NAFI NORTH AUSTRALIA & RANGELANDS FIRE INFORMATION

Kimberley Land Council

KAKADU NATIONAL PARK

GOVERNMENT OF WESTERN AUSTRALIA

PARKS AND WILDLIFE SERVICE

West Arnhem Land Fire Abatement

BUSHFIRES NT

bushfire&natural HAZARDSCRC

QUEENSLAND PARKS AND WILDLIFE SERVICE

PARKS AND WILDLIFE COMMISSION NORTHERN TERRITORY

DCBR Darwin Centre for Bushfire Research

FNQ Spatial Data Services

RIEL Research Institute for the Environment and Livelihoods

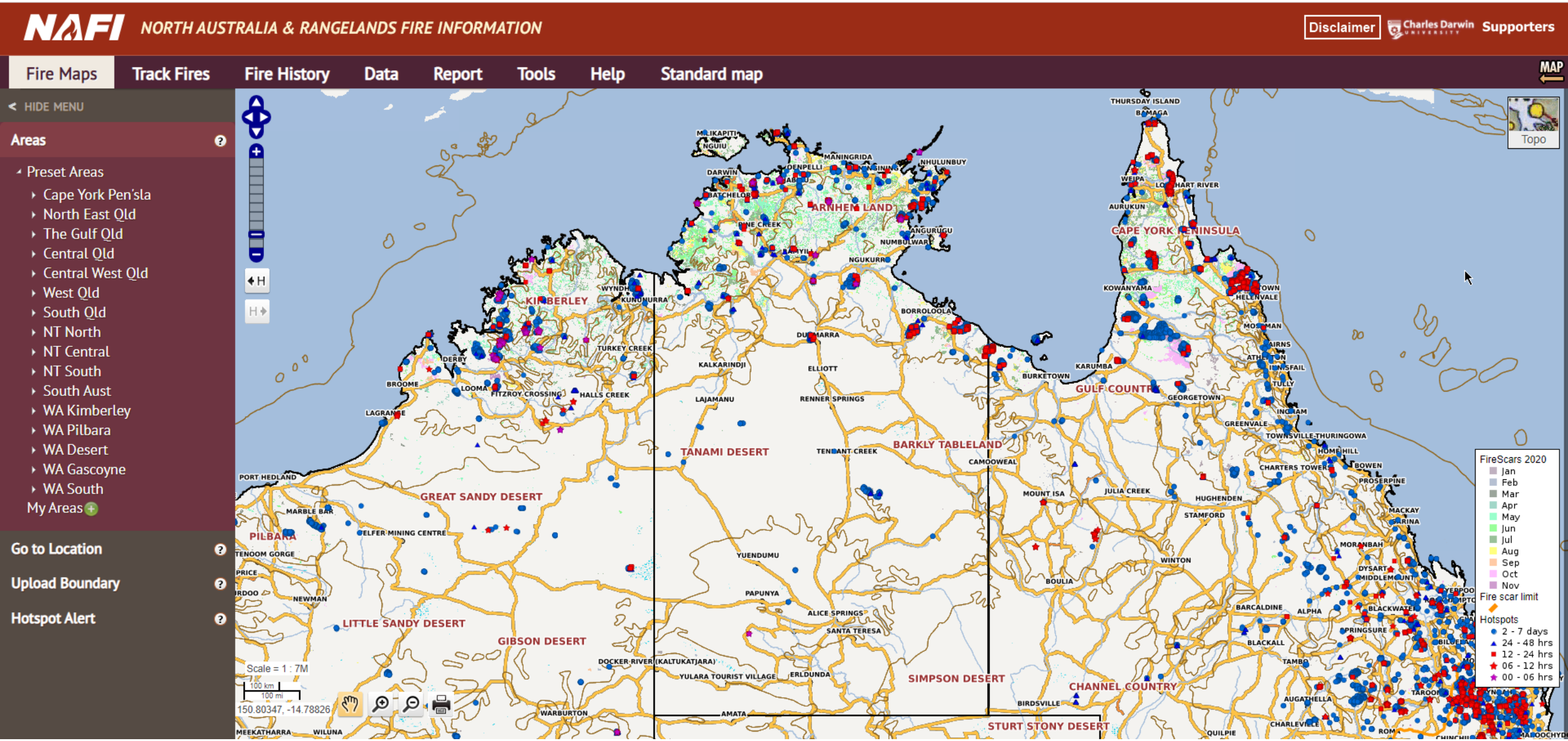
CHARLES DARWIN UNIVERSITY

Savanna Monitoring & Evaluation Reporting Framework

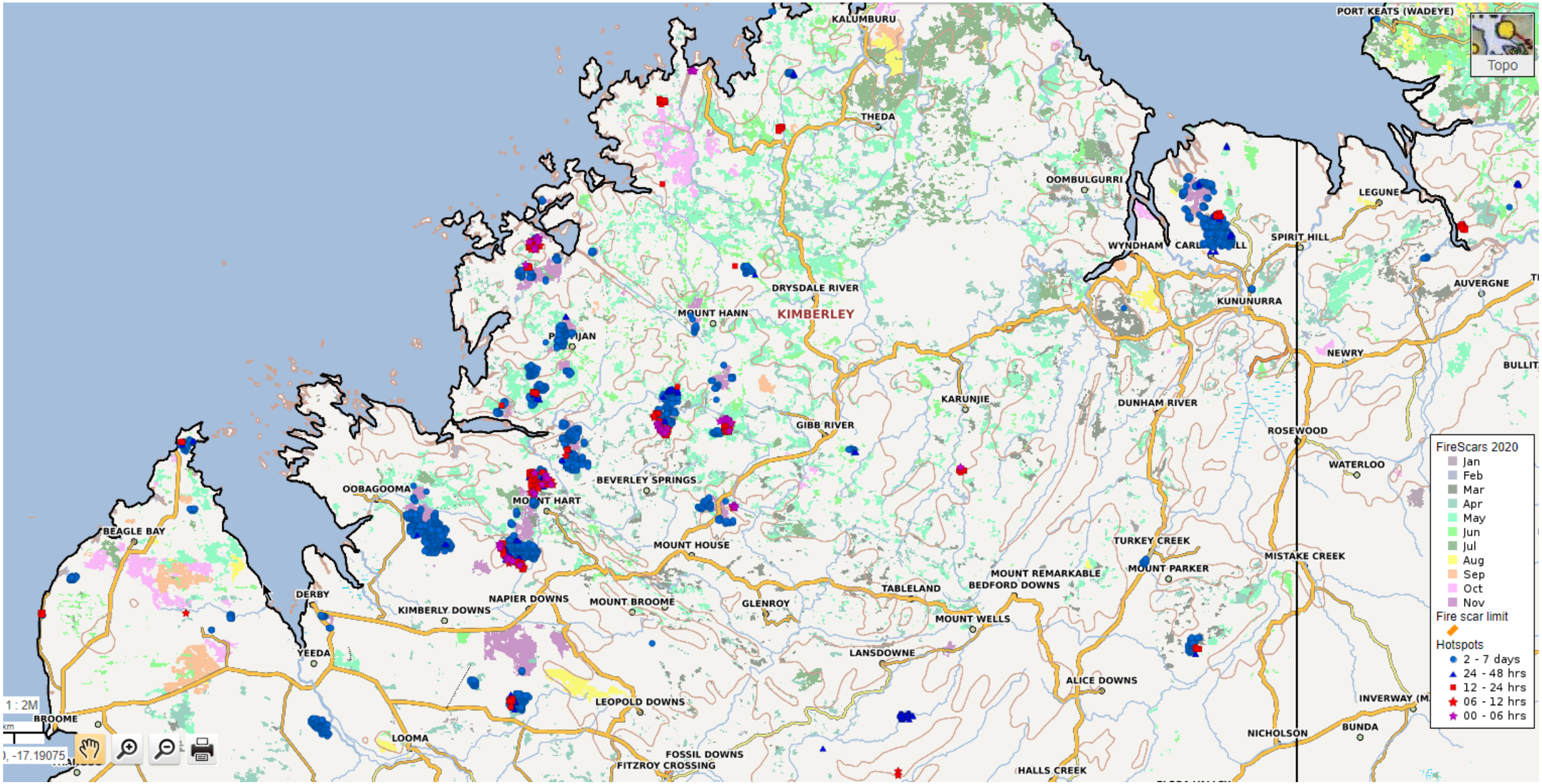
Dr Patrice Weber, Aasish Adhikari, Kerry Crosbie, Dr Andrew Edwards

