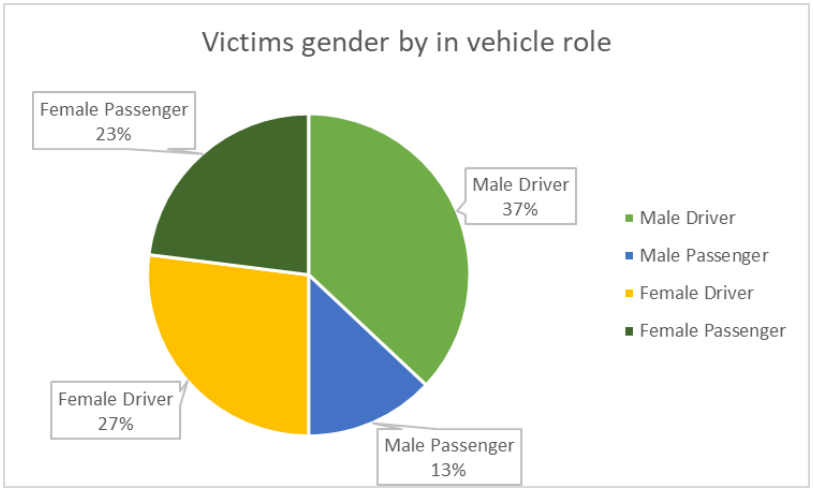
- 182 Australian flood fatalities occurred between 2000 and 2015
  - 45% vehicle-related (n=82)
- Of the vehicle-related flood deaths
  - 35% 4WD (and increasing)
  - 70-80% male
  - Risk groups
    - Males – across ages
    - Workers – including emergency service workers

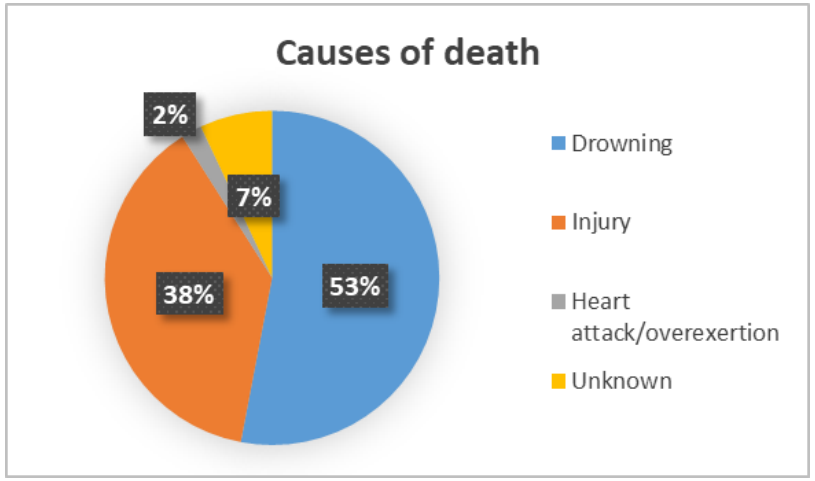
Fatality statistics (AFAC Poster 157 - Ahmed, 2018)











Defining Floodwater – Rationale

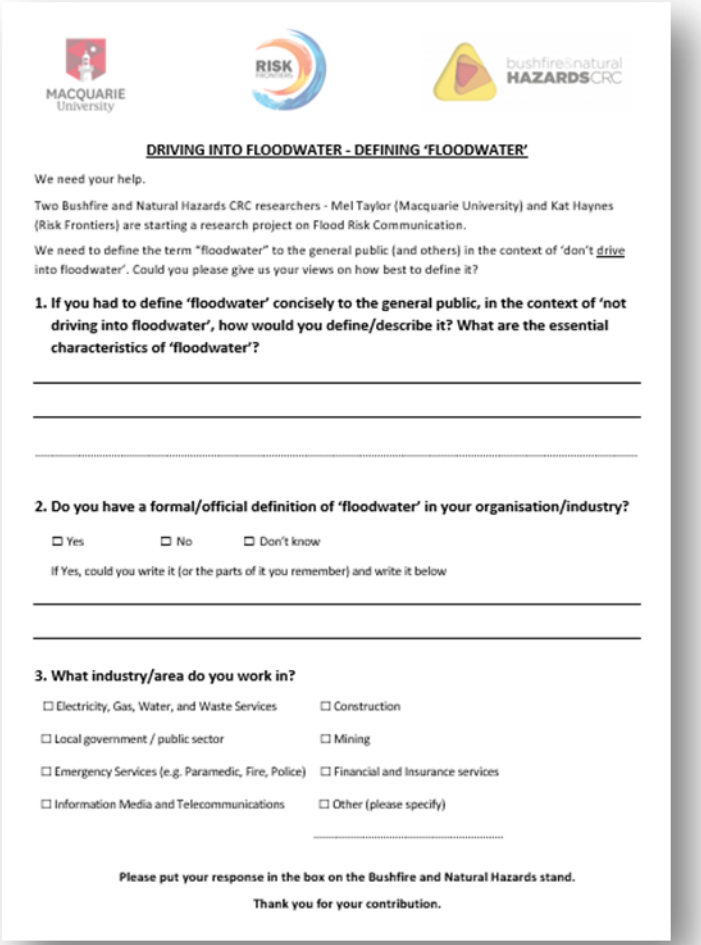
How do you define floodwater?

