bushfire&natural HAZARDSCRC

BUILDING CAPACITY IN NORTH AUSTRALIAN REMOTE COMMUNITIES

Research partnership involving CDU and NAILSMA

Cameron Yates
DCBR

Australian Government
Department of Industry, Innovation and Science

Business Cooperative Research Centres Programme

BUILDING COMMUNITY RESILIENCE IN NORTHERN AUSTRALIA

Phase 1

1. Savanna fire management (and BNH scenario planning for northern Australia)
Dr Andrew Edwards, Assoc Prof Samantha Setterfield, Dr Natalie Rossiter-Rachor, Kate van Wezel, Prof Jeremy Russell-Smith

2. Scoping remote north Australia community resilience and develop governance models through action research
Glenn James, Dr Bev Sithole & ARPNet, Dr Jackie Gould,Dr Kamaljit Sangha, Prof Bob Costanza, Prof Jeremy Russell-Smith

3. North Australian bushfire and natural hazard training
Steve Sutton, Iolanthe Sutton, ARPNet, many Indigenous collaborators

Phase 2

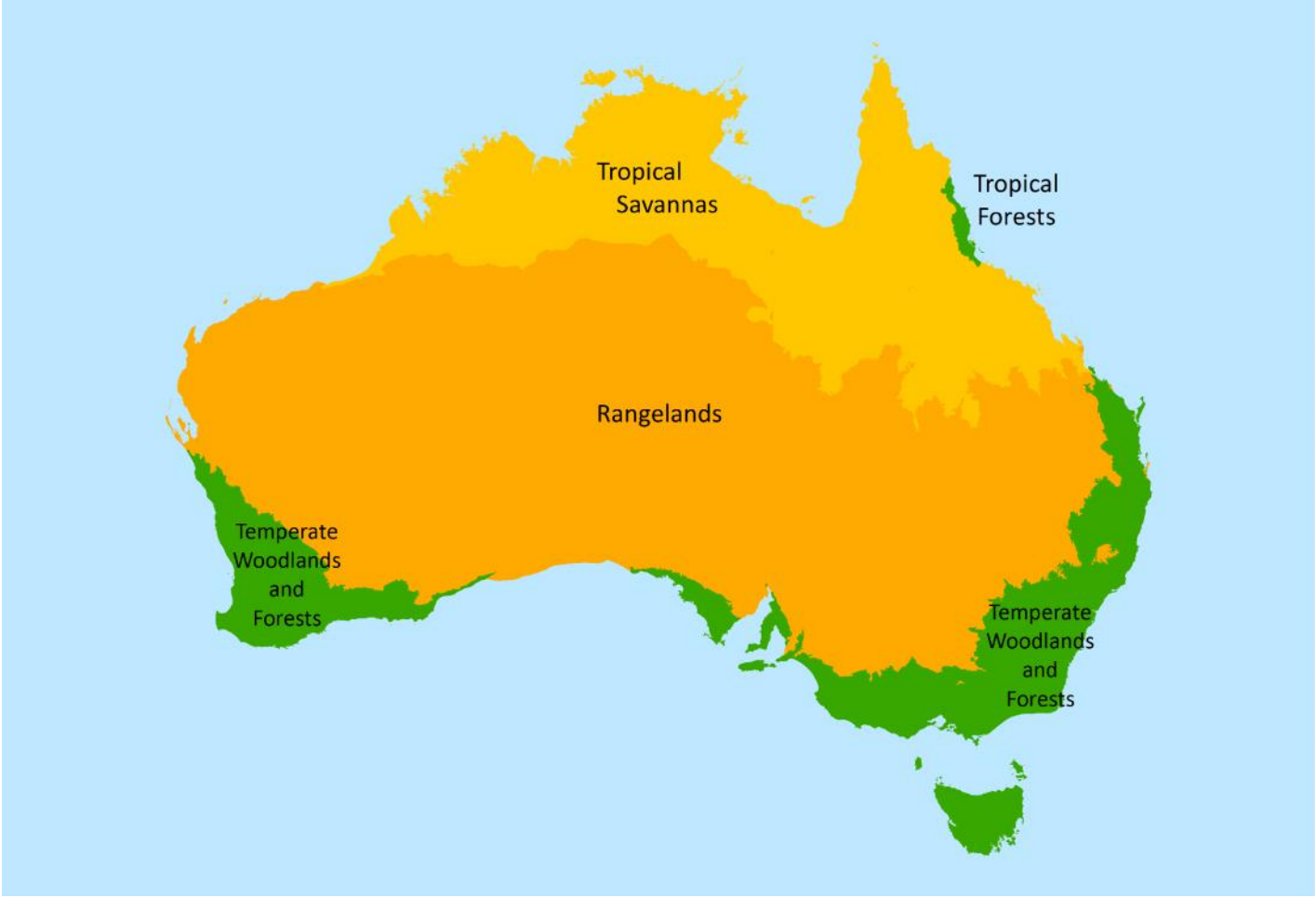
1. Scenario planning for remote community risk management in northern Australia
Essential premise of project**: that Indigenous ranger groups in remote communities can deliver effective front-line EM preparedness and response**

