

The Savanna and Rangelands Monitoring and Evaluation Reporting Framework (SMERF), and other tools

Research advisory forum / 2019



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Business
Cooperative Research
Centres Programme

Outline



- The Savannas and Rangelands
- Savanna Burning
- Monitoring and Evaluation Reporting
- North Australia Fire Information
- The calculation of Metrics
- Ecological indicators

- Case Study: Queensland Parks & Wildlife

- Fire severity mapping – new methodology
- Curing mapping – collaboration with Landgate



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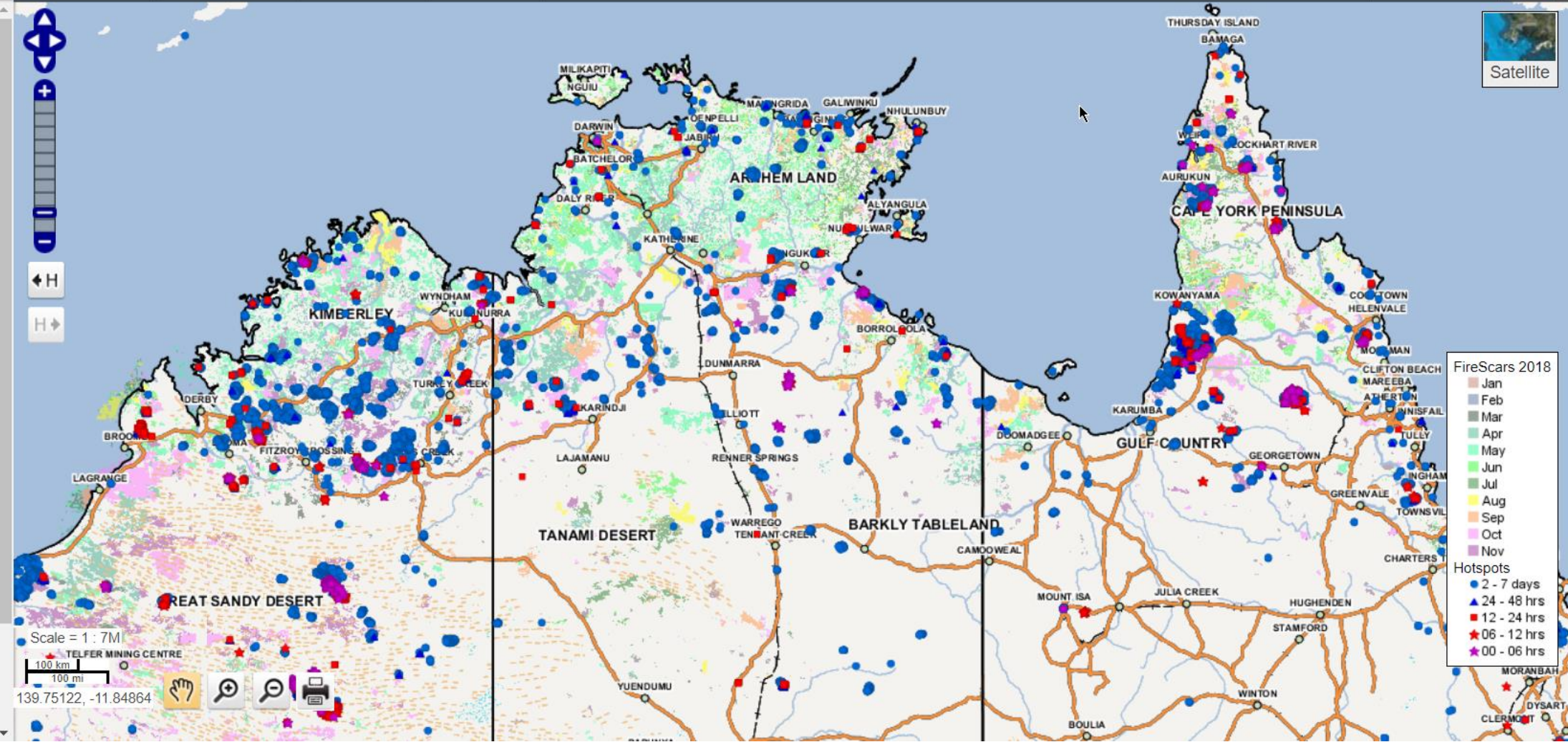
Areas ?