Fundamental question for flood risk communication

Do both these photos show dangerous floodwater?

Defining Floodwater – FMA 2017

- Initial focus on ‘experts’ and organisational definitions
- Pilot survey (FMA 2017) – 32 experts
- Ideas for next wave of responder and public surveys
  - What do people regard as ‘floodwater’ (on a road)?
  - When does a puddle become a flood?
  - Is there consistency in evaluation – ‘experts’ vs ‘public’?
  - Go beyond words
- Water on Roads survey



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RISK

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DRIVING INTO FLOODWATER - DEFINING ‘FLOODWATER’

We need your help.

Two Bushfire and Natural Hazards CRC researchers - Mel Taylor (Macquarie University) and Kat Haynes (Risk Frontiers) are starting a research project on Flood Risk Communication.

We need to define the term “floodwater” to the general public (and others) in the context of ‘don’t drive into floodwater’. Could you please give us your views on how best to define it?

1. If you had to define ‘floodwater’ concisely to the general public, in the context of ‘not driving into floodwater’, how would you define/describe it? What are the essential characteristics of ‘floodwater’?

2. Do you have a formal/official definition of ‘floodwater’ in your organisation/industry?

☐ Yes ☐ No ☐ Don’t know

If Yes, could you write it (or the parts of it you remember) and write it below

3. What industry/area do you work in?

☐ Electricity, Gas, Water, and Waste Services ☐ Construction

☐ Local government / public sector ☐ Mining

☐ Emergency Services (e.g. Paramedic, Fire, Police) ☐ Financial and Insurance services

☐ Information Media and Telecommunications ☐ Other (please specify)

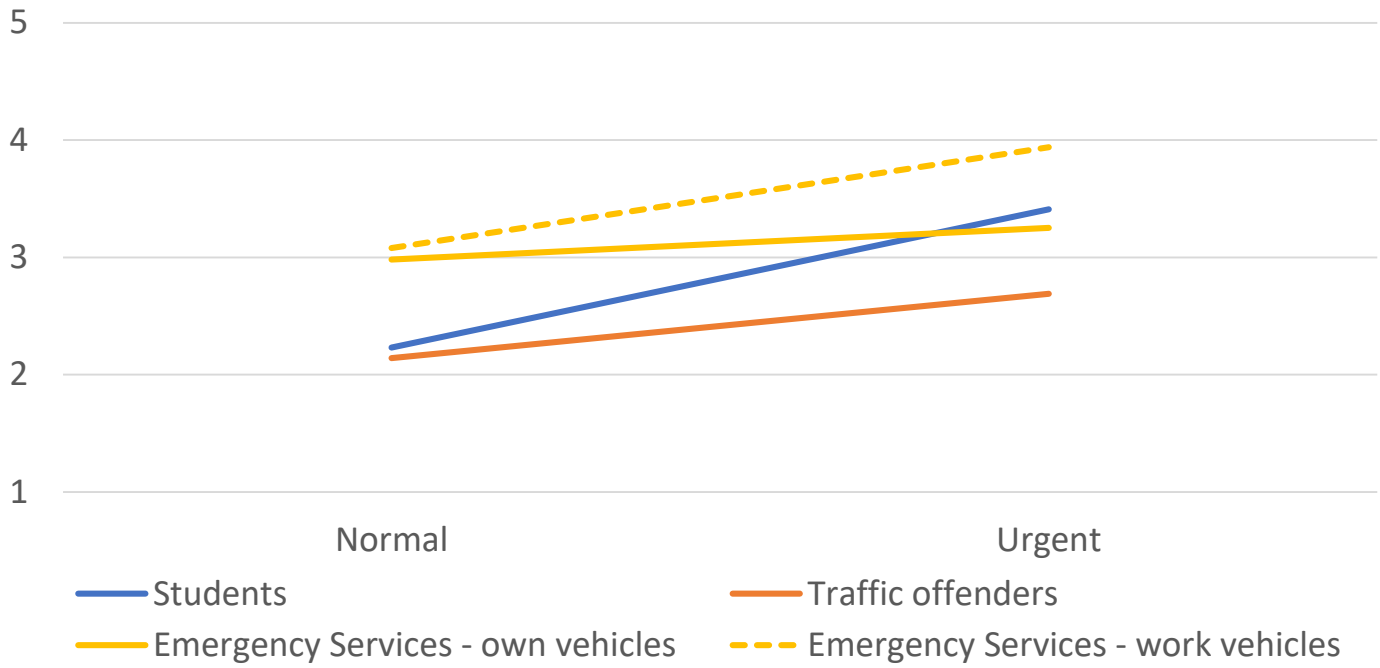
Please put your response in the box on the Bushfire and Natural Hazards stand.