2. Developing effective EM partnerships in remote north Australian communities
addressing the importance of governance,
presented by Glenn James, NAILSMA

RESEARCH TEAM – SAVANNA FIRE MANAGEMENT

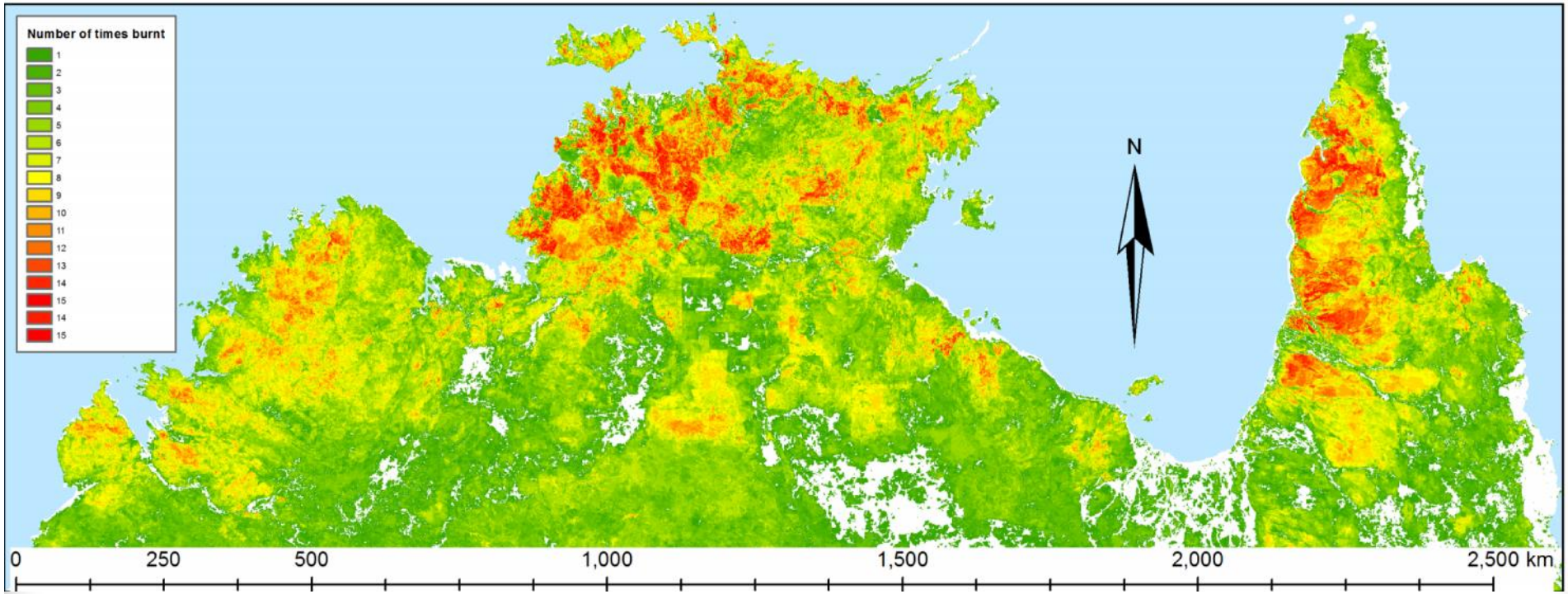
Professor Jeremy Russell-Smith PhD (Project Leader)
Samantha Setterfield PhD (Associate Professor)
Kamaljit Sangha PhD (Research Fellow)
Andrew Edwards PhD (Research Fellow)
Natalie Rossiter-Rachor PhD (Research Associate)
Cameron Yates BSc (Research Associate)
Dominique Lynch BSc (Research Associate)
Jay Evans BSc (Research Associate)
Grigorijs Goldbergs (PhD Student)
Lead End User Naomi Stephens / Felipe Aires(NSW OEH)

WHERE ARE THE SAVANNAS?