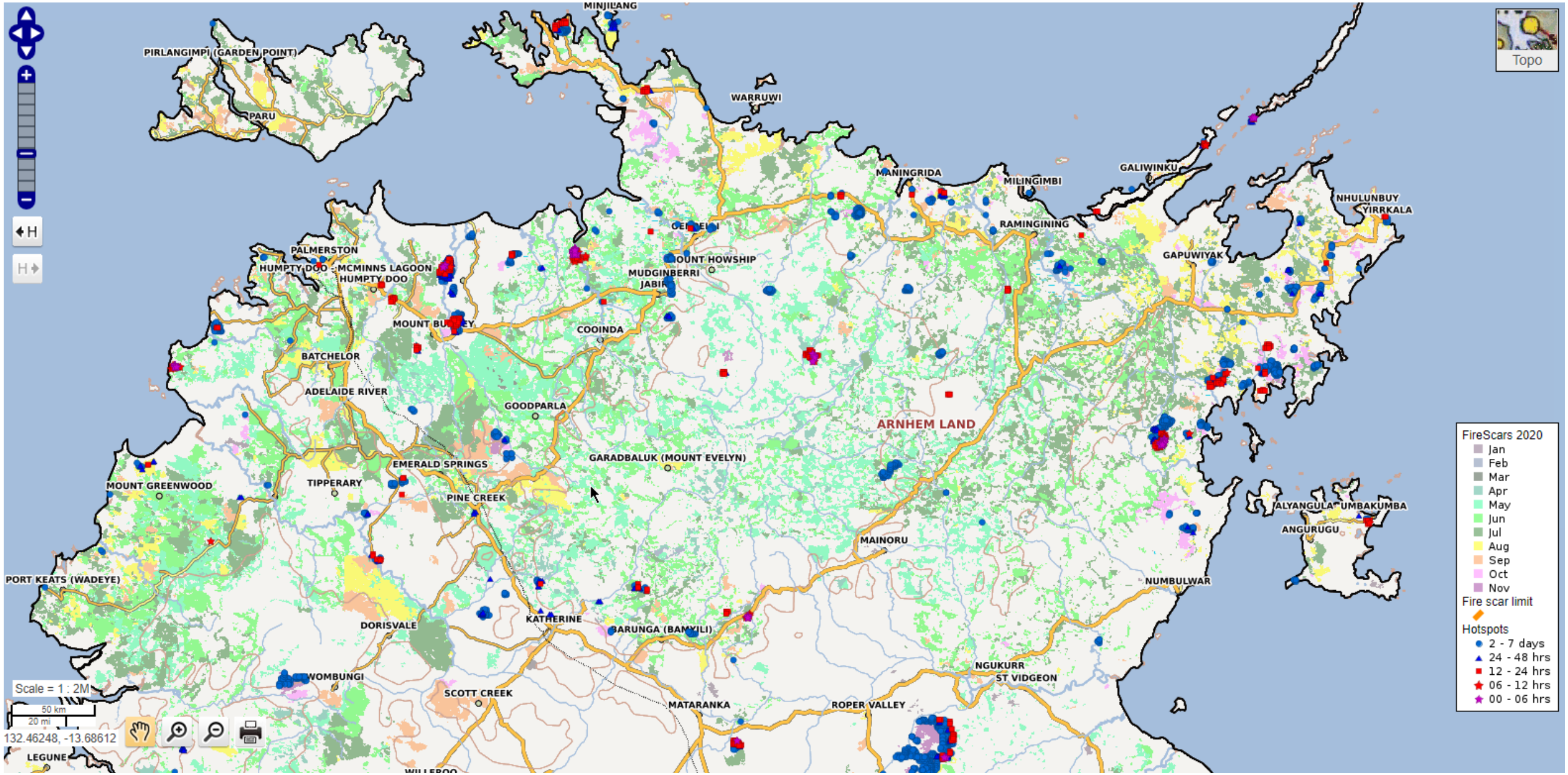
Agenda

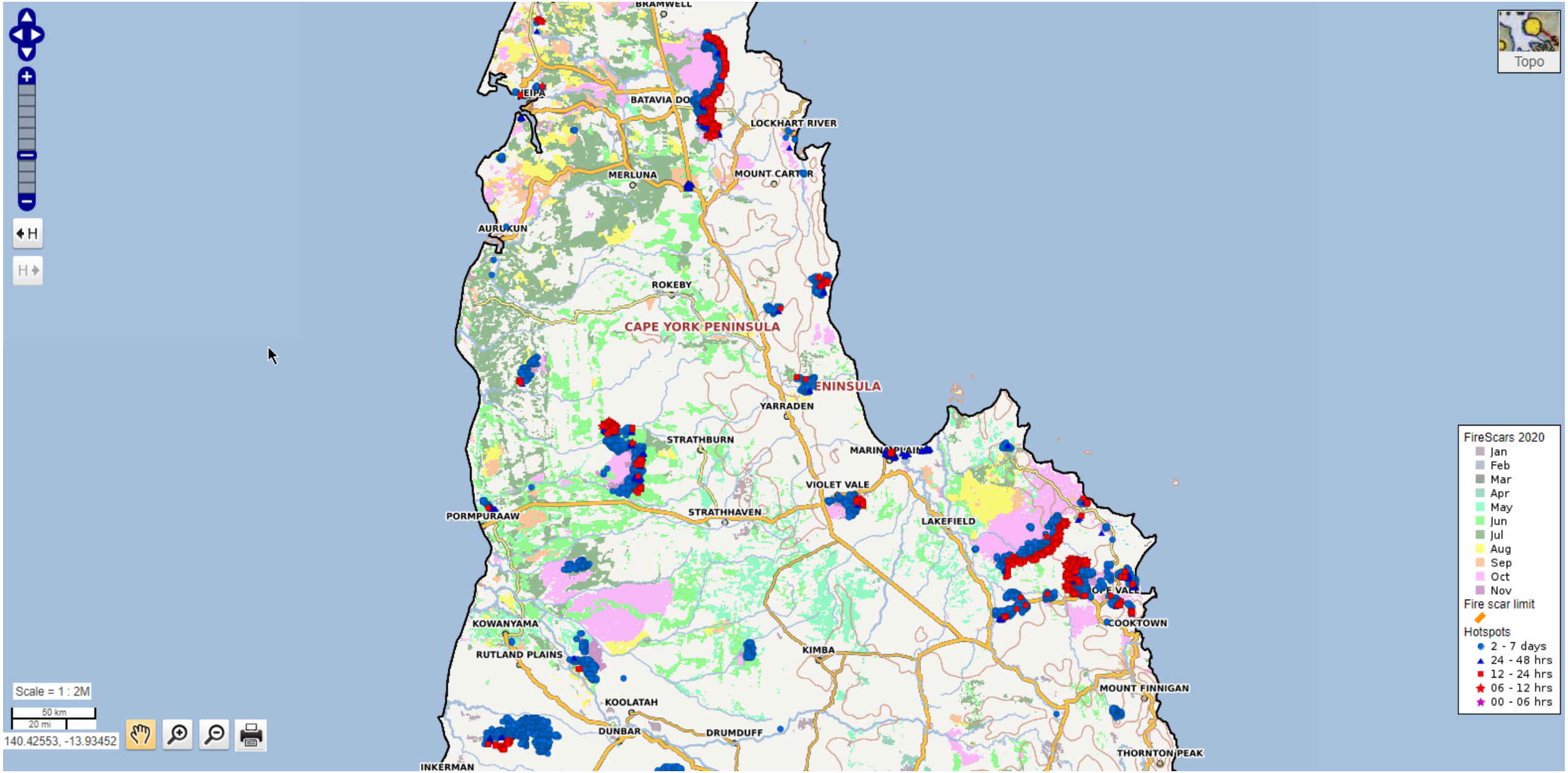
1. Brief outline of the history of SMERF
2. Some common examples of fire management goals
3. Examples of, and discussion about the SMERF metrics and analysis
4. Region specific examples of the reports
5. Introduction to the SMERF dashboard*



www.firenorth.org.au


KALUMBURU
PORT KEATS (WADEYE)
Topo
THEDA
OOMBULGURRI
LEGUNE
SPIRIT HILL
WYNDHAM
KUNUNURRA
AUVERGNE
DRYSDALE RIVER
KIMBERLEY
MOUNT HANN
NEWRY
KARUNJIE
DUNHAM RIVER
GIBB RIVER
ROSEWOOD
WATERLOO
BEVERLEY SPRINGS
OOBAGOOMA
MOUNT HART
BEAGLE BAY
MOUNT HOUSE
TURKEY CREEK
MISTAKE CREEK
MOUNT PARKER
MOUNT REMARKABLE
BEDFORD DOWNS
TABLELAND
DERBY
NAPIER DOWNS
MOUNT BROOME
GLENROY
KIMBERLY DOWNS
MOUNT WELLS
YEEDA
LANSDOWNE
ALICE DOWNS
LEOPOLD DOWNS
INVERWAY
BROOME
LOOMA
NICHOLSON
BUNDA
FOSSIL DOWNS
FITZROY CROSSING
HALLS CREEK
FireScars 2020
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Fire scar limit
Hotspots
2 - 7 days
24 - 48 hrs
12 - 24 hrs
06 - 12 hrs
00 - 06 hrs
1 : 2M