- Presets Areas
 - Cape York Pen'sla
 - North East Qld
 - The Gulf Qld
 - Central Qld
 - Central West Qld
 - West Qld
 - South Qld
 - NT North
 - NT Central
 - NT South
 - South Aust
 - WA Kimberley
 - WA Pilbara
 - WA Desert
 - WA Gascoyne
 - WA South
- My Areas +

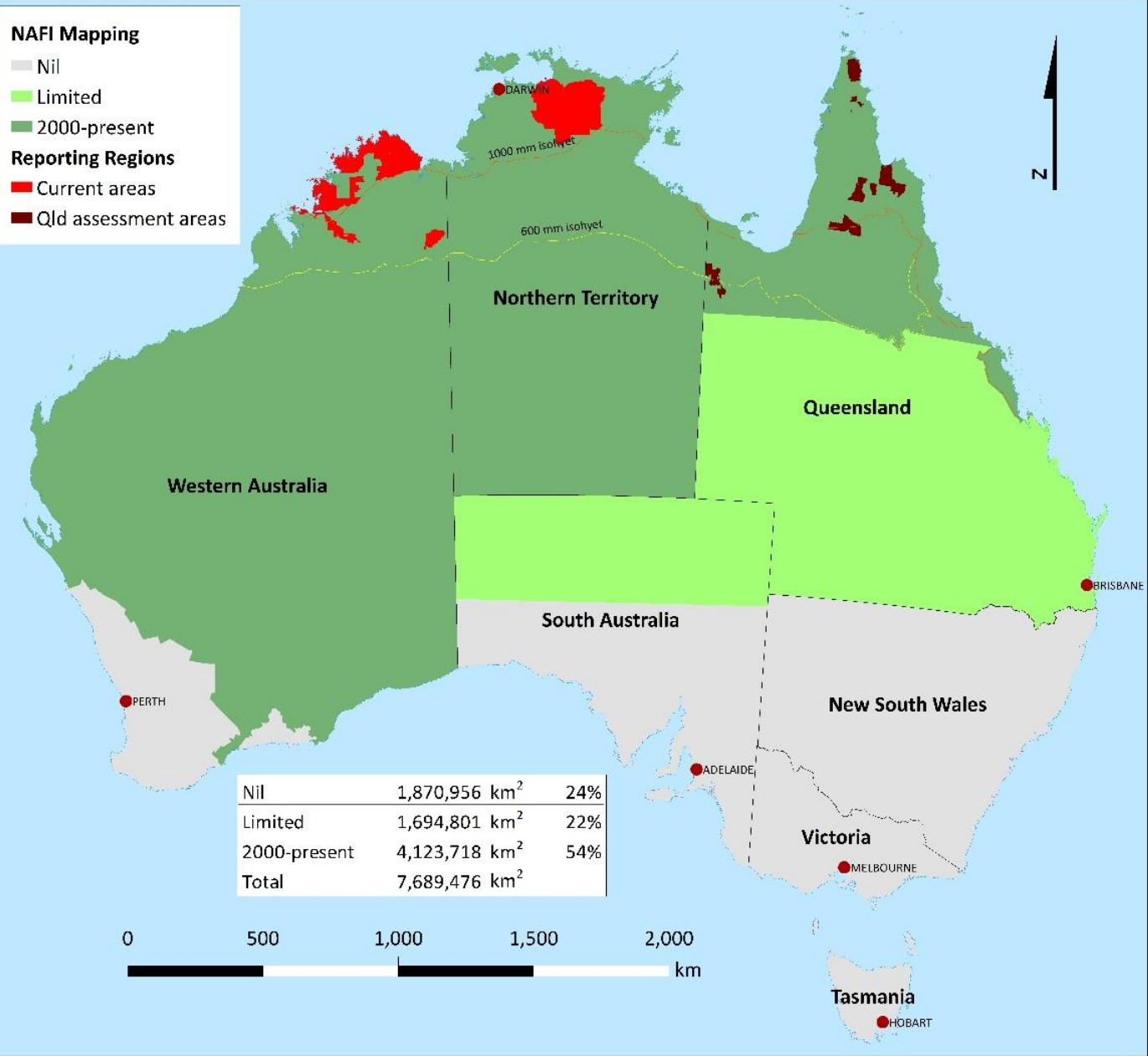
Go to Location ?