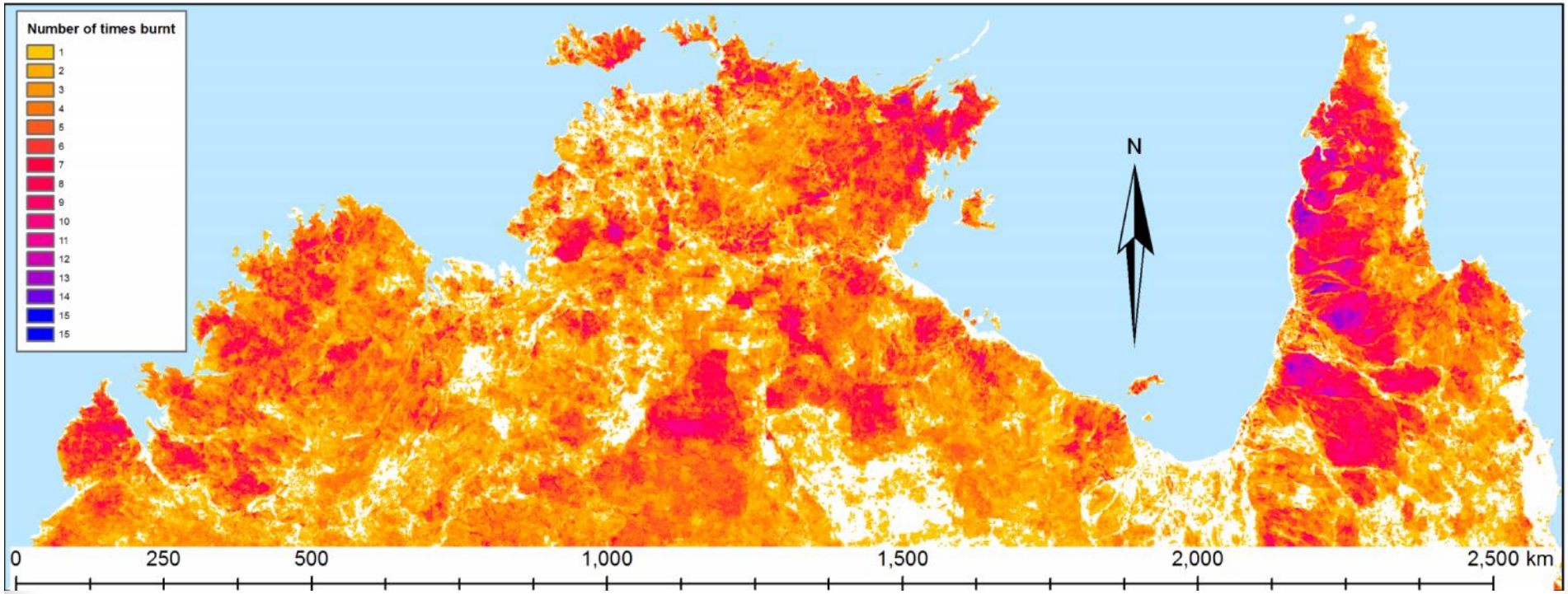
WHAT'S THE PROBLEM WITH FIRE?