Thank you for your contribution.

Water on Roads surveys

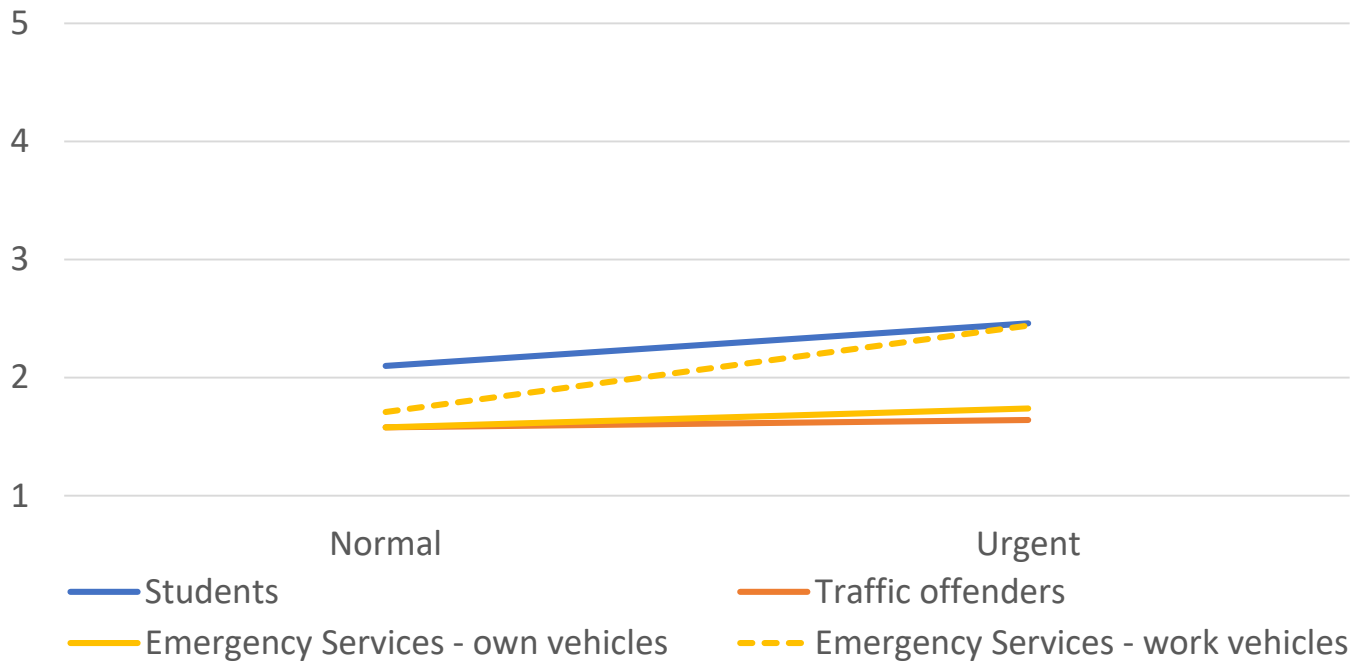
- Research questions
  - What do people regard as ’floodwater’ – in the context of a ‘flooded road’?
  - How do they perceive the risk?
  - What do they think they would do?
- Development
  - Refined set of images from 44 down to a final set of 4
  - Selected to reflect a range of images that a broad range of ‘lay’ and ‘experts’ would (and wouldn’t) drive through
- Participant groups
  - Students (107), Traffic Offenders (66), Emergency services personnel (645), Public (TBA)