View your own maps ?

Log On / Email Alert ?

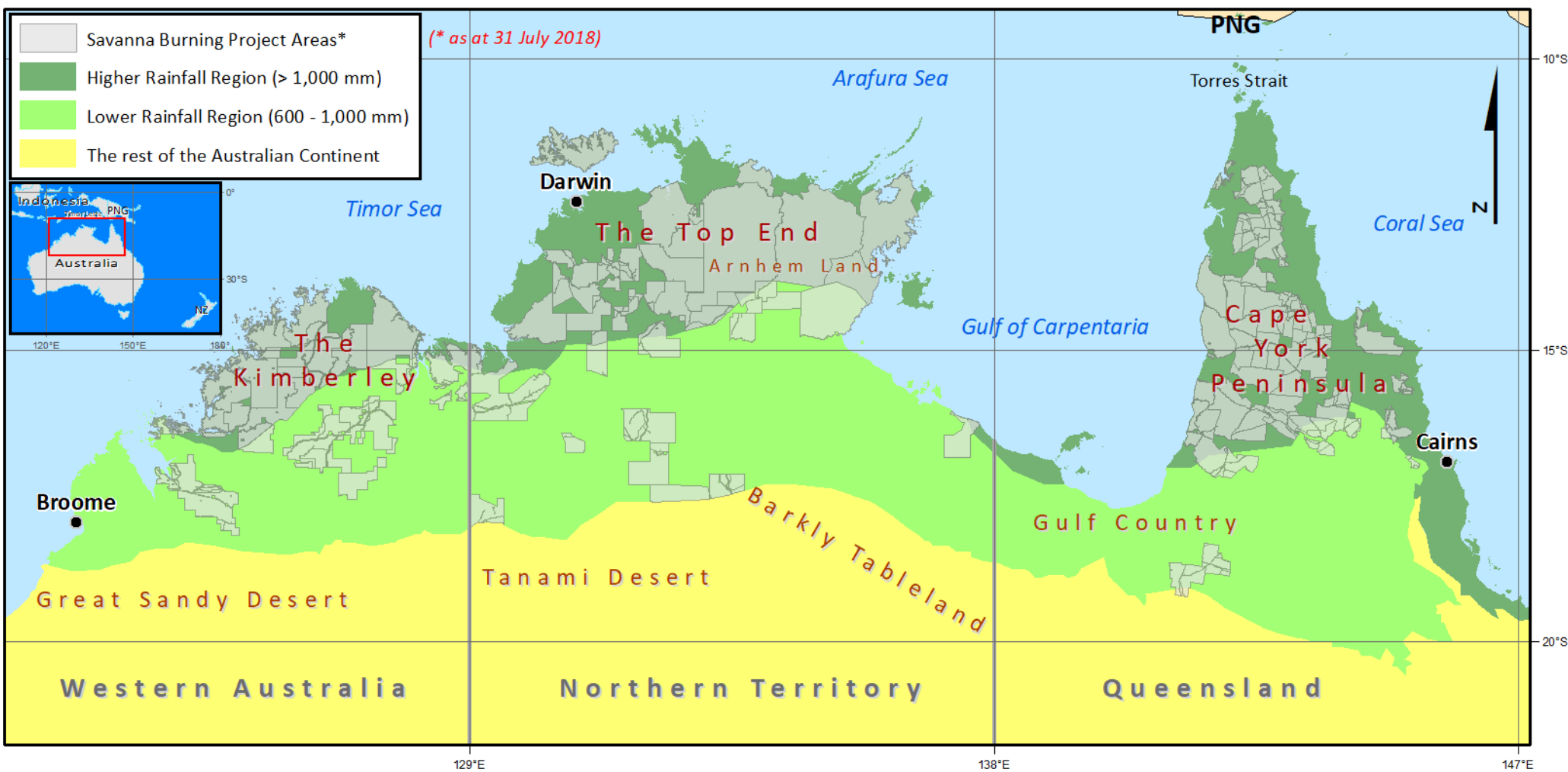


North Australia Fire Information



Current M&E Reporting and NAFI mapping





Co-benefits

- Social
- Cultural
- Economic
- Environmental

Savanna Burning

Setting a Gold Standard

\$40 million p.a. from the Carbon economy
(compared to \$6M = tourism and \$21M = pastoral)