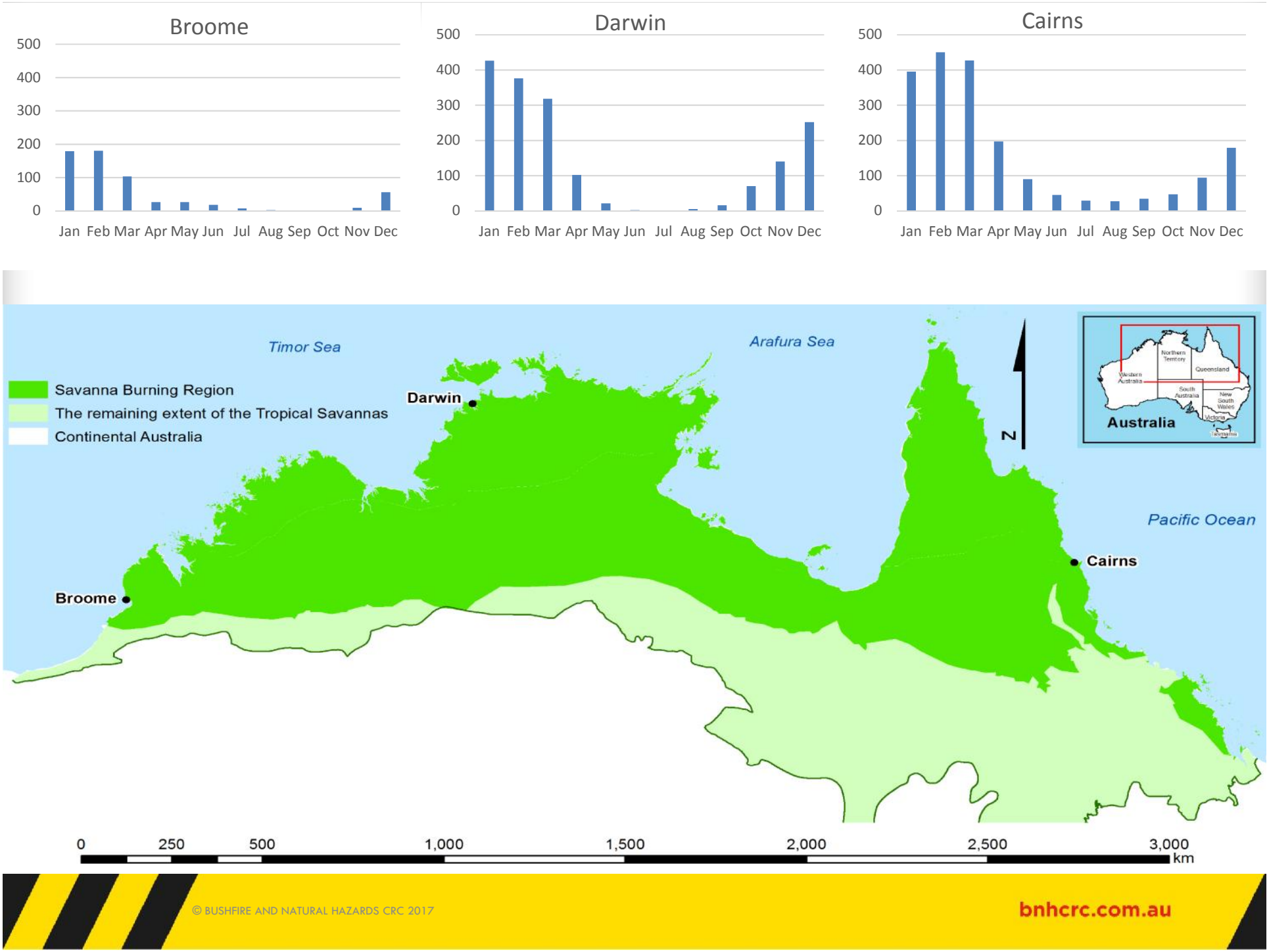
North Australia Fire Frequency 2000-14



WHAT'S THE PROBLEM WITH FIRE?