Image 1



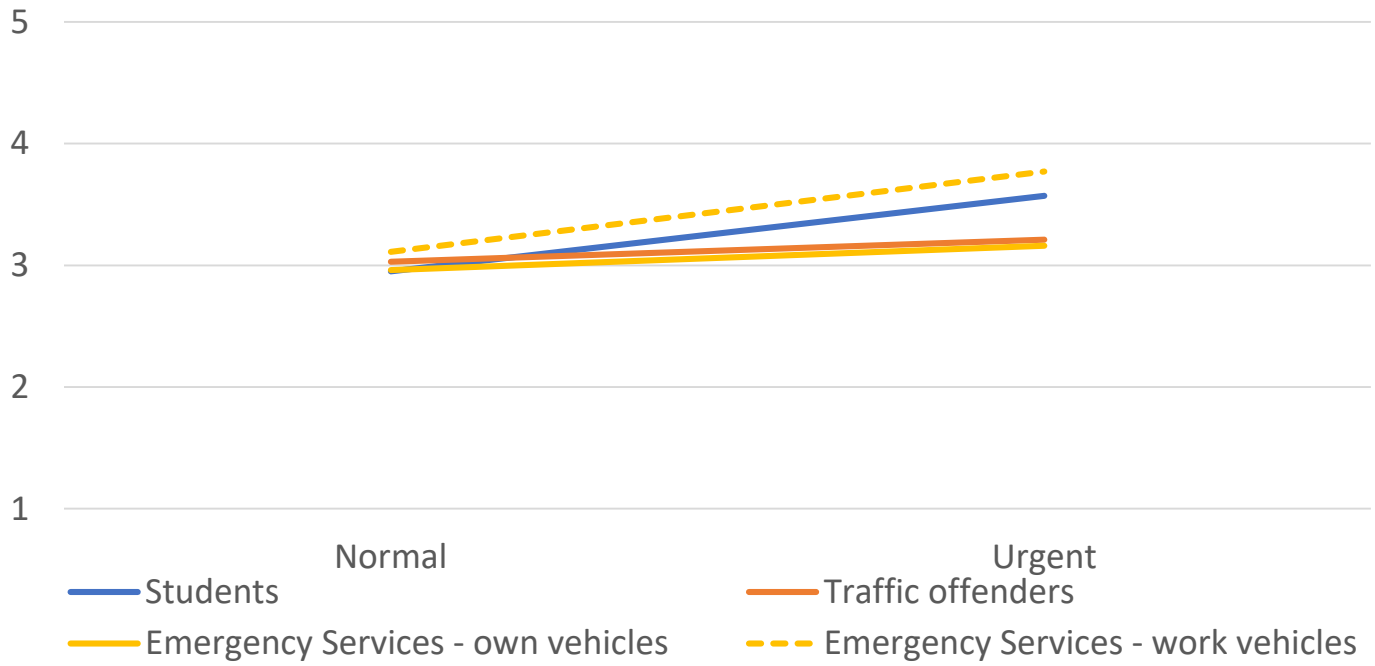
- Flooded? (3.64)
  - + Water above path, can't see lines, drains can't handle it, exceeds storm water design limits, it's flash flooding
  - – Rain water, urban, a flood would be higher, can still drive through it, seems temporary, looks benign, below critical levels

