



National Project

Prevention of Flood Related Fatalities:
A focus on driving through floodwater



Bundaburg 2013 courtesy Courier Mail

Background



- Law Crime Community Safety Council
- Australian New Zealand Emergency Management Committee, Community Engagement Sub Committee
- Funded by Commonwealth Attorney General's Department
- National Working Group
- Workshop
- Scoping Report

What?

FLOOD FATALITIES TOTAL close to 2000 (since 1900)

182 since 2000

4 since Christmas 2015

81 motorists (45%)

35% in 4WD (increased over the last 15 years)

Haynes et al 2016

Perth 2015, courtesy Floodlist

Who?

70-80% male



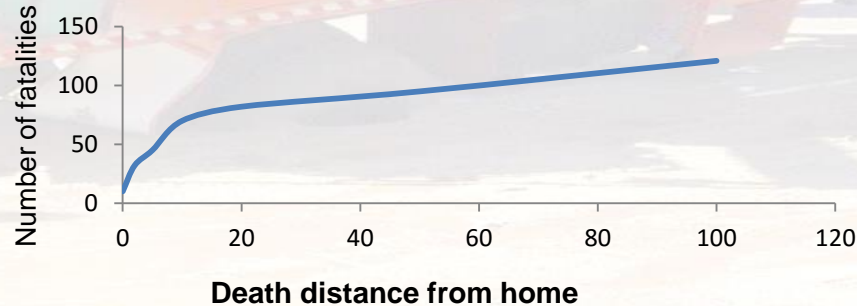
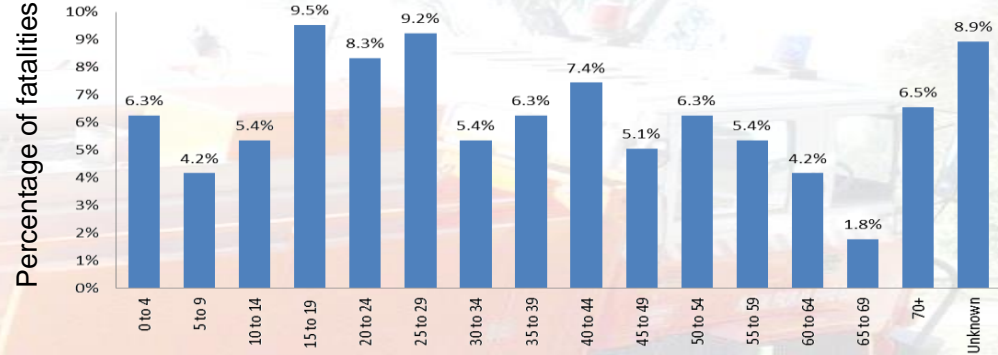
AGE 10-29 and over 60

Experienced, inexperienced drivers and risk takers

Workers

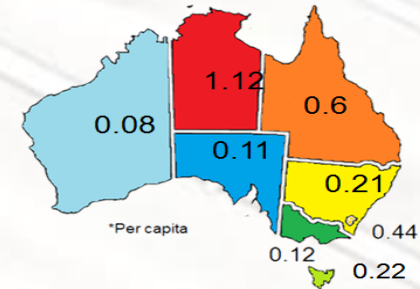
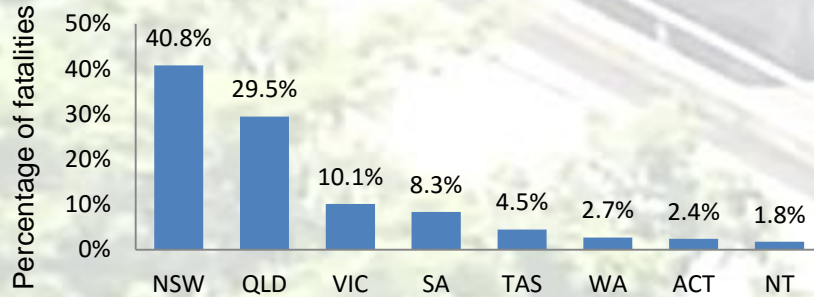
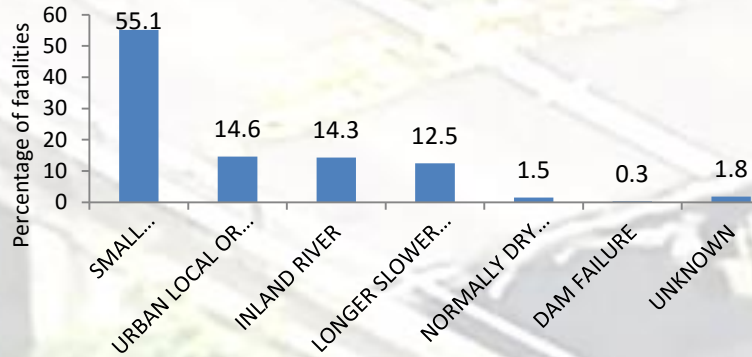
Tourists