North Australia Late Dry Season Fire Frequency 2000-14

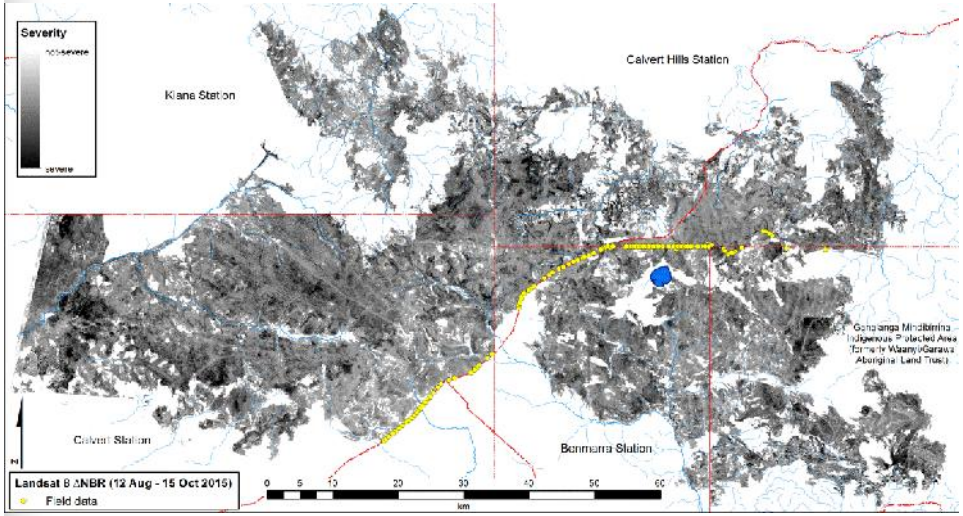


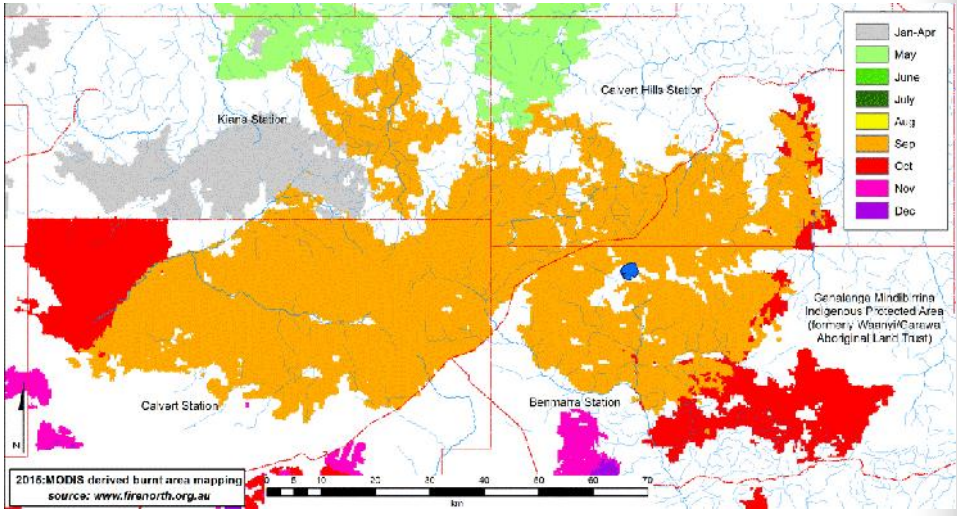


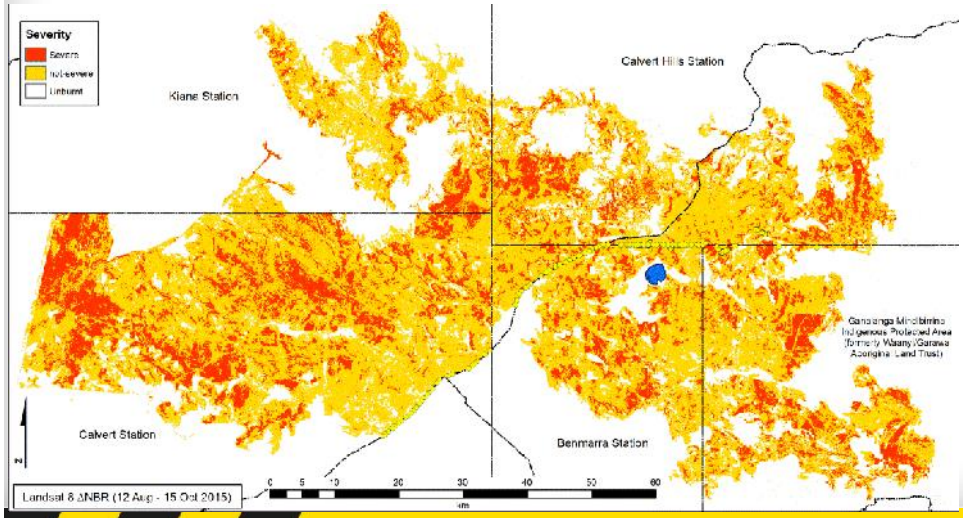
THE PROJECT COMPONENTS

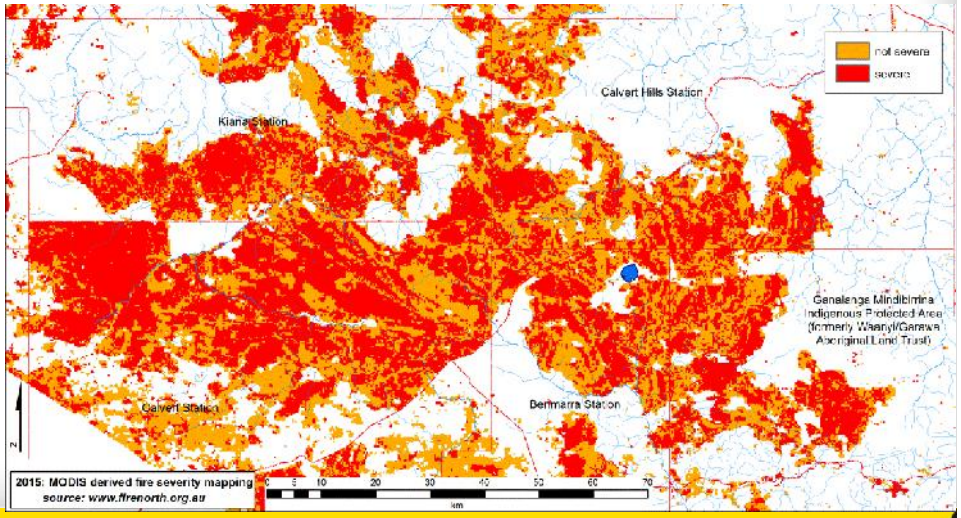
BURNT AREA AND FIRE SEVERITY MAPPING

ANDREW EDWARDS
RESEARCH FELLOW (BUSHFIRES)









EFFECTS OF EXTREME FIRES

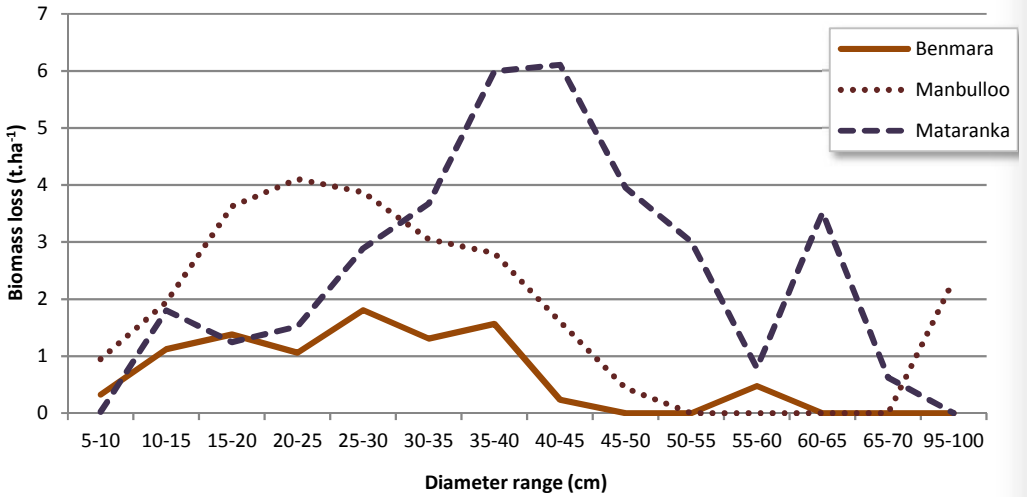
Tree stem mortality:

Previous studies show no significant difference between areas affected by low and high severity fires.

