

## Flood Deaths in the Northern Territory

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Risk Frontiers recently examined the circumstances surrounding deaths from flood events in Australia as part of a wider Bushfire and Natural Hazards CRC (BNHCRC)-funded project, *An analysis of human fatalities and building losses from natural disasters*. One of the results found was a heightened level of risk in the Northern Territory. We decided to investigate this a little more closely.

### Introduction

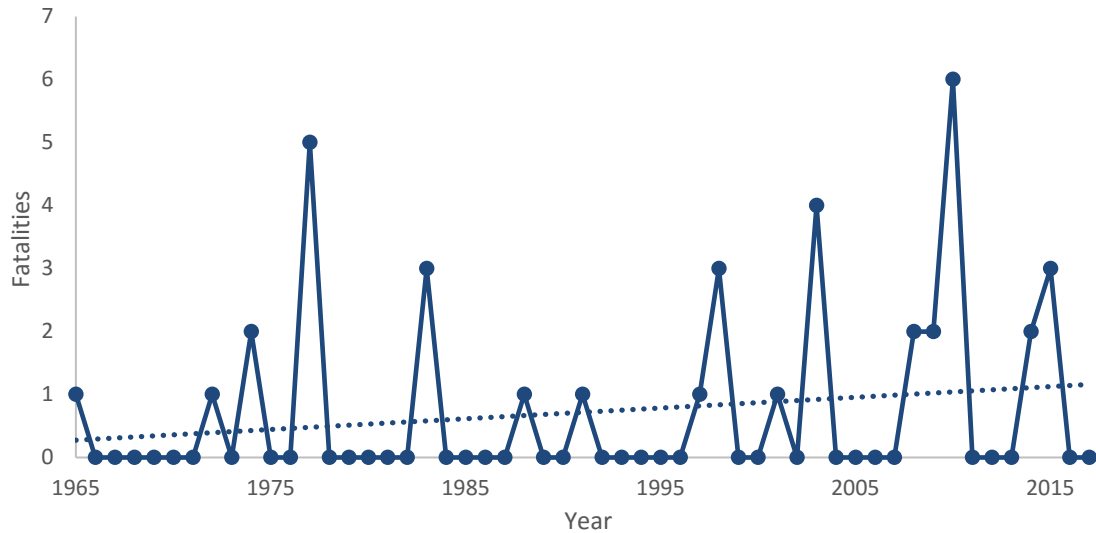
In the previous Risk Frontiers research project, 1859 individually identified flood-related deaths were recorded in Australia from 1900 to 2015 and, of these, 79% were males (Haynes *et al.*, 2016). Death rates showed a steep statistically significant decline up to 1960, with a lesser, steadier decline over the most recent 55 years (Haynes *et al.*, 2016).

Queensland and New South Wales accounted for 75% of the total fatalities across Australia (Haynes *et al.*, 2016). However, when deaths were examined in relation to population size, a heightened level of risk in the Northern Territory (NT) was revealed, with a death rate almost double that of the jurisdiction with the next highest fatality rate (Haynes *et al.*, 2016). When fatalities in the various jurisdictions were examined longitudinally, an expected downward trend in deaths over time was observed, apart from in the NT – particularly in more recent years, where an increasing proportion of flood deaths were seen (Haynes *et al.*, 2016).

This warranted further investigation. This briefing note summarises the results obtained when the demographic characteristics of flood-related deaths occurring in the NT from 1960-2015 were examined.

### Fatality totals and trends

From 1960 to 2015 there have been at least 27 fatal floods in the NT, claiming 38 lives. Annual flood fatalities are increasing with time, while death rates have remained constant (figure 1. Note: zero deaths 1960-1964). Males accounted for 74% of the fatalities. The numbers of both male and female flood fatalities are increasing and, although Australia's male:female ratio is decreasing, the gap between male and female flood deaths in the Northern Territory is growing, showing no sign of equity in the near future.