Locals



Haynes et al 2016
Royal Life Saving Australia,
2016
QFES 2015

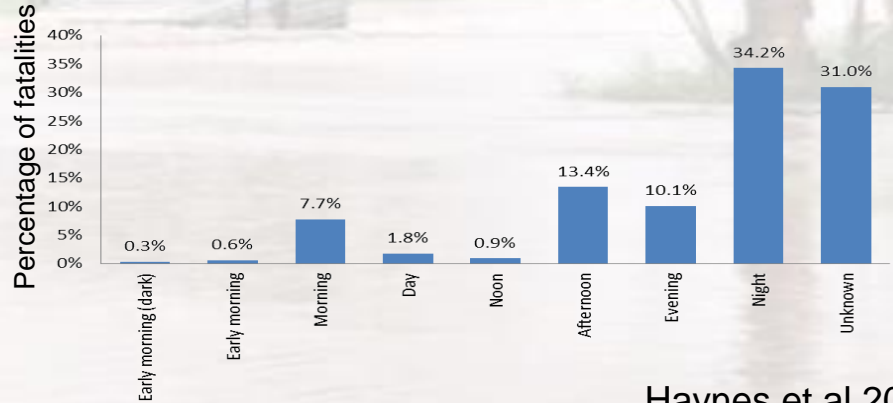
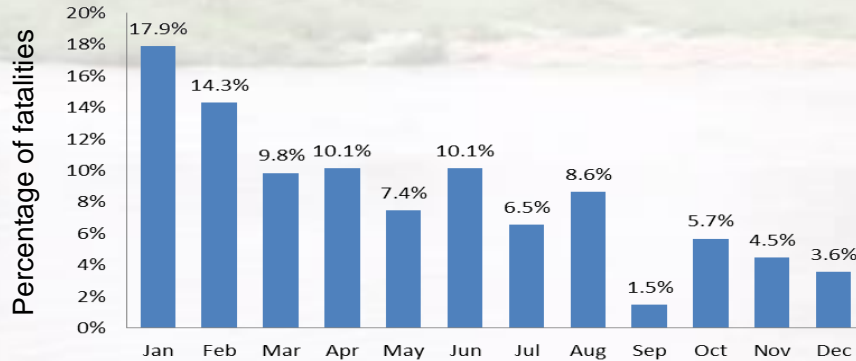
Where?



Haynes et al 2016

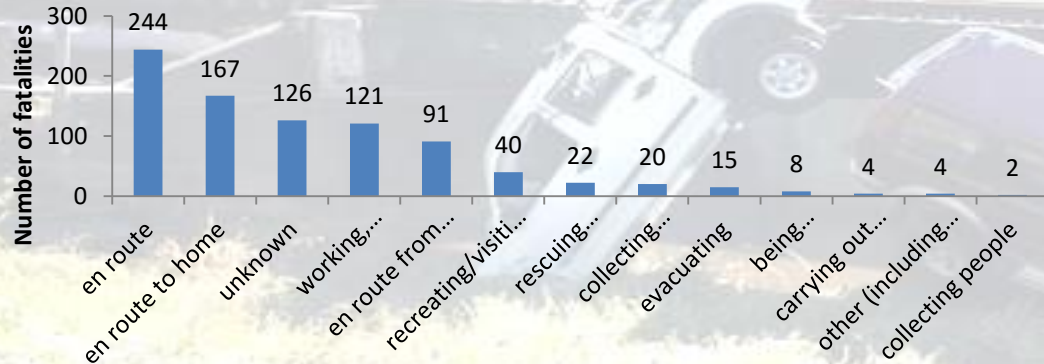
When?

Mostly in **Summer**, especially February
Afternoon/night
Fridays



Haynes et al 2016

Why?