We measured the effects of **extreme** fires only: **25-50% of stems killed**.

Most of the stems killed were the youngest (< 20 cm DBH*) or the oldest (> 35 cm DBH*).

*DBH = [diameter at breast height, measured 1.3 m above the base of the tree]



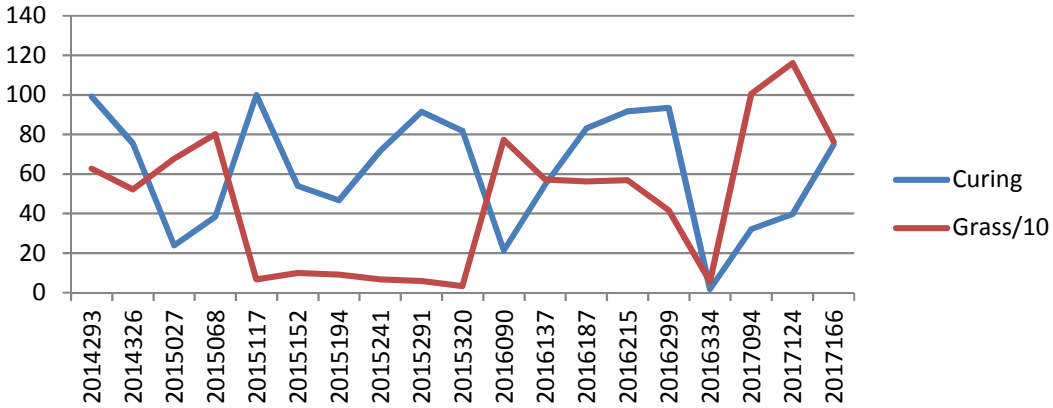
Above Ground Biomass loss associated with tree stem mortality per size class at the three study sites: Benmara, Manbulloo, and Mataranka.

CURING

CAMERON YATES
RESEARCH ASSOCIATE (DCBR)

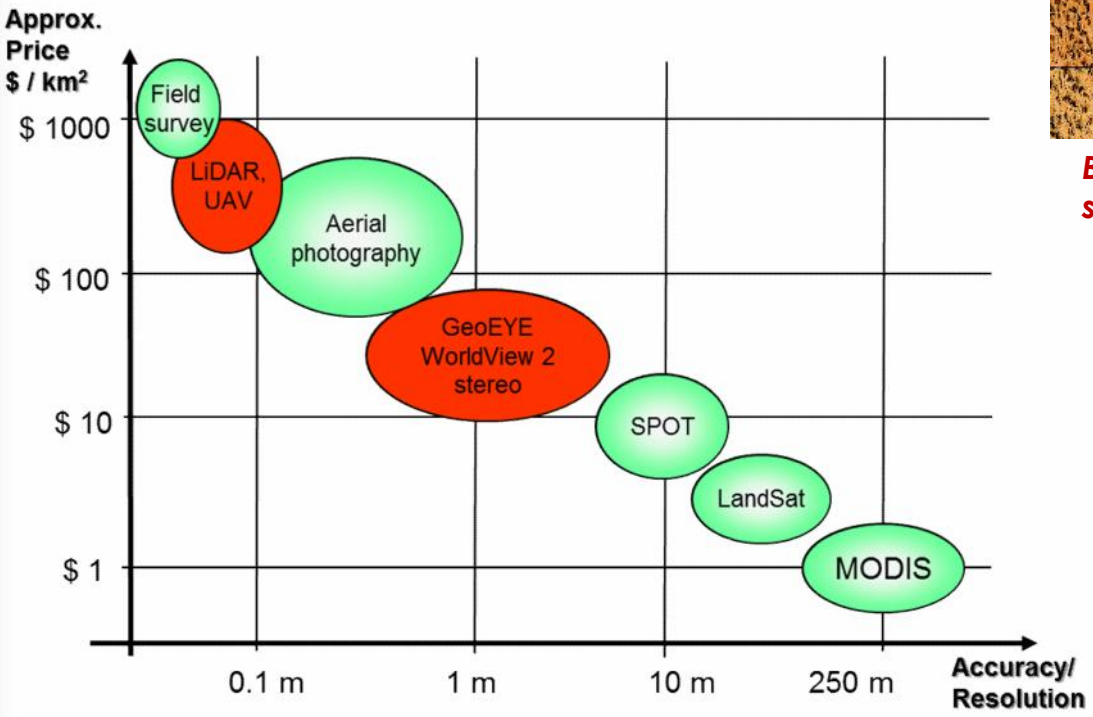
Curing Product in areas with woody overstorey