Image 2



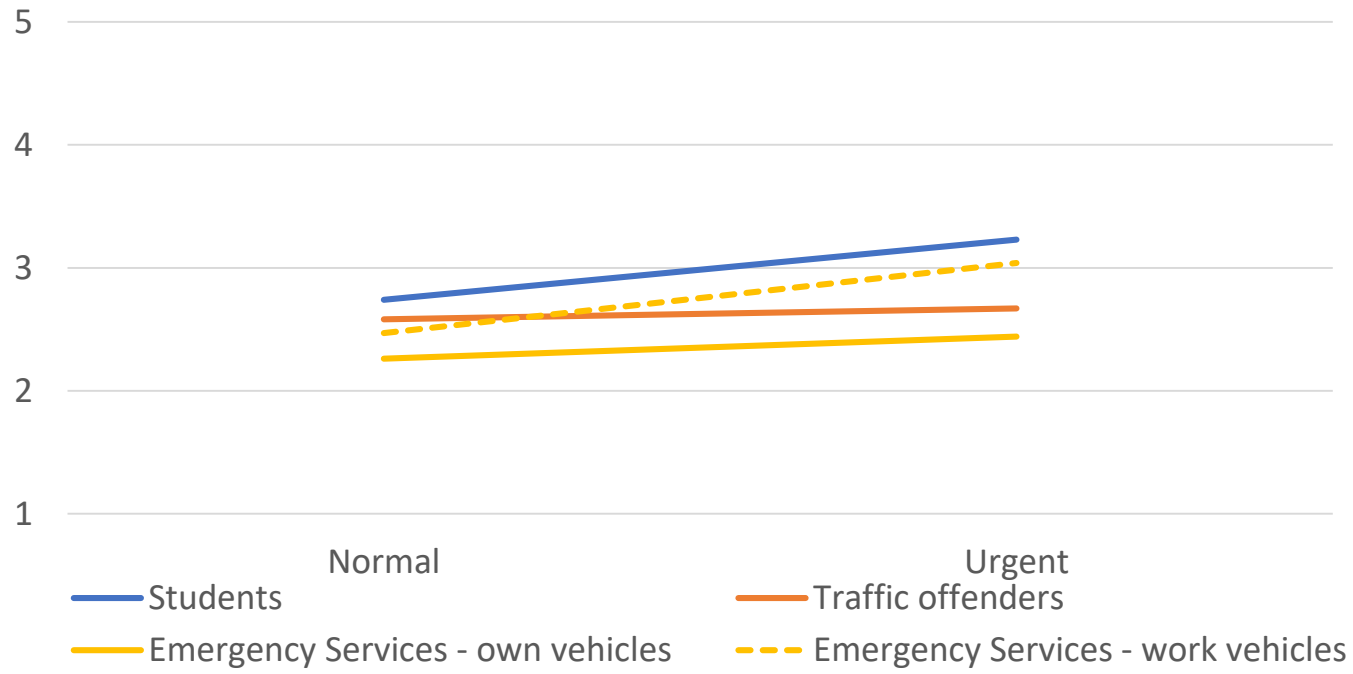
- Flooded? (4.60)
  - + Deep water, road completely submerged, 0.5m deep, it's a floodway with flood depth markers, above critical levels for a standard car
  - − Not a ton of water, water looks shallow

Image 3



- Flooded? (3.68)
  - + Immerses the wheels, not sure how deep it gets, road completely covered, may have hidden deeper spot
  - – Not an area prone to flooding, barely enough to touch the frame, it's shallow, a Yaris can cross, pooled water, ie. a big puddle, not flowing

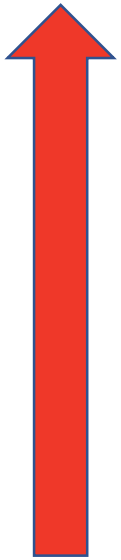
Image 4



- Flooded? (4.08)
  - + Road is about to be entirely submerged, water both sides, flowing water over road, river crossing with depth markers, river crossing causeway above normal levels
  - − Very thin water covering, sections of road uncovered

Research outcomes

- Rolling data collection underway – analysis to be completed by Dec 2018
- Water on Roads image set
  - Statistical testing to determine if useful scale to discriminate between survey participants
    - Valid measure - relates to reported behaviours or other factors, e.g. demographics
  - Potential indicator of ‘risk propensity’ in context of driving into floodwater
    - Value for end users and stakeholders for training
  - Use as a community engagement tool for end users and stakeholders
    - For discussion, possibly development of ‘norms’



Summary

- Still in early phase of project – a work-in-progress
- Differences between ‘expert’ and ‘lay’ views of floodwater – in context of a flooded road
  - Supports taking a step back to look at target audience perspectives
- Tricky issues around official messages
  - ‘If it’s flooded, forget it’
  - ‘Never drive, ride, or walk through floodwater’

Thank you!

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