HAZARD NOTE

BUILDING COLLABORATIVE EMERGENCY MANAGEMENT CAPACITY IN NORTHERN AUSTRALIA

ABOUT THIS PROJECT

The *Scenario planning for remote community risk management in northern Australia* project was a continuation of research that began in 2014 at Charles Darwin University, assessing emergency management capacity building needs in northern Australian remote communities. This project was a partnership between the Darwin Centre for Bushfire Research at Charles Darwin University, the North Australia Indigenous Land and Sea Management Alliance, regional fire and emergency agencies, conservation agencies and remote Indigenous communities.

AUTHORS

Prof Jeremy Russell-Smith, Dr Kamaljit Sangha and Dr Andrew Edwards, Charles Darwin University. Contact: jeremy.russell-smith@cdu.edu.au

SUMMARY

Indigenous communities in northern Australia are constantly affected by natural hazards, with large areas of more than 250,000 km^2 experiencing bushfires in the dry season (August–November), coupled with frequent floods and cyclones in the wet season (December–April). Remote communities do not have the same access to services as other towns and communities and, as such, need to develop effective partnerships with centralised emergency management agencies as well as building their own emergency management capabilities. Through a consultative and culturally respectful process, this project has empowered remote Indigenous communities by enhancing their capability to better understand emergency management processes and procedures. Researchers worked closely with Indigenous communities and Indigenous Ranger Groups in the Northern Territory, the Kimberley region of Western Australia, and northern Queensland to understand key issues they are facing when it comes to emergency management, and to explore options through scenario planning for enhancing their preparedness, disaster response capacity and resilience.

▲ **Above:** THIS RESEARCH USED CONSULTATION AND RESPECT TO EMPOWER INDIGENOUS COMMUNITIES BY ENHANCING THEIR CAPABILITY TO BETTER UNDERSTAND EMERGENCY MANAGEMENT PROCEDURES AND PROCESSES. PHOTO: CHARLES DARWIN UNIVERSITY.

For emergency service agencies, a framework and set of protocols has been developed that will help them more effectively engage with, and provide service delivery to, remote Indigenous communities (Sithole et al. 2017; Sangha et al. 2019b). While the classic model of emergency service volunteering isn't suitable for remote communities, the rapidly expanding Indigenous Ranger Program affords a constructive opportunity for enhanced community engagement and on-the-ground operational delivery. A cost-savings analysis of engaging remote Indigenous communities in the emergency management sector clearly demonstrates the huge benefits that such opportunities afford for the governments.

CONTEXT

Northern Australia – spanning northern Western Australia, the Northern Territory and northern Queensland – is an extensive area with a sparse population and minimal infrastructure. There is considerable rain in summer (the 'wet season'), meaning vegetation grows considerably, and very little in winter (the 'dry season') where grassy fuels progressively cure.

Temperatures are high all year, and the number of very hot days (>35°C) is projected to significantly increase in coming decades. Large tracts burn annually, and traditionally based early season burning practices are a major part of cultural land management practice, requiring significant resources. Cyclones and flooding recur frequently, especially in higher rainfall coastal and sub-coastal regions.

Fire and emergency services agencies recognise the need to improve the services provided remotely, but also recognise that all jurisdictions (but particularly the Northern Territory) are not adequately resourced to achieve this. The classic model of volunteering does not meet the needs of most Indigenous communities in remote areas given chronic underemployment, poor socio-economic status and related issues.

▲ **Top:** DR ANDREW EDWARDS AND DR GRIGORIJS GOLDBERGS ASSESSING THE EFFECT OF A BUSHFIRE ON TREES NEAR MATARANKA IN THE NORTHERN TERRITORY. PHOTO: NATHAN MADDOCK, BUSHFIRE AND NATURAL HAZARDS CRC.

▲ **Above:** RESEARCHERS WORKING WITH INDIGENOUS RANGER GROUPS. PHOTO: CHARLES DARWIN UNIVERSITY.