Haynes et al 2016

Footprints Market Research 2015

Sunshine Coast 2015

“I’m a local, I know the roads and how they flood”

“My vehicle can handle the water – It’s a 4WD, heavy, diesel, has high clearance, has a snorkel”

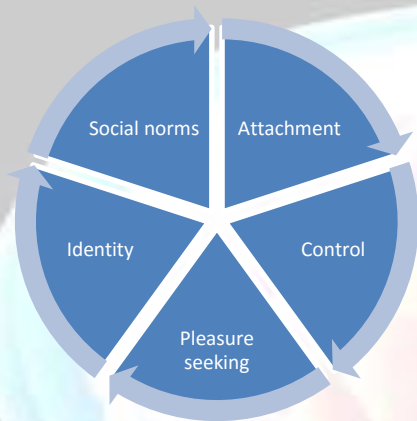
“It’s the small cars and soccer mums that don’t know what they’re doing – they get in the way”

“Only fast flowing water is dangerous”

“If I can walk through it, I can drive through it”

“I’ll follow in the wake of a truck and be OK”

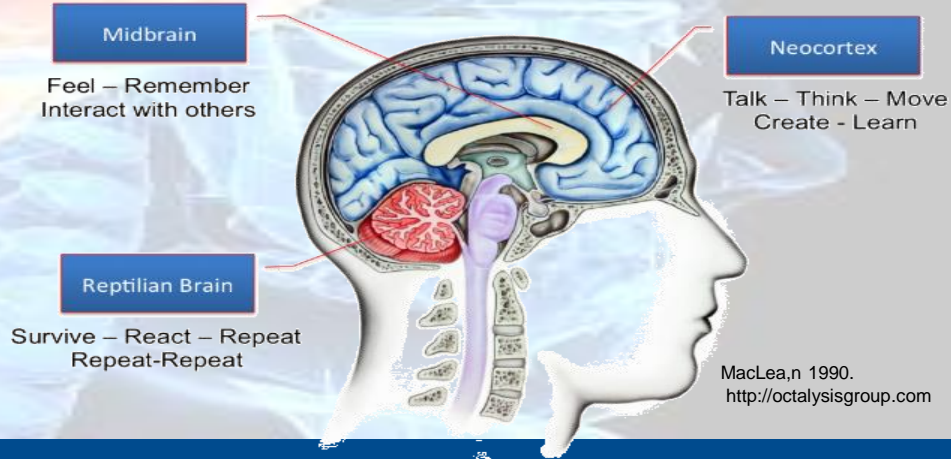
“The car manual says it can handle this depth”



Michalski & Bearman, 2014

- Attitudinal beliefs
- Normative pressure
- Efficacy
- Past behaviour
- Risk perception

Pearson and Hamilton, 2014



MacLea,n 1990.
<http://octalysisgroup.com>

Decision making under pressure

Why not?

- Dangerous (even 10-30cm)
- Things may be hidden beneath the surface
- Road and car damage
- Legal charges (up to \$425)
- Manslaughter or actual bodily harm/ grievous bodily harm
- Sends mixed messages – encourages others
- Electrocution or contaminants e.g. E.Coli, enterovirus, hepatitis, norovirus, adenovirus, coliforms



DV (m ² s ⁻¹)	Infants, small children (H.M ≤ 25) and frail/older persons	Children (H.M = 25 to 50)	Adults (H.M > 50)
0	Safe	Safe	Safe
0 – 0.4	Safe	Low Hazard ¹	Low Hazard ¹
0.4 – 0.6	Extreme Hazard; Dangerous to all	Significant Hazard; Dangerous to most	Low Hazard ¹
0.6 – 0.8		Extreme Hazard; Dangerous to all	Moderate Hazard; Dangerous to some ²
0.8 – 1.2	Extreme Hazard; Dangerous to all		Significant Hazard; Dangerous to most ³
> 1.2		Extreme Hazard; Dangerous to all	Extreme Hazard; Dangerous to all

¹ Stability uncompromised for persons within laboratory testing program at these flows (to maximum flow depth of 3.5 m for children and 1.2 m for adults and a maximum velocity of 3.0 ms⁻¹ at shallow depths).

² Working limit for trained safety workers or experienced and well equipped persons (D.V < 0.8 m²s⁻¹)

³ Upper limit of stability observed during most investigations (D.V > 1.2 m²s⁻¹)

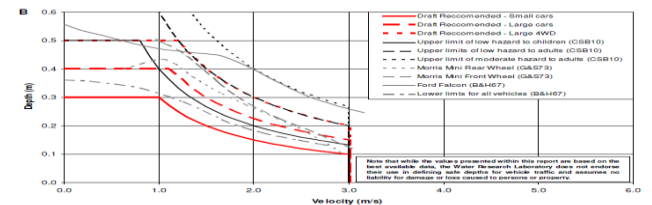


Figure 11 Possible (A) and proposed (B) Draft stability criteria for stationary vehicles compared to experimental and computational results.