MINJILANG
PIRLANGIMPI (GARDEN POINT)
PARU
WARRUWI
MANINGRIDA
MILINGIMBI
GALIWINKU
NHULUNBUY
YIRRKALA
RAMINGINING
GAPUWIYAK
PALMERSTON
HUMPTY DOO
MCMINNS LAGOON
HUMPTY DOO
MUDGINBERRI
JABIRU
COOINDA
BATCHELOR
ADELAIDE RIVER
GOODPARLA
ARNHEM LAND
GARADBALUK (MOUNT EVELYN)
EMERALD SPRINGS
TIPPERARY
MOUNT GREENWOOD
PINE CREEK
MAINORU
ALYANGULA
UMBAKUMBA
ANGURUGU
PORT KEATS (WADEYE)
NUMBULWAR
DORISVALE
KATHERINE
BARUNGA (BAMYILI)
NGUKURR
ST VIDGEON
WOMBUNGI
SCOTT CREEK
MATARANKA
ROPER VALLEY
LEGUNE
Topo
FireScars 2020
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Fire scar limit
Hotspots
2 - 7 days
24 - 48 hrs
12 - 24 hrs
06 - 12 hrs
00 - 06 hrs
Scale = 1 : 2M
50 km
20 mi
132.46248, -13.68612

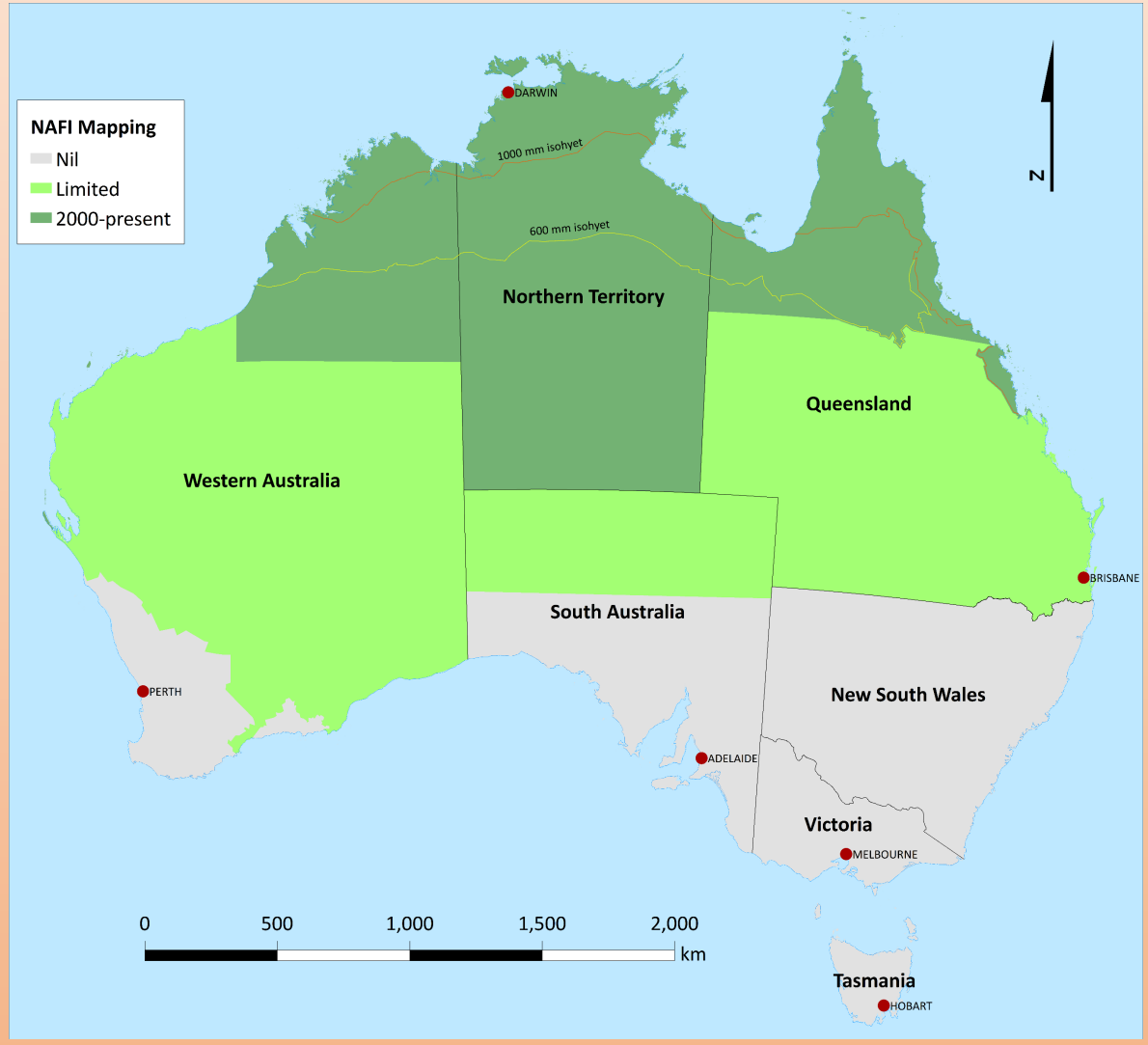

BRAMWELL
BATAVIA DO
LOCKHART RIVER
MERLUNA
MOUNT CARTER
AURUKUN
ROKEBY
CAPE YORK PENINSULA
YARRADEN
STRATHBURN
VIOLET VALE
PORMPURAAW
STRATHHAVEN
LAKEFIELD
COOKTOWN
KOWANYAMA
RUTLAND PLAINS
KIMBA
KOOLATAH
DUNBAR
DRUMDUFF
MOUNT FINNIGAN
THORNTON PEAK
INKERMAN
Topo
FireScars 2020
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Fire scar limit
Hotspots
2 - 7 days
24 - 48 hrs
12 - 24 hrs
06 - 12 hrs
00 - 06 hrs
Scale = 1 : 2M
50 km
20 mi
140.42553, -13.93452

SMERF coverage and limitations

SMERF Reports are based on the 250m burnt area mapping provided through North Australia Fire Information (NAFI).

NAFI mapping is available for the majority of WA, the NT and northern QLD from 2000 to present.

Currently, SMERF data and reports are only available in northern QLD, the NT and northern WA.



Some common fire management goals.

Fire management in northern Australia's savanna landscapes is carried out by many different groups and organisations from different industries, including: Conservation, Carbon Farming, and Pastoral. There are some common or similar fire management goals that are shared between these different groups and organisations:

- Reduce severe late season wildfire
- Reduce the frequency of fire and increase the variety of areas that burn from year to year
- Increase the amount of 'long unburnt' vegetation
- Increase burn patchiness (enhance the mosaic effect of burns)
- Reduce the size of burnt patches
- Implement early prescribed burns that effectively pull up or reduce wildfire
- Natural and cultural asset protection

What's in the SMERF reports?

A suite of standardised fire metrics reported in the form of maps, graphs and tables of data that provide capacity to evaluate the effects of fire, either from prescribed burning activities or wildfire, at property and regional scales.