▲ **Above:** LOCATION OF PARTICIPATING COMMUNITIES IN THE NORTHERN TERRITORY AND WESTERN AUSTRALIA.

However, the expanding Indigenous Ranger Program is a potential means to engage with local Indigenous peoples and build local emergency management capacity. This research worked closely both with Indigenous Ranger Groups and emergency management agencies to identify issues and opportunities for building more effective emergency management capability.

BUSHFIRE AND NATURAL HAZARDS CRC RESEARCH

This project is part of a suite of projects that commenced in 2014. Conducted by researchers at Charles Darwin University, the collective aim of the projects was to build and empower resilience capability and capacity in north Australian remote Indigenous communities. This phase of the project began in 2017, with the objective of enhancing emergency management capabilities, especially through scenario planning processes – for example, working with communities and Indigenous Ranger Groups to identify current capability and capacity issues, and what was required to address resourcing and structural limitations into the future. Researchers from CDU's Darwin Centre for Bushfire Research worked closely with the North Australia

Indigenous Land and Sea Management Alliance (NAILSMA), the Aboriginal Research Practitioners Network (ARPNet), north Australian fire and emergency management agencies, conservation agencies and remote Indigenous communities.

Researchers initially developed a framework – using a suite of case studies based on interviews and workshops with members of Indigenous Ranger Groups – to understand the aspirations, willingness and capacity to engage in emergency management activities. These case studies were developed with remote Indigenous communities, including Hermannsberg and Yuendumu in central Australia; Beagle Bay and Bidyadanga in the Kimberley; Galiwin'ku on Elcho Island off Arnhem Land; Bulukhuduru, Ramingining and Ngukkurr in Arnhem Land; and Borroloola in the Gulf of Carpentaria. Researchers then assessed and reported on the current emergency management situations in these communities, and identified gaps, resource needs and proposed solutions or alternatives to better manage and mitigate natural hazards.

Based on these findings, further research outputs included published analyses addressing: (1) outlining the case for investment in building the emergency management capacity of Indigenous Ranger Groups (Russell-Smith et al. 2020), (2) the true costs of natural hazards in northern Australia (Sangha et al. 2020,

2021), (3) the total costs (direct and indirect) from bushfires in the Northern Territory (Sangha et al. 2019a) and (4) full cost assessment of all major and minor natural hazards in the Northern Territory over the last 10 years (Sangha et al. 2021).

Fire management tools

Associated research activities included ongoing development of land management, monitoring and evaluation tools for practical application by emergency management agency and broader community end-users, including enhancements with fire severity mapping and the use of the Savanna Monitoring and Evaluation Reporting Framework (SMERF – see *Hazard Note 46*, March 2018). Scientific publications describing both these research products are under development.

Fire severity mapping

Fire severity mapping is about how severe the fires are. Fire severity underpins fire management with respect to key ecological fire effects. Unlike fire extent/burnt area mapping, fire severity has proven to be difficult to interpret directly from high resolution aerial photography, or its equivalent, and nearly impossible using moderate resolution satellite imagery. A program has been in development for several years to continually improve the automated algorithms. In particular, this

project has developed a fire severity map product for use in remote communities, not only to inform land management but also to improve savanna burning greenhouse gas emissions calculations. This also directly informs Australia's greenhouse gas emissions inventory.

Savanna Monitoring and Evaluation Reporting Framework

SMERF is an online tool and is the result of research completed with Parks and Wildlife in the Northern Territory, Kakadu National Park (Parks Australia) and the Queensland Parks and Wildlife Service. SMERF can be accessed at infonet.org.au/smerf-crc/ and can be used to: monitor the effects of fires through a multitude of effects models; analyse the effects of past fires, through the assessment of an extensive fire history; and improve planning capacity through analysis of past fire effects. Specifically, this project has used SMERF to inform distribution and effects of fires on tropical savanna and rangeland habitats across northern Australia.