Proposed DRAFT INTERIM criteria for stationary vehicle stability							
Class of vehicle	Length (m)	Kerb Weight (kg)	Ground clearance (m)	Limiting still water depth ¹	Limiting high velocity flow depth ²	Limiting velocity ³	Equation of stability
Small passenger	< 4.3	< 1250	< 0.12	0.3	0.1	3.0	DV ≤ 0.3
Large passenger	> 4.3	> 1250	> 0.12	0.4	0.15	3.0	DV ≤ 0.45
Large 4WD	> 4.5	> 2000	> 0.22	0.5	0.2	3.0	DV ≤ 0.6

¹ At velocity = 0 ms⁻¹; ² at velocity = 3ms⁻¹; ³ at low depth

Shand et al 2011

Engagement

Enforcement

Encouragement

Engineering

Emergency Management





GET A PLAN B

FLOODED ROADS MAP

INCIDENT ANATOMY

FACTS & FICTIONS

VIDEOS

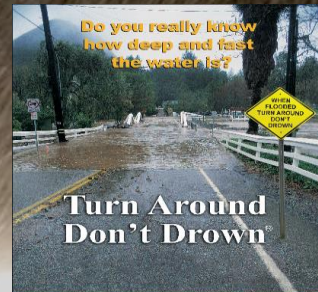
SUPPORT SERVICES

REPORT A FLOOD PRONE ROAD

AVOID LOSING CONTROL OF THE SITUATION

Check your journey for potential flood risks and get your Plan B together to stay safe.

Flooded Roads Map



For important, life-saving information please visit <http://tadd.weather.gov>



IF YOU KNEW WHAT WAS IN IT, YOU WOULDN'T GO IN IT.