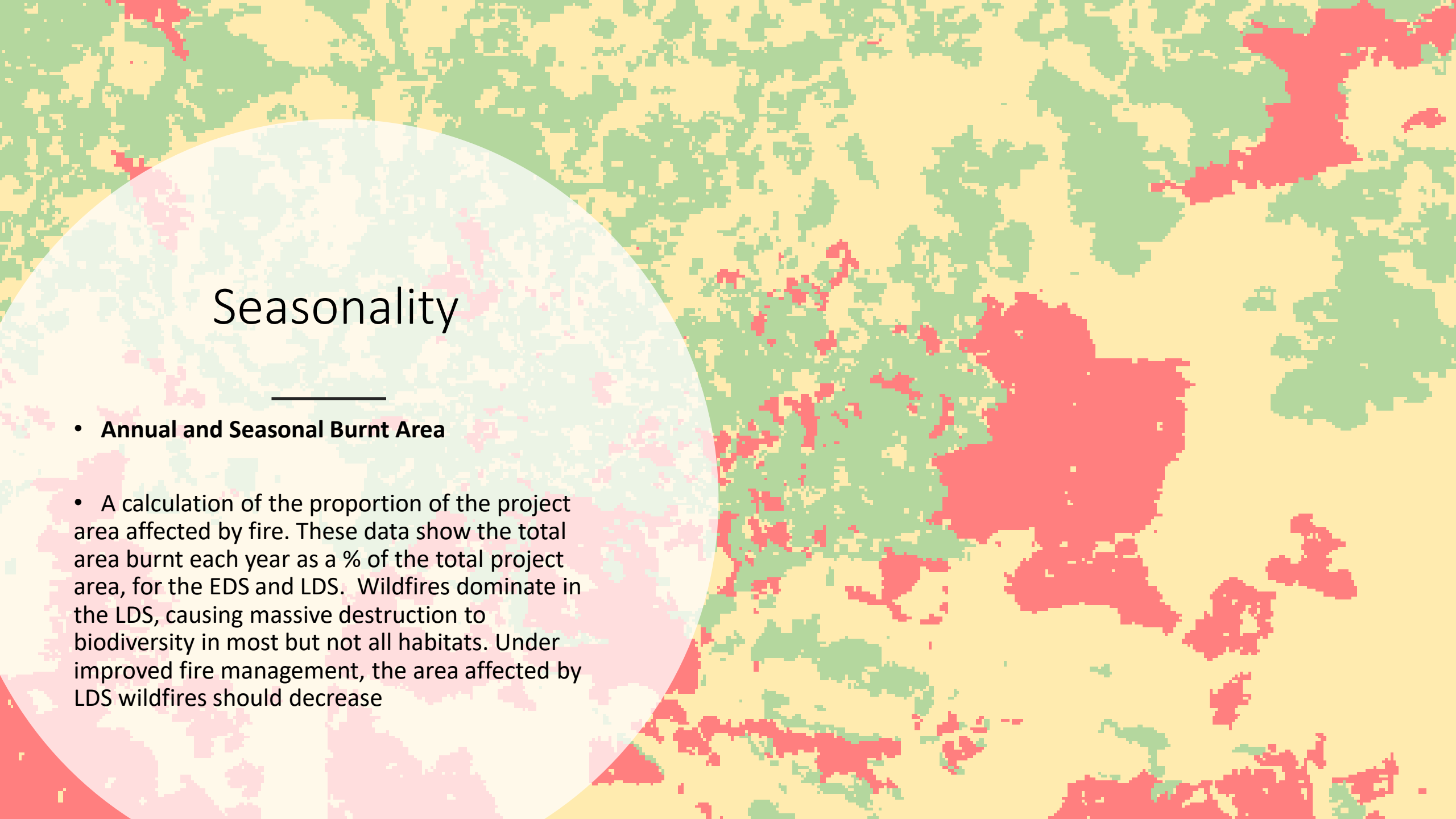
The data is reported and displayed for multiple years over time to allow the user to identify trends and changes.

Metrics
Seasonality / Total Area Burnt
Fire Frequency
Area of Longer Unburnt Vegetation
Time Since Last Burnt
Minimum Inter-Fire Interval
Patchiness of Burnt Areas
Patchiness of Unburnt Areas
Distance from Burnt to Unburnt areas

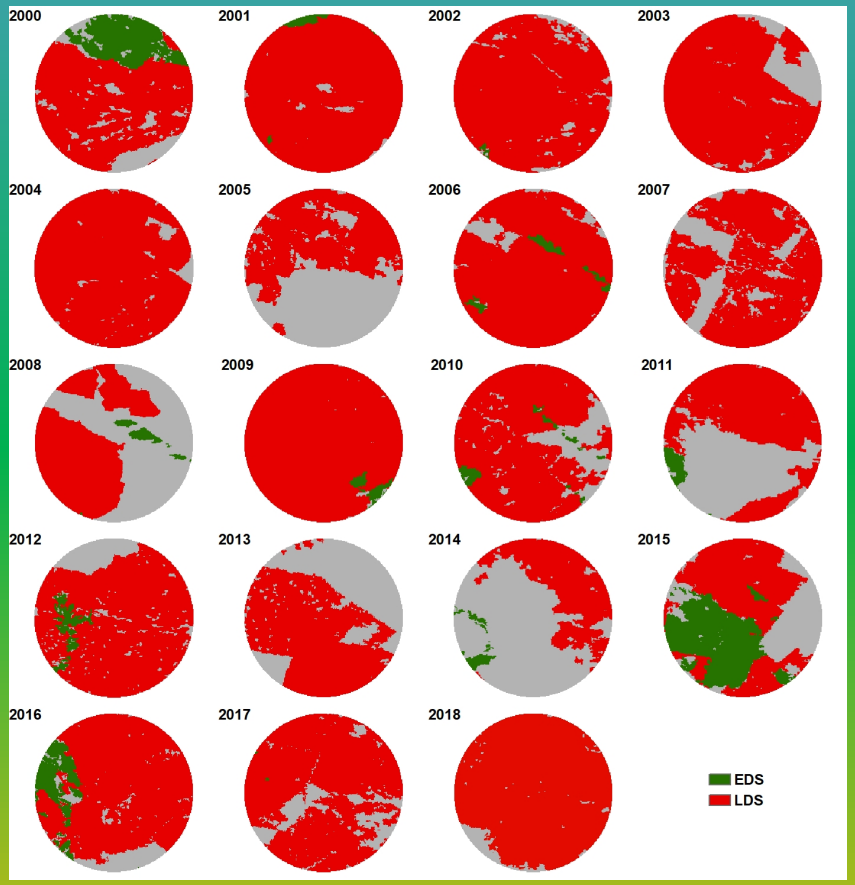
Seasonality

- **Annual and Seasonal Burnt Area**

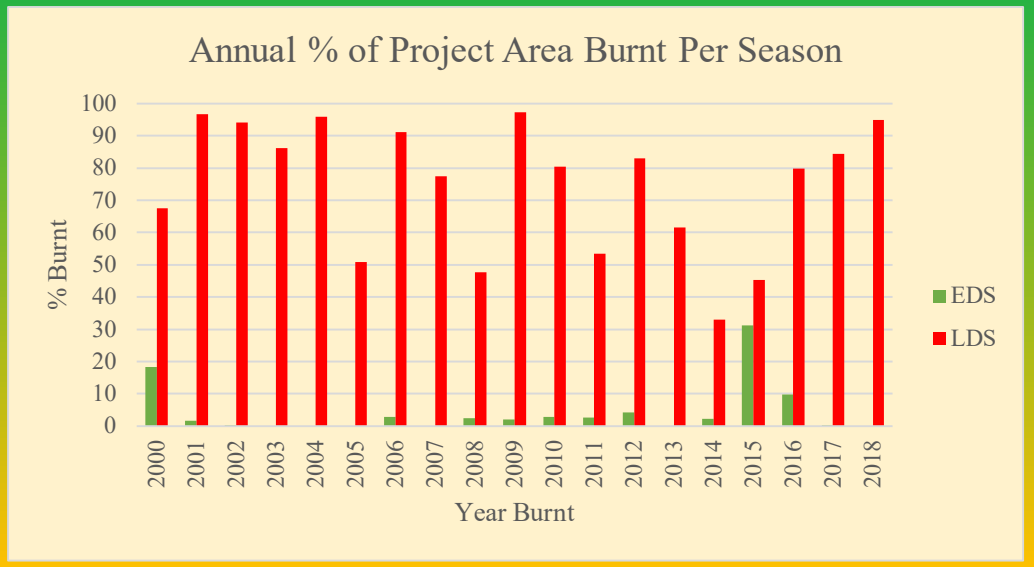
- A calculation of the proportion of the project area affected by fire. These data show the total area burnt each year as a % of the total project area, for the EDS and LDS. Wildfires dominate in the LDS, causing massive destruction to biodiversity in most but not all habitats. Under improved fire management, the area affected by LDS wildfires should decrease