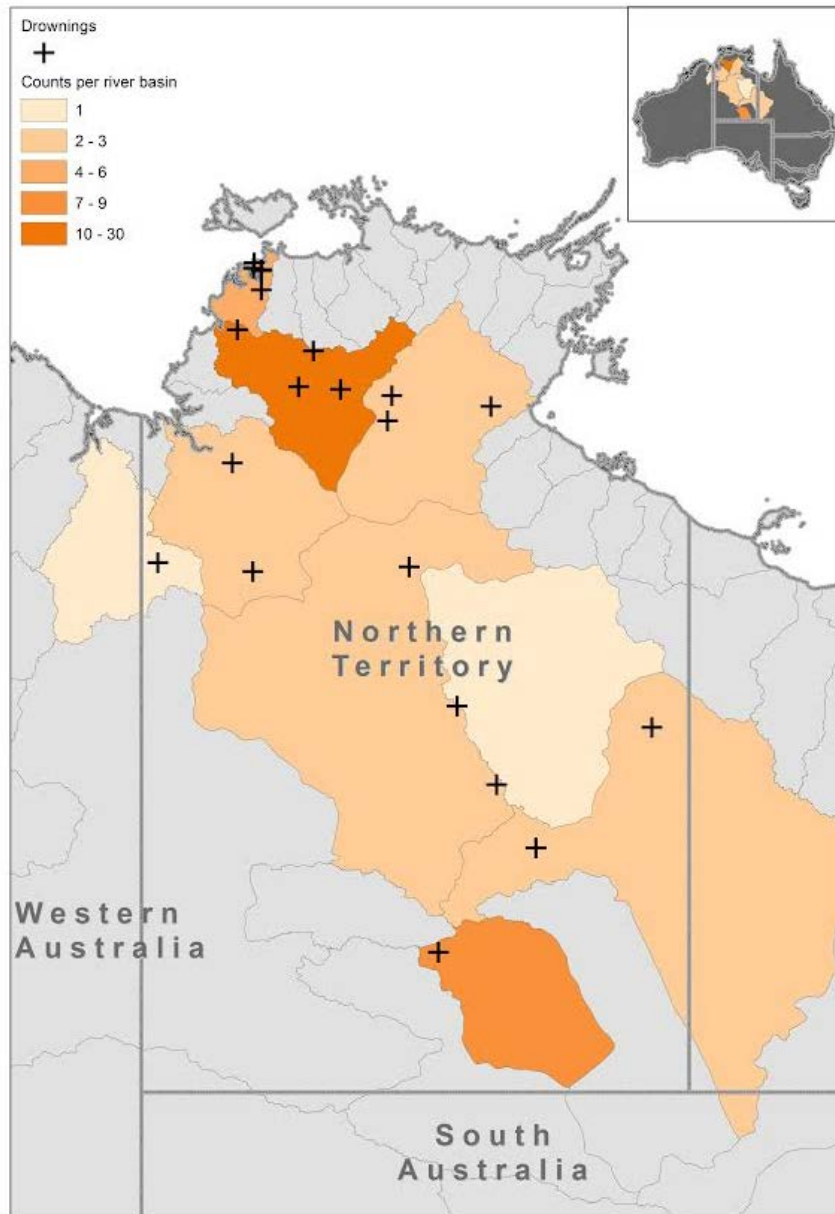


**Figure 1:** Flood fatalities in the Northern Territory, 1960-2015

Males tend to be more at risk in flood events due to their risk-taking behaviour: for example, males are over-represented in attempting to cross floodwaters (67%), and undertaking an activity near (100%) or in (80%) floodwaters. In all these activities, males are aware of the flood and undertake the activity nonetheless. On the other hand, females are less likely to take these risks and are over-represented only in carrying out activities not near usual watercourses such as staying at home (71%). These statistics suggest gender-specific approaches must be developed to address the clear differences in causes of death.

In regards to age, males are over-represented in most age brackets. Most (98%) decedents were aged 0-59 years, the age group most at risk being those aged 30-39 years.

The Daly River Drainage Basin has claimed the most lives, accounting for 34% of flood fatalities in NT (figure 2). There have been five fatal floods there since 1960, three of which were high fatality ( $\geq 3$  deaths) events. The Todd River Drainage Basin is the second most dangerous, accounting for 21% of fatalities, and having also experienced five fatal flood events.



**Figure 2:** Location of flood fatalities in NT by drainage basin, 1960-2015

Indigeneity was investigated from 2000 onwards. A clear inequity is presented, as the indigenous account for 65% of fatalities from 2000-2015. Indigenous males account for over half (52%) of all flood fatalities in NT. This is alarmingly high in comparison to the group least at risk – non-indigenous females, who account for only 4% of fatalities. In terms of age, those most at risk are the 0-9 year-old non-indigenous and 10-19 year-old indigenous groups. It is clear that, similar to the case of the male population, indigenous persons are more prone to risk-taking activities: the majority (71%) of those crossing a flooded watercourse and 67% of those engaged in an activity in a flooded watercourse were indigenous. Research suggests indigenous persons are

more likely to present risk-taking behaviours due to poor education on the risks (Atkinson, 2012). A key to reducing flood fatalities in NT is, therefore, training in flood-safe behaviours targeted to the indigenous population.

The riskiest “activity prior to death” was found to be crossing flooded watercourses, which accounts for over a third (35%) of fatalities in NT: 67% of these were male. A total of 57% of female decedents were attempting to cross floodwaters. The second most risky activity (21%) was being engaged in an activity near floodwaters: males were over-represented (100%). [The results for those engaged in an activity not near a usual watercourse – e.g, being at home – are skewed due to one large event in 1977, in which five people were drowned at a cattle station.]

The familiarity of the decedent with the death location was investigated. The term “familiar” as used in this research refers to being within 10km of one’s house. Locals accounted for 87% of flood fatalities. In relation to activity prior to death, locals were most likely to be crossing floodwaters (29%), engaged in an activity in or near floodwaters (21%) or at home (21%). An analysis of those decedents who died at home clearly showed that they chose not to evacuate when warnings were received. This suggests that behavioural changes must be made through education of the risks of ignoring flood warnings. [Note: a relatively small dataset means these results should be treated with some caution.]

Some 25% of the decedents from 2000-2015 were intoxicated and, of those, 80% were attempting to cross a flooded river and 20% were engaged in activities in flood waters. 80% were male; 80% were indigenous. [Note: a relatively small dataset means these results should be treated with some caution.]

There are a few take-home messages around mitigation and education strategies for the Northern Territory. Appropriate strategies must be developed targeting, especially, indigenous males. The aim should be to educate on the risks floods present and the measures that should be taken to avoid them, such as not attempting to cross, or engaging in activities in or near, floodwaters. Haynes et al (2016) gives insight into potential mitigation strategies which should be modified to best suit the target population. The three key strategies should be to educate, pose consequences and apply structural interventions.

## Acknowledgements

Risk Frontiers employed Macquarie University climate science PACE student Alice Carney to investigate the circumstances surrounding flood deaths in the Northern Territory (NT). PACE is Macquarie University’s Professional and Community Engagement program, which gives students a chance to explore key economic, social and ethical challenges by seeing at first-hand how contemporary organizations (such as Risk Frontiers) address them, allowing them to develop new knowledge and skills and explore future career opportunities.

The work utilised Risk Frontiers’ database *PerilAUS* and the National Coronial Information System (NCIS) database of coronial data, sourced from the Department of Justice and Regulation, Victoria: a resource of coronial records across Australia from July 2000 onwards.

## References

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