Fire Metrics

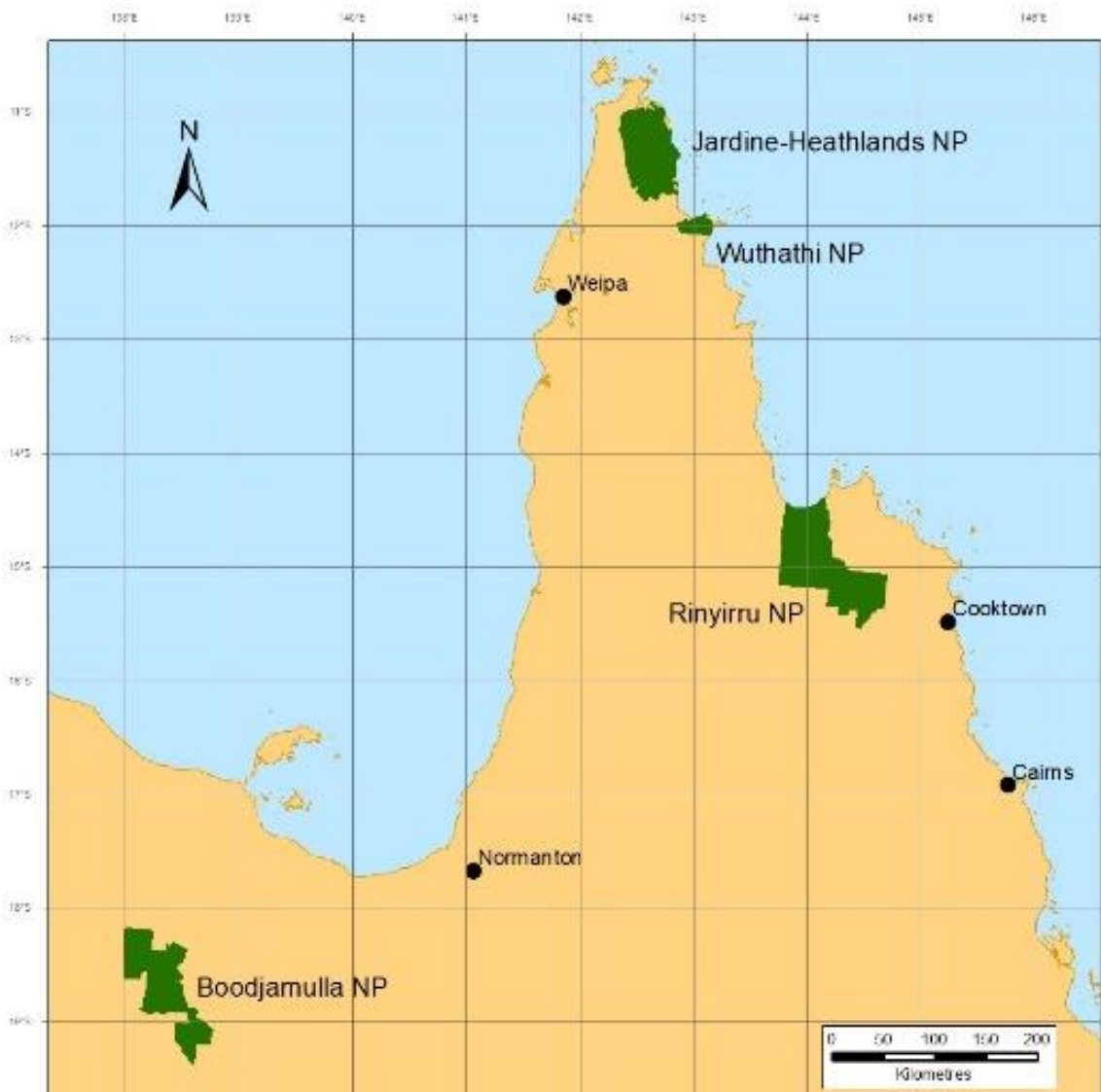
- Annual fire mapping layers
- Geographical Information Systems