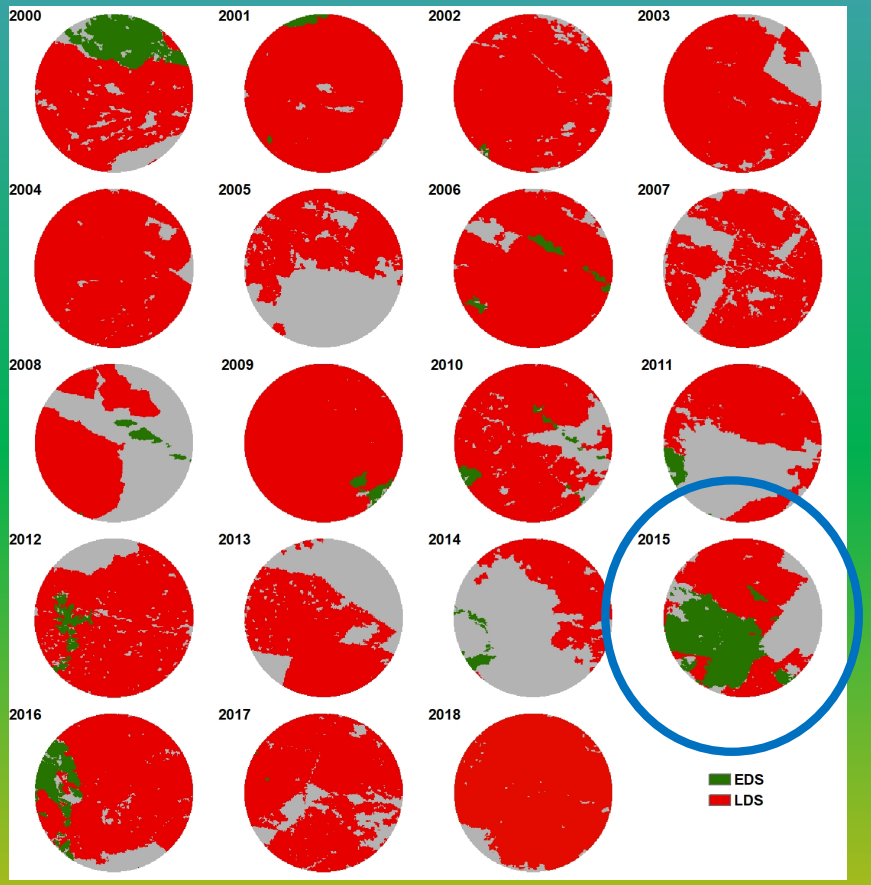
Seasonality – Site B



Total % Burnt Yearly			
Year	EDS	LDS	Total
2000	18.4	67.5	85.9
2001	1.7	96.6	98.3
2002	0.3	94.0	94.3
2003	0.0	86.2	86.2
2004	0.0	95.8	95.8
2005	0.0	50.8	50.8
2006	2.8	91.1	93.9
2007	0.0	77.4	77.4
2008	2.4	47.7	50.0
2009	2.1	97.3	99.4
2010	2.8	80.4	83.2
2011	2.7	53.5	56.2
2012	4.3	82.9	87.2