RESEARCH FINDINGS

This research has identified that effective partnerships with remote communities, and cross-sectoral engagement, especially with the environmental sector, is essential for building resilience to natural hazards across northern Australia, and for ensuring effective emergency management delivery in remote community settings.

This research highlights ongoing priorities, as identified by partner agencies and community stakeholders, that require further action-based research and implementation.

Building the capacity of Indigenous ranger groups to deliver effective emergency management in remote community settings

A model for effective engagement and partnership with remote Indigenous communities can be guided through the following salient points:

• Long-term emergency service agency support is required from trained personnel with appropriate understanding of and consideration for social, economic and cultural sensitivities.
• The classic model of volunteerism has limited applicability in remote Indigenous communities for various social, economic and cultural reasons.
• Support needs to build on foundations of mutual respect.
• A collaborative model of managing emergency management in remote communities, developed in consultation with local community members, is vital to improve the current situation.
• It is important to implement a multi-sector targeted approach for generating new opportunities to reduce the risk of natural hazards in remote settings, offering a cost-effective way to mitigate and manage natural hazards.
• Emergency management can be conducted as part of other activities that address broader landscape and community management.
• Emergency service agencies need to be patient in their support for, and provide regular, flexible and appropriate training, mentoring and resourcing assistance.
• Significant efficiencies can be gained through developing contracted,

fee-for-service arrangements – especially where agencies have limited or no capacity to deliver required services in remote locations themselves.

Full accounting of the real costs of natural hazards in the Northern Territory

A detailed assessment of total direct and indirect costs associated with natural hazards in the Northern Territory suggests that:

• natural hazards in the Northern Territory have resulted in total losses of $156 million on average per annum for the 10 years from 2010 to 2019, with direct losses comprising only $53 million per annum and indirect losses estimated at $103 million per annum (accounting mainly for bushfires and cyclones). Indirect losses are largely omitted in current natural hazard-related assessments and policies.
• minor yet frequent events, such as monsoon troughs and floods, cost more than $7 million per annum for the Northern Territory and need to be considered in national datasets.

HOW IS THE RESEARCH BEING USED?

This project has had a significant impact on informing emergency management issues in remote northern communities, both for emergency management agencies and Indigenous stakeholders, including:

• initiating a dialogue between emergency management agencies (the Northern Territory Emergency Service, the Department of Fire and Emergency Services WA and the Queensland Fire and Emergency Service) and Community

FURTHER READING

Russell-Smith J & Edwards AC (2018) Strengthening fire mapping for improved fire management and carbon abatement in northern Australia, *Hazard Note 46*, Bushfire and Natural Hazards CRC, accessible at www.bnhcrc.com.au/hazardnotes/46.

Russell-Smith J, Edwards AC, Sangha KK, Yates CP & Gardener M (2020) Challenges for prescribed fire management in Australia's fire-prone rangelands – the example of the Northern Territory, *International Journal of Wildland Fir,* 29: pp.339–353.

Russell-Smith J, Sangha KK & Edwards AC (2020) Scenario planning for remote community risk management in northern Australia, final project report, Bushfire and Natural Hazards

CRC, accessible at www.bnhcrc.com.au/publications/biblio/bnh-7739.

Sangha KK, Russell-Smith J, Edwards AC & Surjan A (2021) Assessing the real costs of natural hazard induced disasters: a case study of Australia's Northern Territory Natural Hazards, accepted for publication in March 2021.

Sangha KK, Russell-Smith J, Evans J & Edwards AC (2020) Methodological approaches and challenges to assess the environmental losses from natural disasters, *International Journal of Disaster Risk Reduction*, 49, available at https://doi.org/10.1016/j.ijdrr.2020.101619.

Sangha KK, Evans J, Edwards AC & Russell-Smith J (2019) Measuring environmental losses from natural disasters: a case study of costing bushfires in the

Northern Territory, *Australian Journal of Emergency Management*, 34, pp.32–40.