Metric
Total Area Burnt
Area Burnt by Late Dry Season (Wild) Fires
Fire Frequency
Frequency of Late Dry Season (Wild) Fires
Area of Longer Unburnt Vegetation
Minimum Inter-Fire Interval
Patchiness
Area/Perimeter Ratio

Landscape unit	Model of functional group/species	Fire metrics
Savanna woodlands	Sapling density (All species)	Fire frequency
	Sapling density (Non-Eucalypts)	Frequency of low severity fires
	Sapling density (Callitris intratropica)	Time since burnt severely
	Adult stem density (Callitris intratropica)	Frequency of severe and very severe fires
Savanna and Heathland	Number of shrub taxa (obligate seeders)	Minimum inter-fire interval
	Number of long maturing (> 3 yrs) shrub taxa (obligate seeders)	Frequency of early dry season fires
	Shrub density (resprouters)	Frequency of severe and very severe fires

Fire metrics as Indicators of ecological change

Derived from empirical data
 - generally, regionally specific

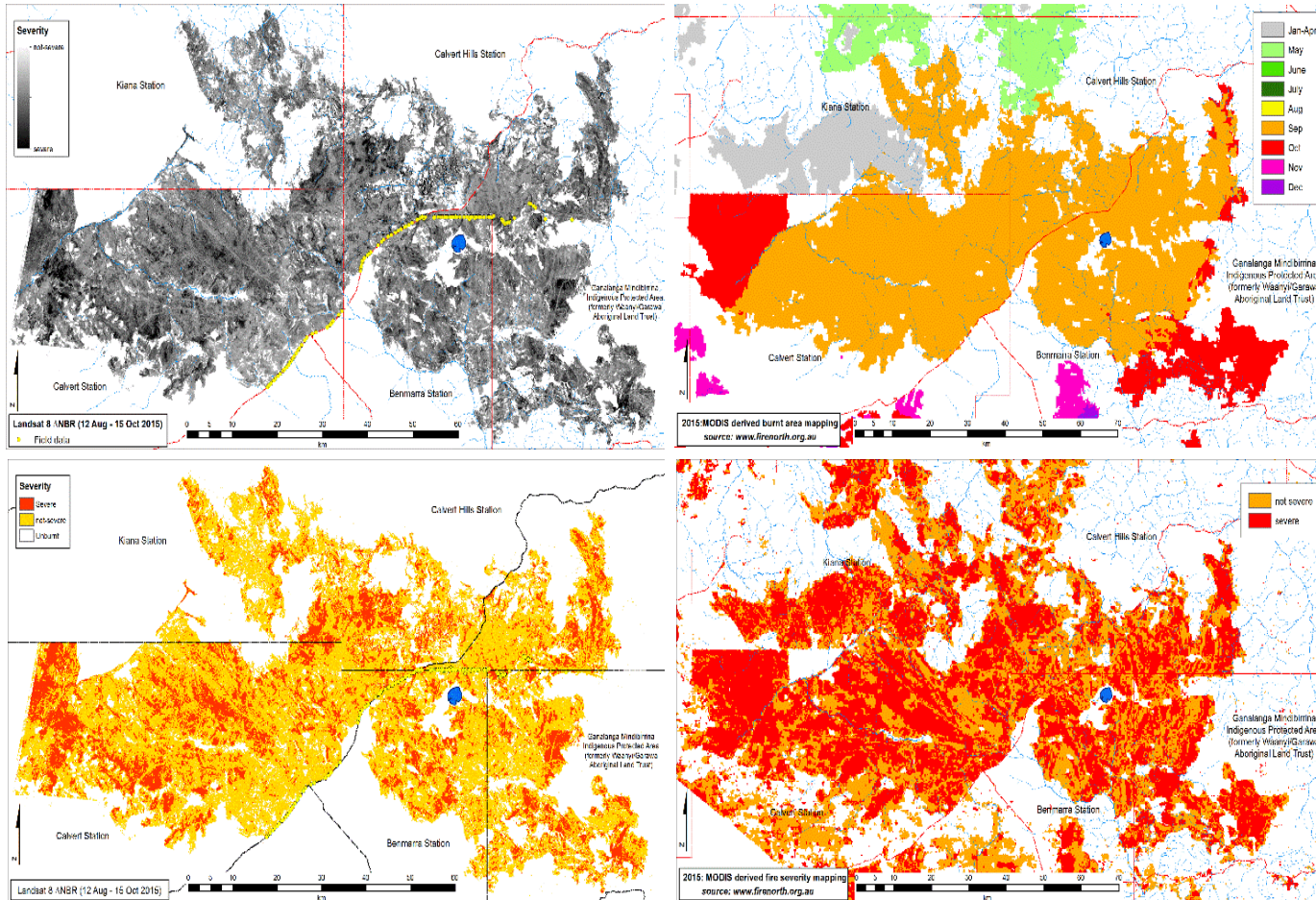


National Park	Area (km ²)
Rinyirru NP	5,439
Boodjamulla NP	3,753
Wuthathi NP	373
Jardine-heathlands NP	3,422

Queensland Parks & Wildlife

Case Study

Fire severity mapping



Relative change in the temporally differenced Normalized Burn Ratio (RdNBR): $(NBR_{prefire} - NBR_{postfire}) / (|NBR_{prefire}|)^{0.5}$