WARNING FLOODWATER

Flooded? Here's why you forget it

NEVER ENTER FLOODWATER

Principal Partner **SES**  

NEVER DRIVE

NEVER RIDE

NEVER WALK

NEVER PLAY

floodsafe.com.au 





The Great California Shake Out™

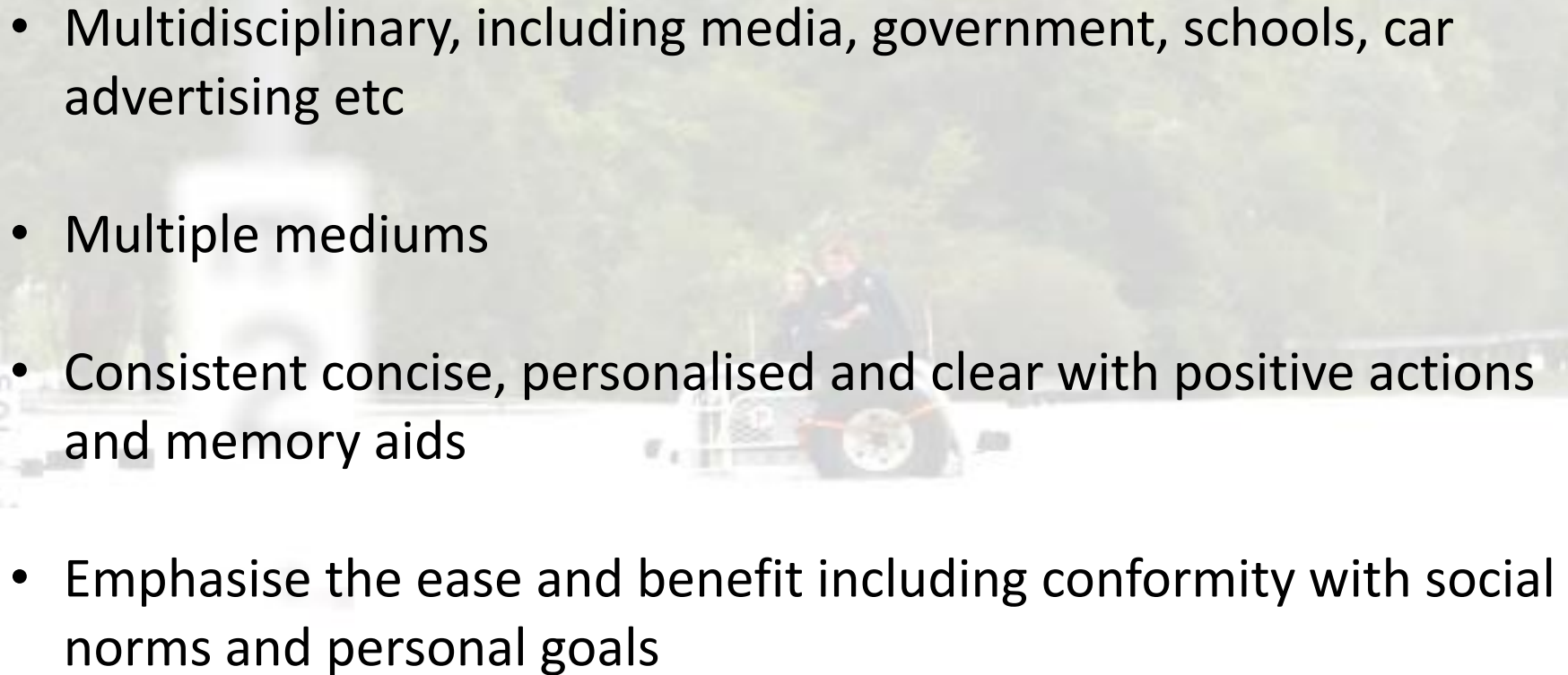
BUTTS

SMOKERS PLEASE

BUTT OUT HERE

en tropoles
1300 428 887



- 
- Multidisciplinary, including media, government, schools, car advertising etc
 - Multiple mediums
 - Consistent concise, personalised and clear with positive actions and memory aids
 - Emphasise the ease and benefit including conformity with social norms and personal goals

Engineering

ROAD SUBJECT TO
FLOODING
INDICATORS SHOW DEPTH



ROAD
CLOSED

MAXIMUM
PENALTY
200
PENALTY
UNITS

DUE TO FLOODING

ROAD
CLOSED

NO
ENTRY

DUE TO FLOODING

ROAD CLOSED
AHEAD

WATER
OVER
ROAD

ROAD FLOODED
BEYOND
ALTERNATIVE ROUTE
VIA

ROAD CLOSED
BEYOND
ALTERNATIVE ROUTE
VIA



Enforcement

ACT

Crimes Act 1900
Emergencies Act 2004
Road Transport (Safety & Traffic Management) Act 1999

NSW

Crimes Act 1900
Fire Brigades Act 1989
Law Enforcement (Powers & Responsibilities) Act 2002
Road Rules 2004
Roads Act 1993
Roads Regulation 2008 & Roads (General) Regulation 2000
Rural Fires Act 1997 (NSW)
State Emergency & Rescue Management Act 1989
State Emergency Service Act 1989
Work Health & Safety Act 2011

NT

Criminal Code Act 1983
Fire & Emergency Act 2004
Traffic Act 1987 & Traffic Regulations

Qld

Criminal Code 1899
Disaster Management Act 2003
Fire & Emergency Services Act 1990
& Police Powers & Responsibilities Act 2000
Public Safety Preservation Act 1986
Transport Infrastructure Act 1994
Transport Operations (Road Use Management Act) 1995

SA

Criminal Law Consolidation Act 1935
Emergency Management Act 2004
Fire & Emergency Services Act 2005
Road Traffic Act 1961

Tas

Criminal Code Act 1924
Emergency Management Act 2006
Police Powers (Public Safety) Act 2005
Traffic Act 1925
Vehicle & Traffic Act 1999

Vic

Crimes Act 1958
Emergency Management Act 1986
Road Safety Act 1986
Victoria State Emergency Service Act 2005

WA

Criminal Code 1913
Emergency Management Act 2005
Fire & Emergency Services Act 1988
Road Traffic (Administration) Act 2008
Road Traffic Act 1974

Other general local laws

Encouragement



Bathurst July 2016 (Western Advocate)

Emergency Management

A person in a black wetsuit is pushing a shopping cart on a beach. The cart is filled with items, including a red bag and a blue bag. The person is barefoot and is pushing the cart towards the right. In the background, there is a metal fence and the ocean. The scene is overlaid with a semi-transparent blue background.

- ***Prevention...*** Land use and community engagement
- ***Preparedness...*** Plans and community engagement
- ***Response...*** Rescue capability and warning systems

Some key points

- Collaboration
- Measurement (beyond)
- Research and piloting

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On behalf of the working group