Sangha KK, Edwards AC & Russell-Smith J (2019) Long-term solutions to improve emergency management services in remote communities in northern Australia, *Australian Journal of Emergency Management,* 34, pp.23–31.

Sithole B, Hunter-Xenie H, Daniels C, Daniels G, Daniels K, Daniels A, Daniels G, Daniels D, Turner H, Daniels CA, Daniels T, Thomas P, Thomas D, Yibarbuk D, Campion O, Namarnyilk S, Narorroga E, Dann O, Dirdi K, Nayilibibj G, Brown C (2017) Living with Widdijith – protocols for building community resilience in remote communities in northern Australia, in Paton D & Johnson DM (Eds.) *Disaster resilience: an integrated approach* (second edition), Charles C Thomas, United States.

Elders (from the Northern Territory and north Queensland) to look for community-based solutions to effectively manage and mitigate natural hazards in the region

- encouraging discussions among Indigenous stakeholders to consider emergency management issues and realise that their involvement is valuable and critical for their own communities
- informing emergency management agencies, particularly the Northern Territory Emergency Service, to learn directly from the Indigenous Ranger Groups in remote communities about various emergency management issues they face
- providing detailed cost analyses, including direct and indirect losses from bushfires and all the major and minor natural hazards from 2010–2019, directly informing agencies in the Northern Territory
- providing fire severity mapping and SMERF monitoring products that are proving valuable for a wide range of northern land managers, including pastoralists, Indigenous and conservation land managers
- enhance fire severity mapping to better informing the National Greenhouse Gas Inventory
- generating detailed information both for emergency management agencies and remote community partners to enhance collaborative emergency management across the sparsely settled northern savannas.

▲ **Above:** RESEARCHERS GATHER WITH THE NGUKKURR COMMUNITY FOR A WORKSHOP. PHOTO: NATHAN MADDOCK, BUSHFIRE AND NATURAL HAZARDS CRC.

END-USER STATEMENT

"The scenario planning project has focused on opportunities for engaging with and utilising the emerging capacities of Indigenous ranger groups in emergency management in remote community settings. As a rural fire management agency, Bushfires NT can foresee many benefits flowing from greater involvement of trusted and skilled local personnel in all phases of emergency management in remote communities. To that end, we recognise the importance of emergency management agencies providing appropriate, long-term support for remote communities and ranger groups, including provision of regular, flexible and appropriate training and resourcing, and respectful collaboration with community leaders and Traditional Owners. We also commit to encouraging development of fee-for-service arrangements within the shire councils, agencies and other land owners/managers to help support Indigenous ranger groups.

The research team have performed well, having published papers of international significance, and patiently working towards the development of remote Indigenous community resilience. They have provided insights into the potential for Indigenous Ranger Group involvement in remote community emergency management activities, and assisted rangers to better understand their aspirations in this space."

Kenneth Baulch, Director of Policy and Planning, Bushfires NT

FUTURE DIRECTIONS

This project has expanded on identified community-based research needs commenced in the first round of the CRC's research program. Ongoing priorities identified by partner agencies and community stakeholders requiring further action-based research and implementation include:

- understanding the full costs and benefits of engaging with Indigenous Ranger Groups in the delivery of effective emergency management in remote community settings

- full accounting of the costs of natural hazards in northern Australia , especially in remote communities
- ongoing development of tools to assist savanna fire managers, for example, fire behaviour models, improved fire severity mapping and curing mapping
- further facilitation of case-based dialogue between emergency management agencies and remote communities to promote enhanced emergency management arrangements.

A first of its kind cross-sectoral workshop, bringing together senior representatives from north Australian end-user emergency management agencies and Indigenous remote community stakeholders, the Australian Red Cross, and other partners, was organised in November 2020. There was a mutual agreement among the emergency management representatives and Indigenous stakeholders to develop effective partnerships for building resilience for managing emergencies in the future.