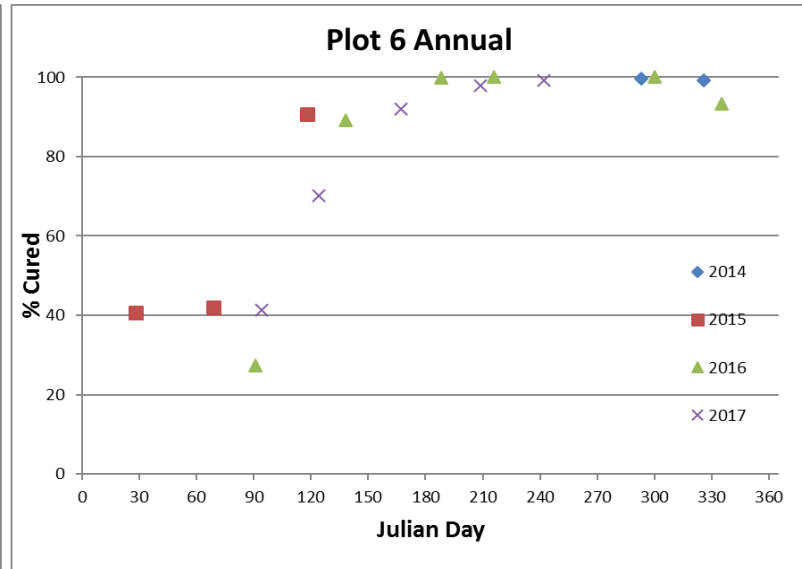
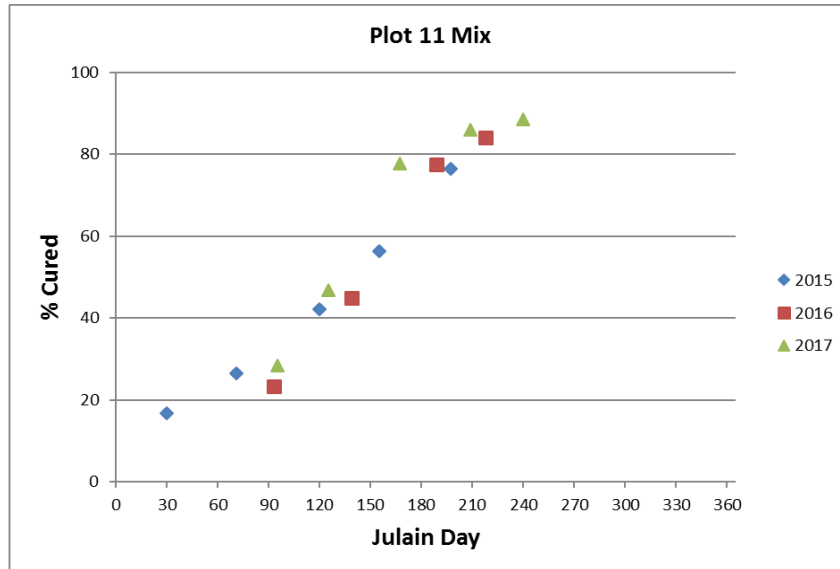