- Feed into GFDI
- Aid land mangers with prescribed fire activities



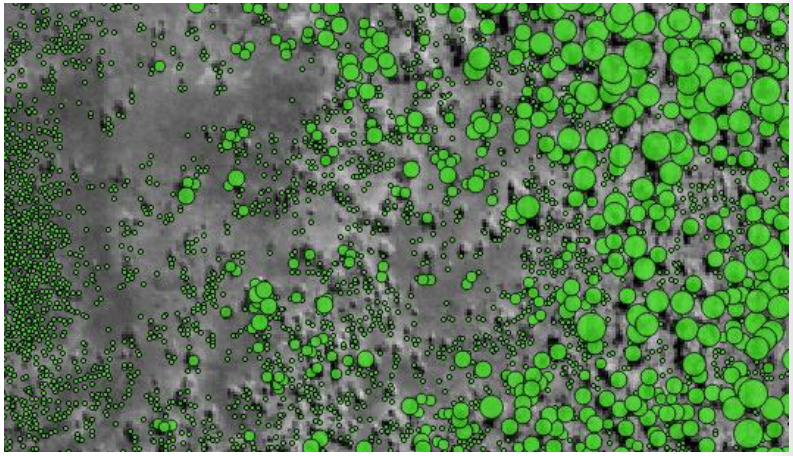
GRIGORIJS GOLDBERGS
PHD CANDIDATE

This PhD research aims to develop and assess methods, using laser scanning data, UAV based and stereo satellite imagery, to extract 3D tree structural parameters for estimating biomass/carbon stocks in NT mesic savannas.



Paper 1: Hierarchical integration of individual tree and area-based approaches for savanna biomass uncertainty estimation from airborne LiDAR (submitted Aug 2017)

Biomass map fragment, based on the area-based statistical LiDAR height distribution (1 ha plots).



Biomass map fragment, based on LiDAR individual tree approach

MONITORING MANAGEMENT EFFECTIVENESS …EFFECTIVELY

JAY EVANS

The continental scale of the fire issue probably obscures:

1. the importance of being able to effectively monitor burned area at scales relevant to fire sensitive biota and habitats;
2. The role of fine scale prescribed burning for mitigation objectives.

What is an appropriate way to measure a fire regime?

Mapping is not mapping, the many and varied techniques of image classification result in burnt area products that are different, is this significant and does this matter?

A comparative analysis of burned area classification methods using globally available moderate resolution sources (Landsat, Sentinel-2).

- Explore trade-offs between efficiency / cost, and accuracy in terms of savanna tenure scale monitoring…