2013	0.0	61.6	61.6
2014	2.3	33.0	35.3
2015	31.2	45.4	76.6
2016	9.8	79.9	89.6
2017	0.1	84.4	84.5
2018	0.0	95.0	95.0



Seasonality – Site B



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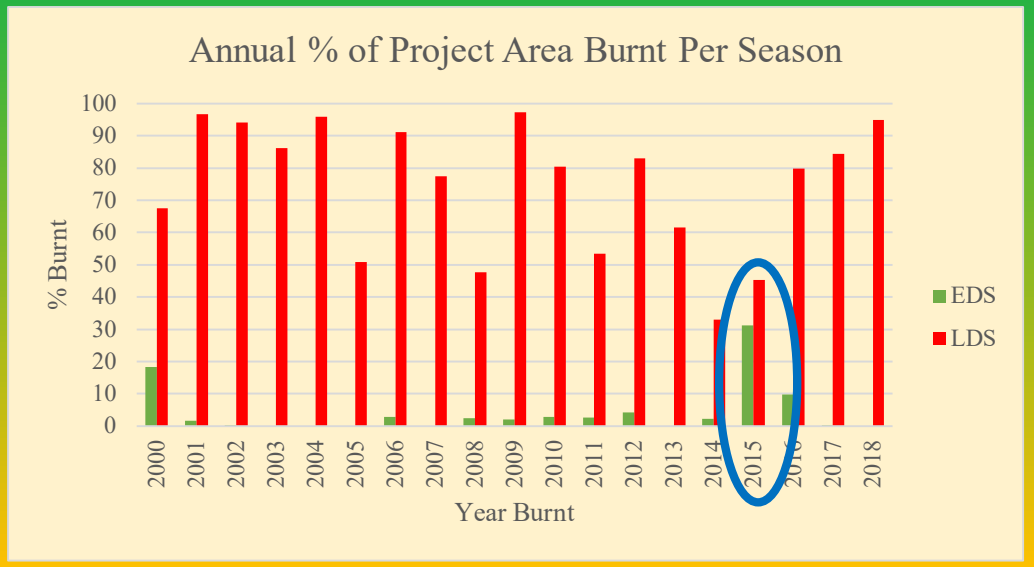
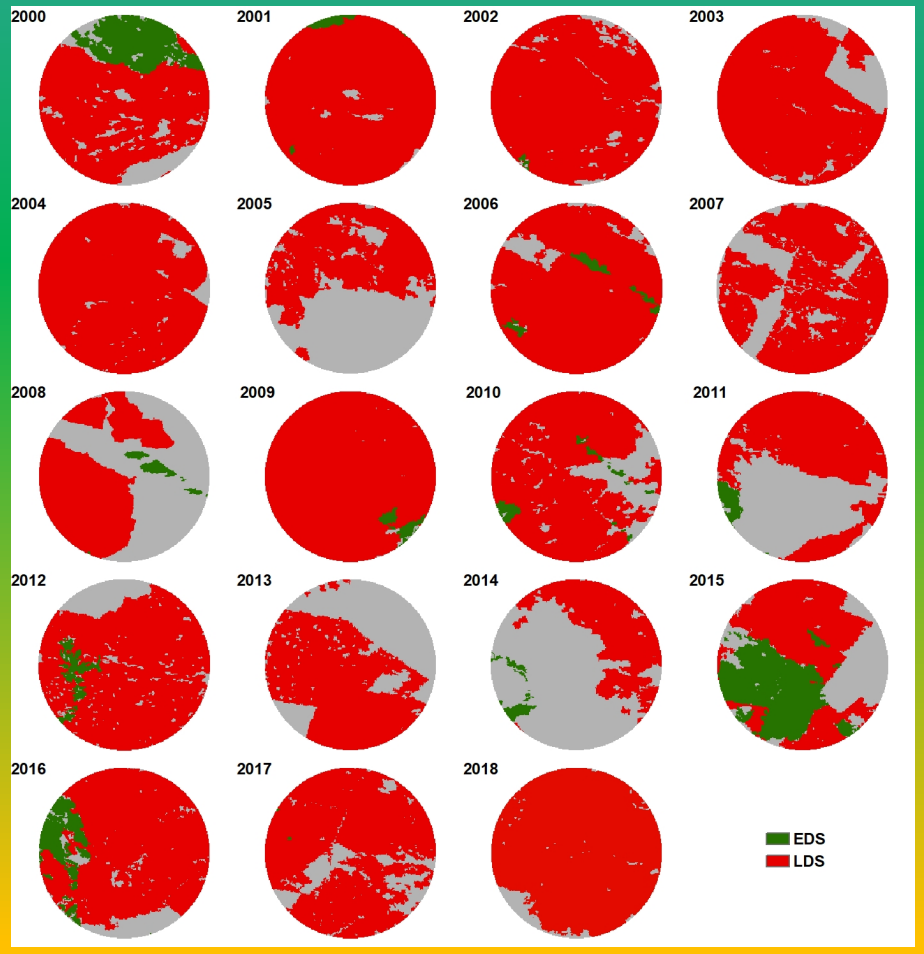
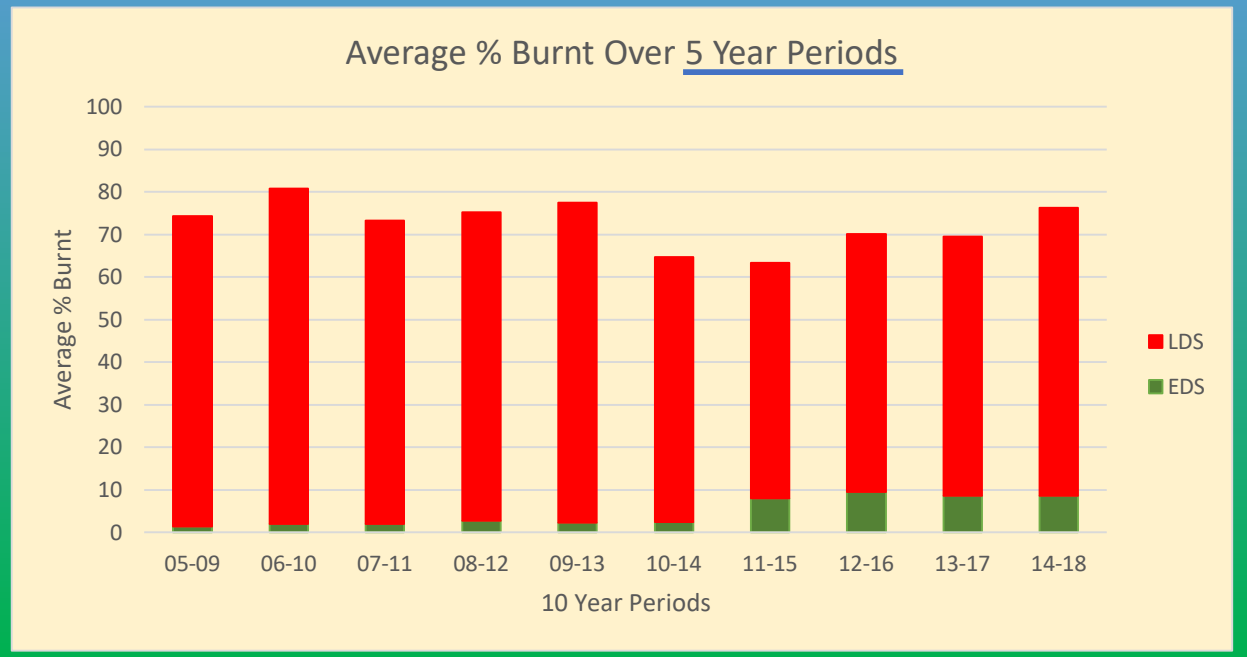
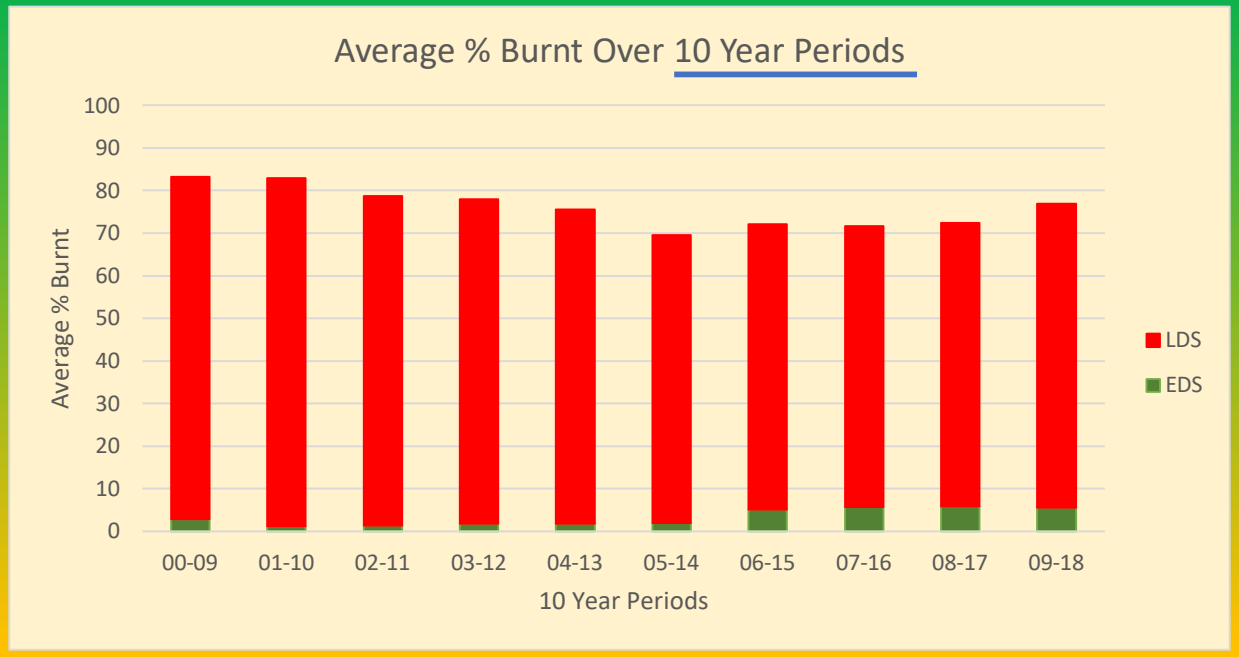