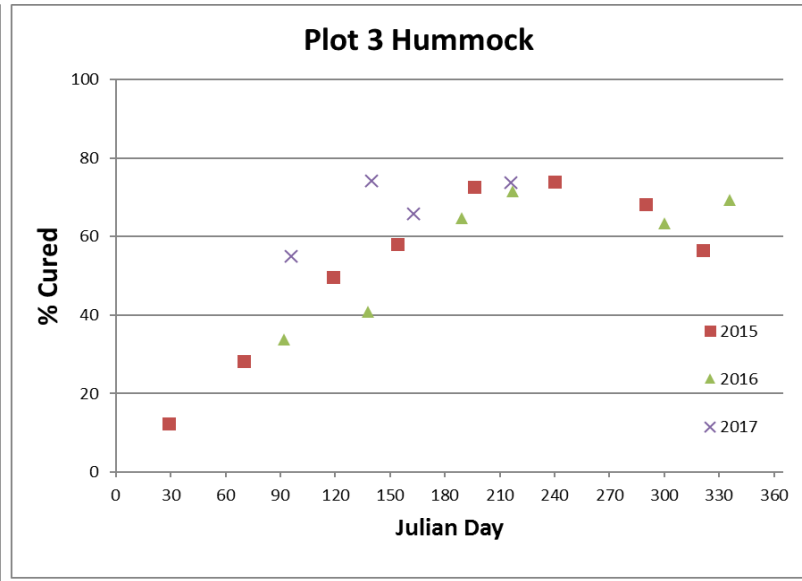
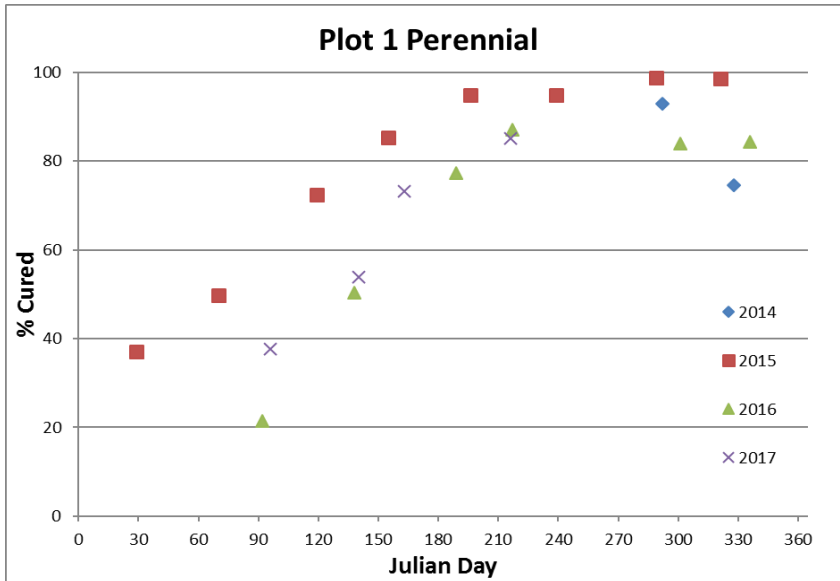
- **But only 70% reliable**