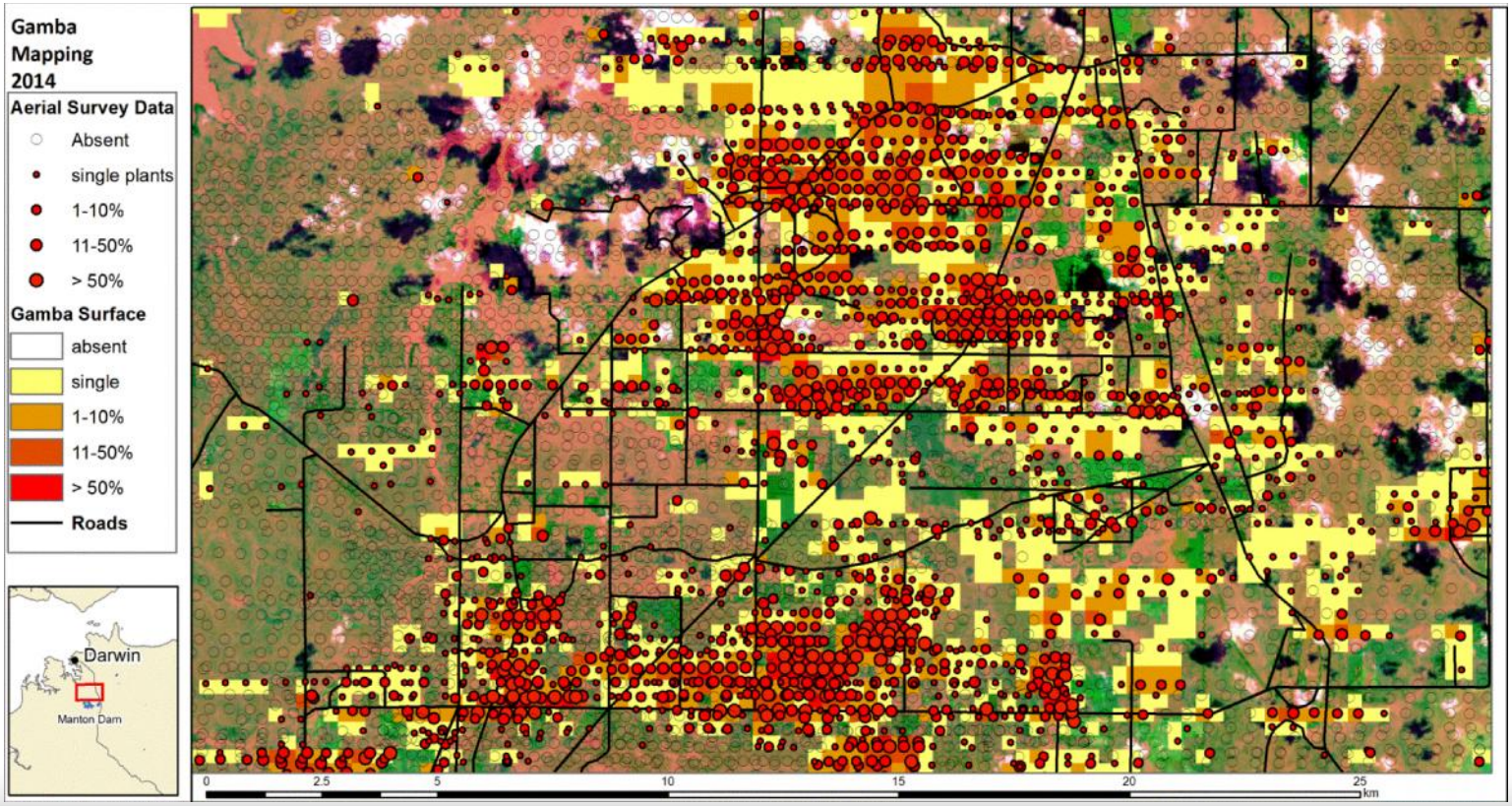
FLAMMABLE GRASSY WEEDS

1) Savanna Biodiversity and function are seriously under threat from high biomass weeds.
2) Gamba grass currently only covers 2% of its potential range.
3) Research is studying its effects, particularly on fire behaviour.



GFDI RESEARCH

- Fuel loads data: extensive for native grass habitats.
- Gamba grass fuel loads: high, but not yet quantified with respect to "Time Since Last Burnt". i.e. need a fuel accumulation curve
- Program in train with MSc student.



Tools developed

NAFI

- near national, fits into a national service
- multiple layers of fire mapping information and metrics
- provides spatial information for planning, mitigation, suppression, monitoring and evaluation.

SavBAT (Savanna Burning Abatement Tool)

- calculates Greenhouse gas emissions
- supports the Carbon industry in north Australia (~$30 million/yr)

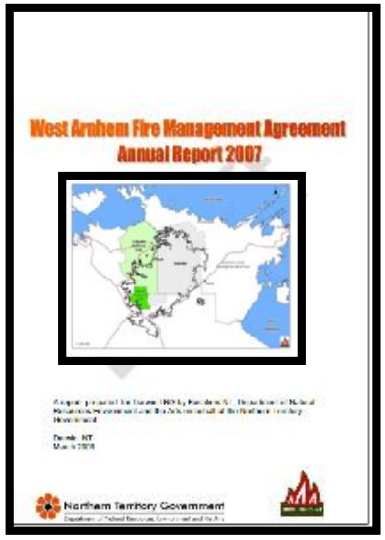
Critical things to address

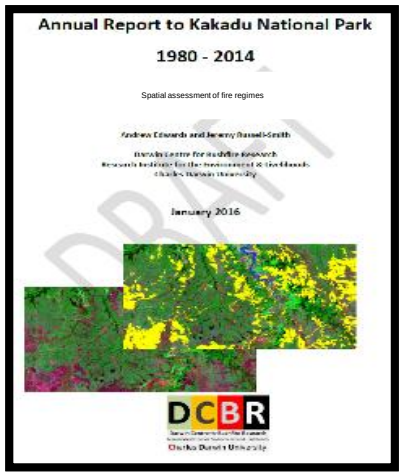
SMERF (Savanna Monitoring & Evaluation Reporting Tool)

- on-line reporting tool
- calculates stats on-the-fly
- required for many agencies

Biomass estimation

- currently, biomass is calculated using fuel accumulation curves relying on fire history information and generalised vegetation mapping
- dynamic biomass mapping reduces the error in calculating pre and post-fire biomass





A MAJOR OUTCOME FOR THE CLUSTER WILL BE A SPECIAL EDITION:

THE STATUS OF PRESCRIBED BURNING IN AUSTRALIA: SETTING TARGETS, MEASURING OUTCOMES AND COST-EFFECTIVENESS

- *An essential ecological, cultural, fuel reduction, and community safety practice in most fire-prone Australian settings.*
- *Building on long traditions of landscape fire management practiced by Indigenous Australians, and more recently by European settler society.*
- *Substantial advances continue to be made in our scientific understanding of the complexities involved with setting appropriate ecological and community safety targets, our capacity to measure and model performance outcomes, and associated assessment of the cost-effectiveness of different management options.*
- *1 x National "Synthesis" paper, 16 papers from across the States and Territories.*