Edwards et al. 2018

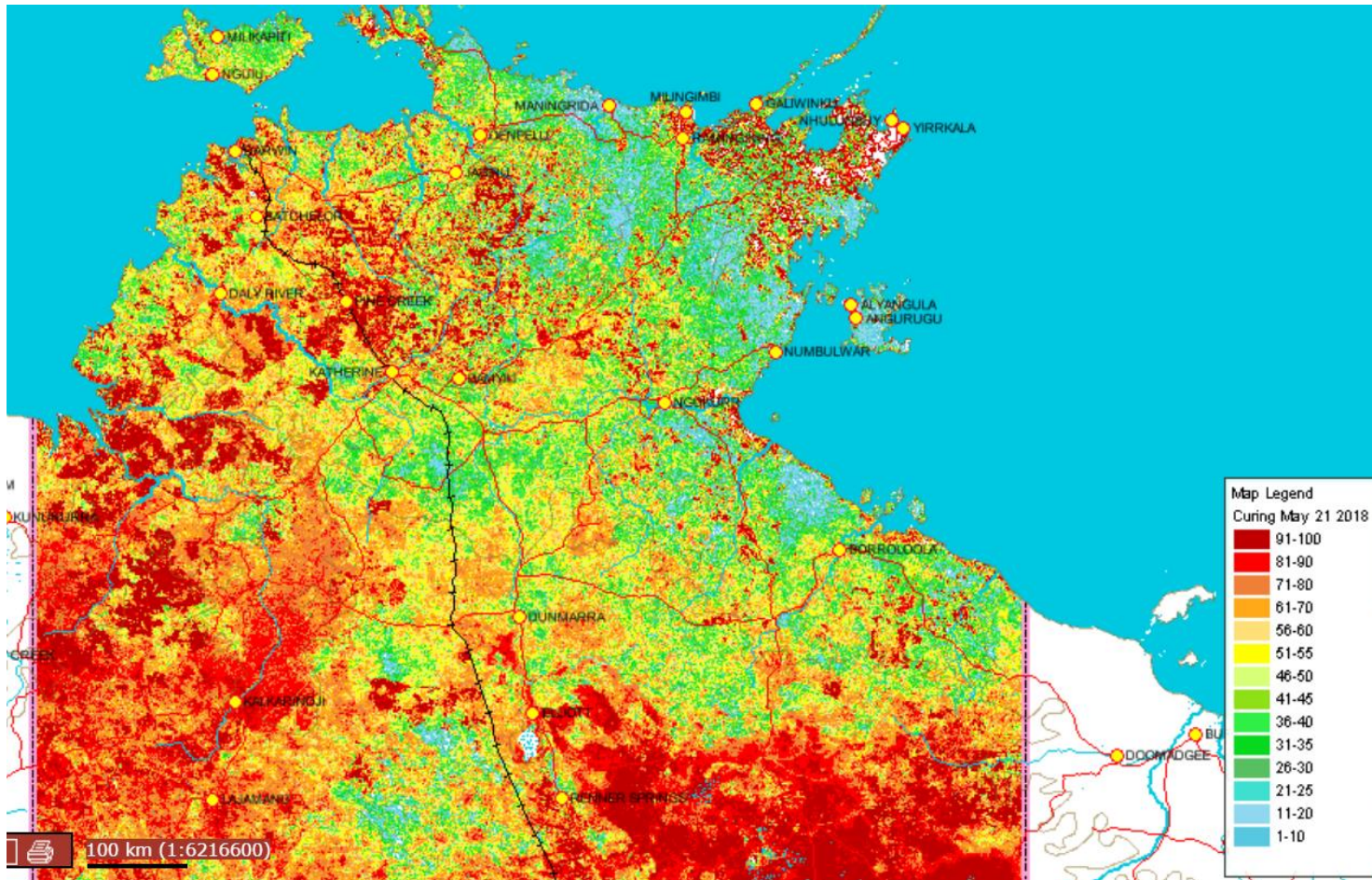


Exploring new technique using brightness of ground-calibrated active fire data points to locally calibrate ΔNIR 250 m imagery under different geographical conditions and by season.

Grass fuels curing



Grass fuels curing at MODIS 250 m scale—available on NAFI website



Curing product provided by Landgate WA, based on Yates 2019 data:

- *Rolling 4-day NDVI_{max} to remove cloud*
- *Removal of fire and waterbody effects*
- *Curing given as NDVI_{max} (from 2000-present) – NDVI_{daily}*