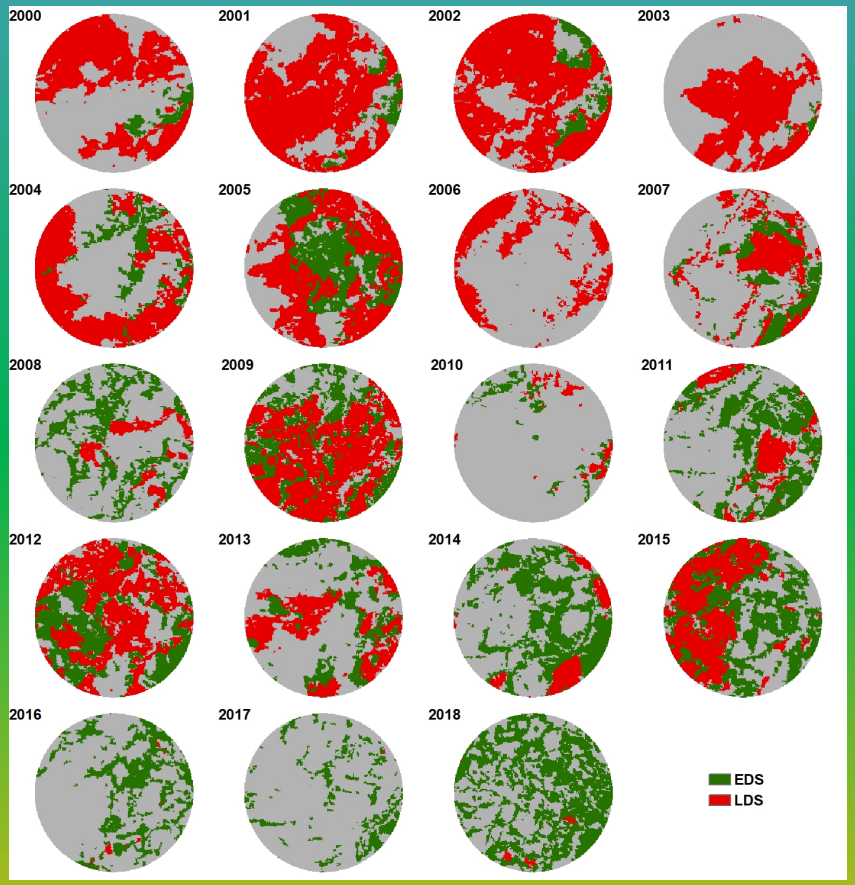
Seasonality - Site B Averages

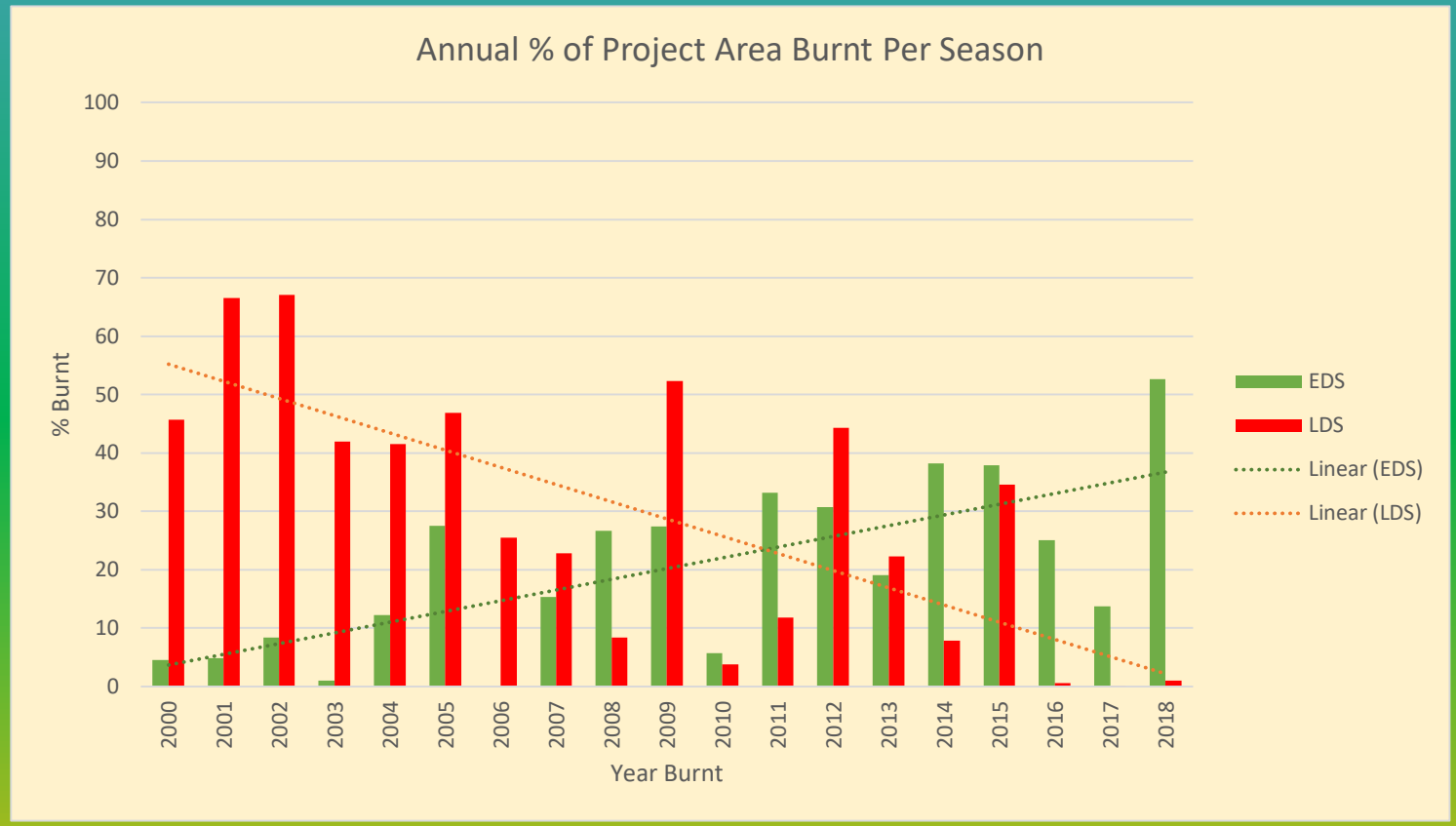




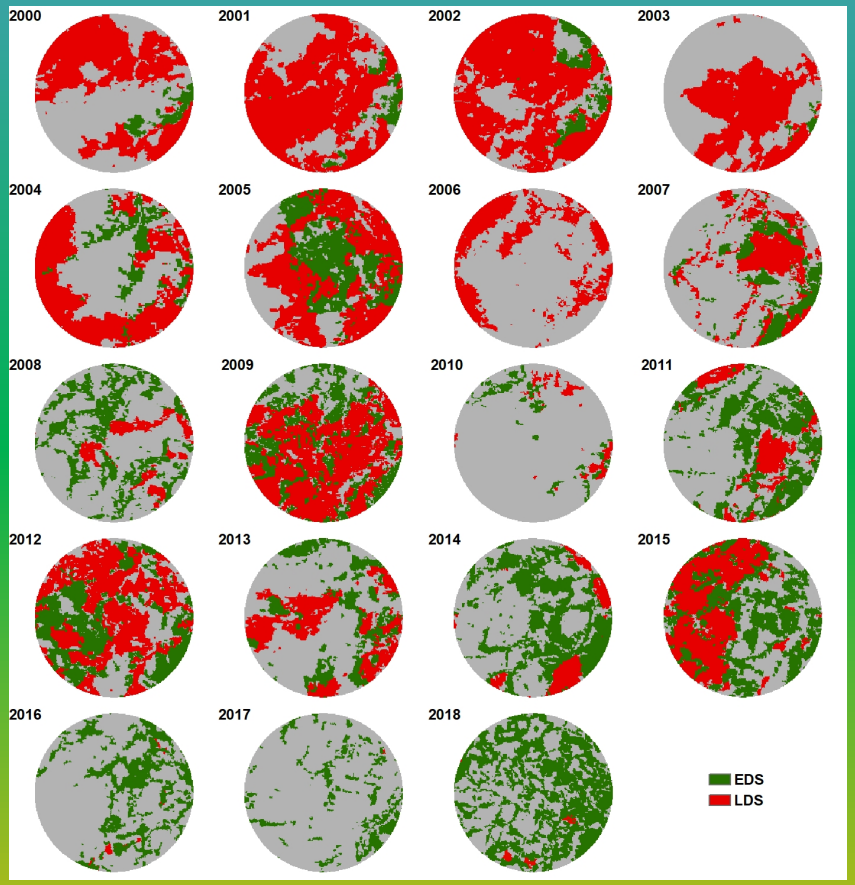


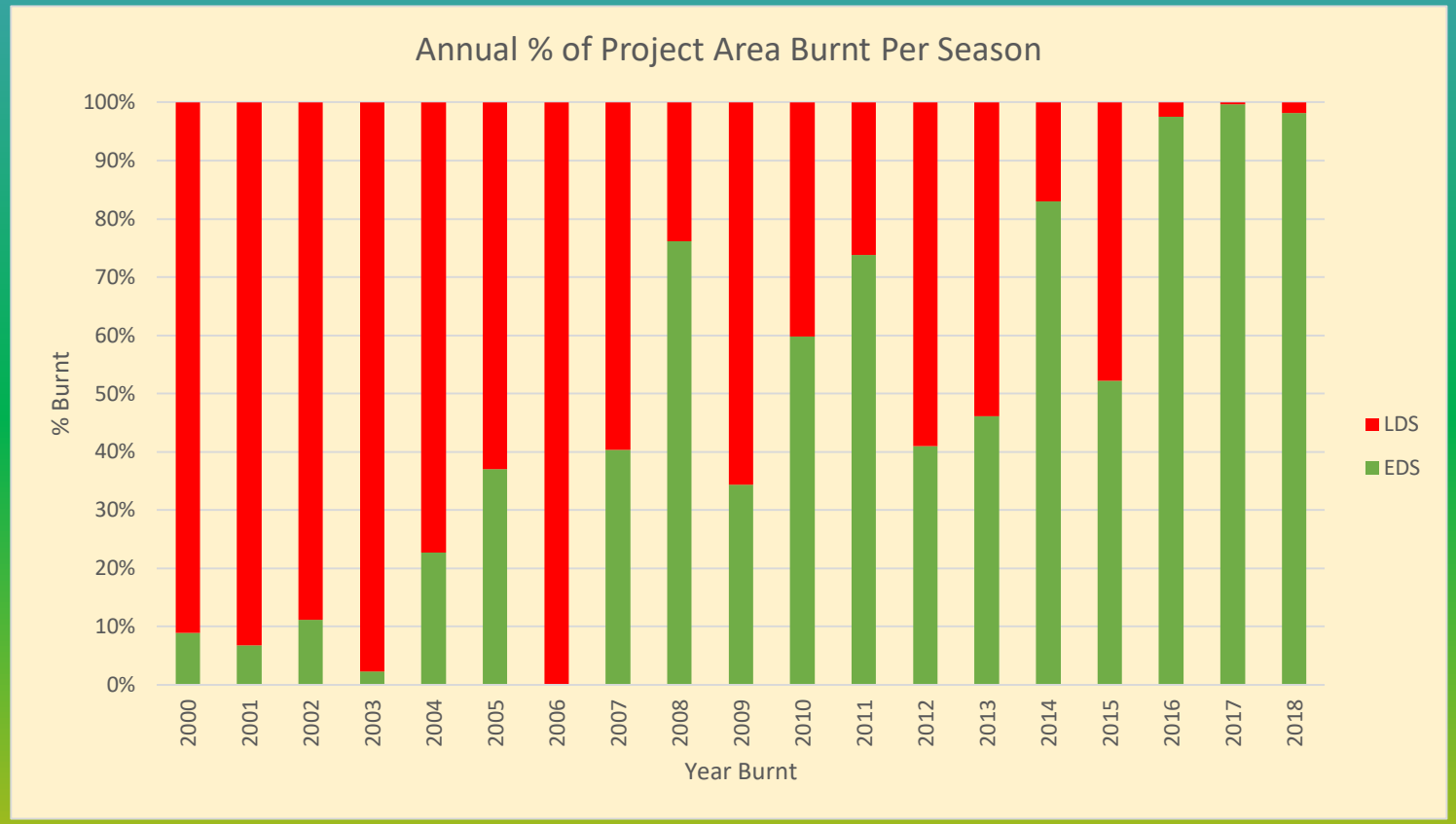
Seasonality - Site A



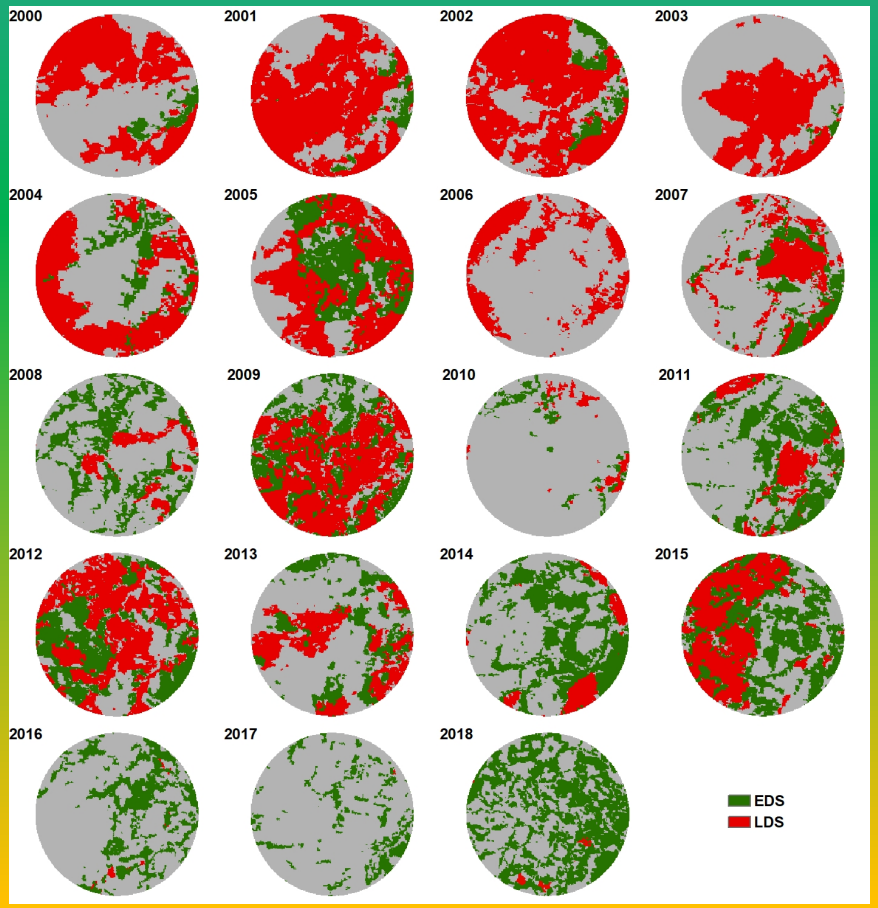


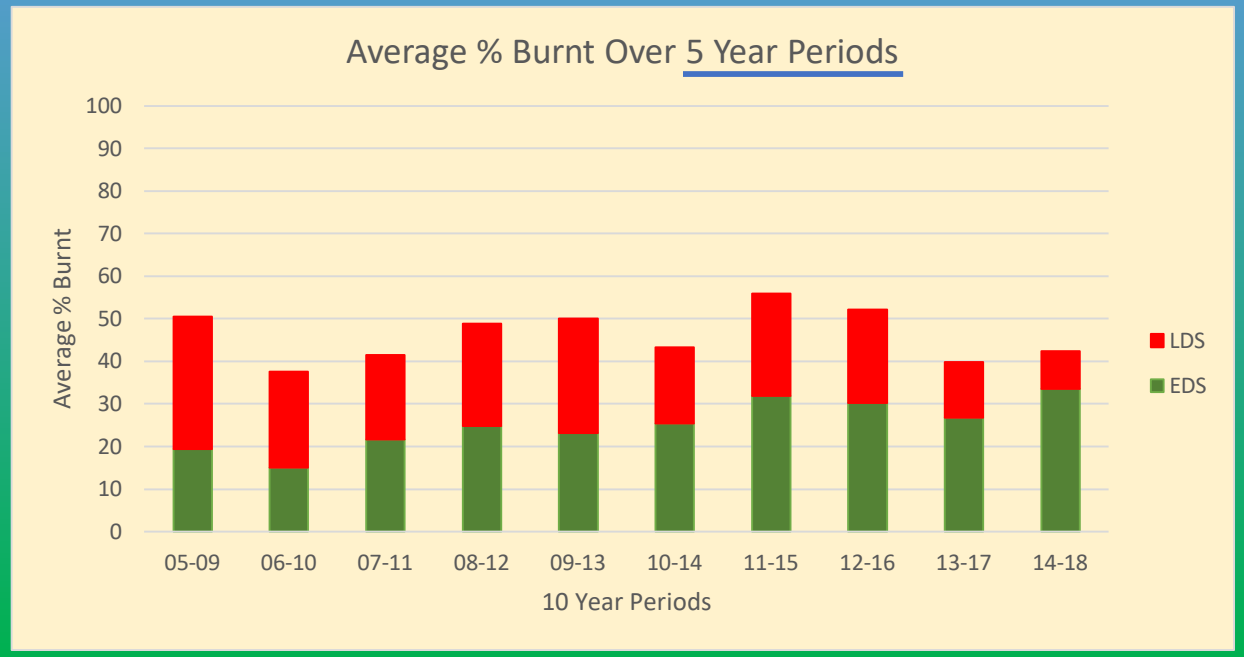
Seasonality - Site A

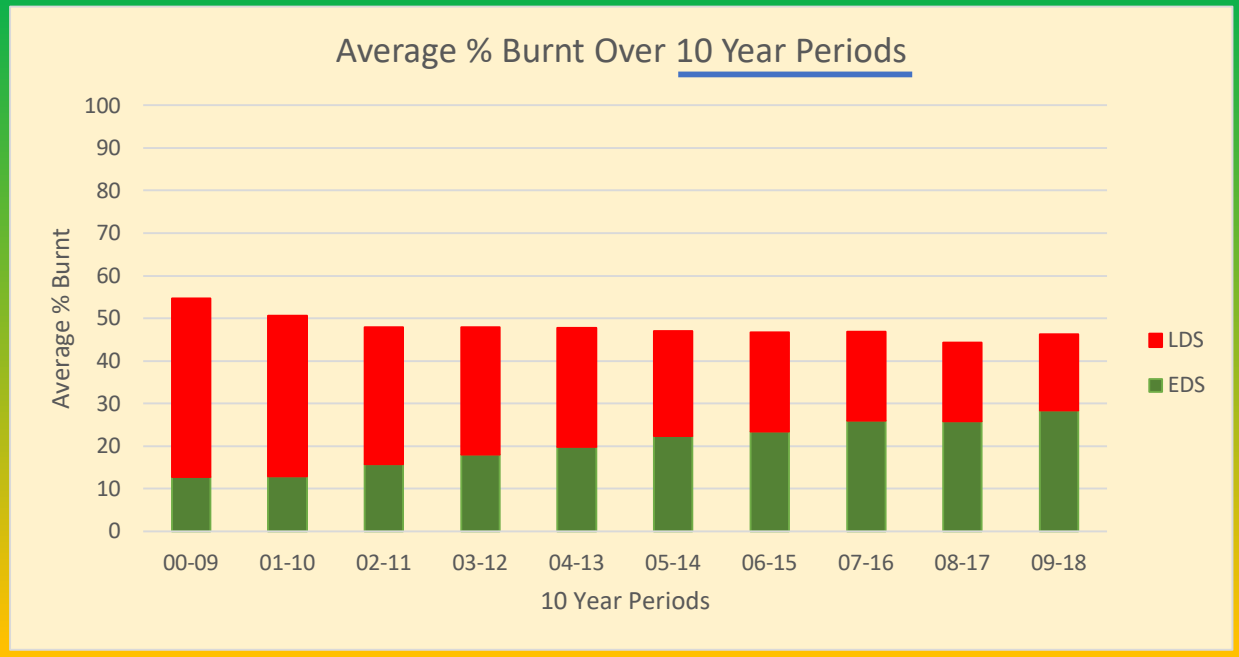




Seasonality - Site A Averages







Fire Frequency

- The calculation of the proportion of the number of times an area has been burnt in a 10-year period. The higher the proportion of high fire frequency the worse the effect on biodiversity. Mean fire frequency should decrease through time with improved fire management.

Long Unburnt Patches

- In this analysis we overlay each of the previous years of burnt area mapping, back through time, to calculate the area and age of previously burnt areas. Fire frequency in the tropical savannas has been high in past decades. Improved fire management should mean an increase in the area of longer unburnt vegetation. It is important to have large areas that have not been burnt for at least 2 years to allow small trees and shrubs to grow, and for some long-lived obligate seeding plants, this should be more than 5 years.

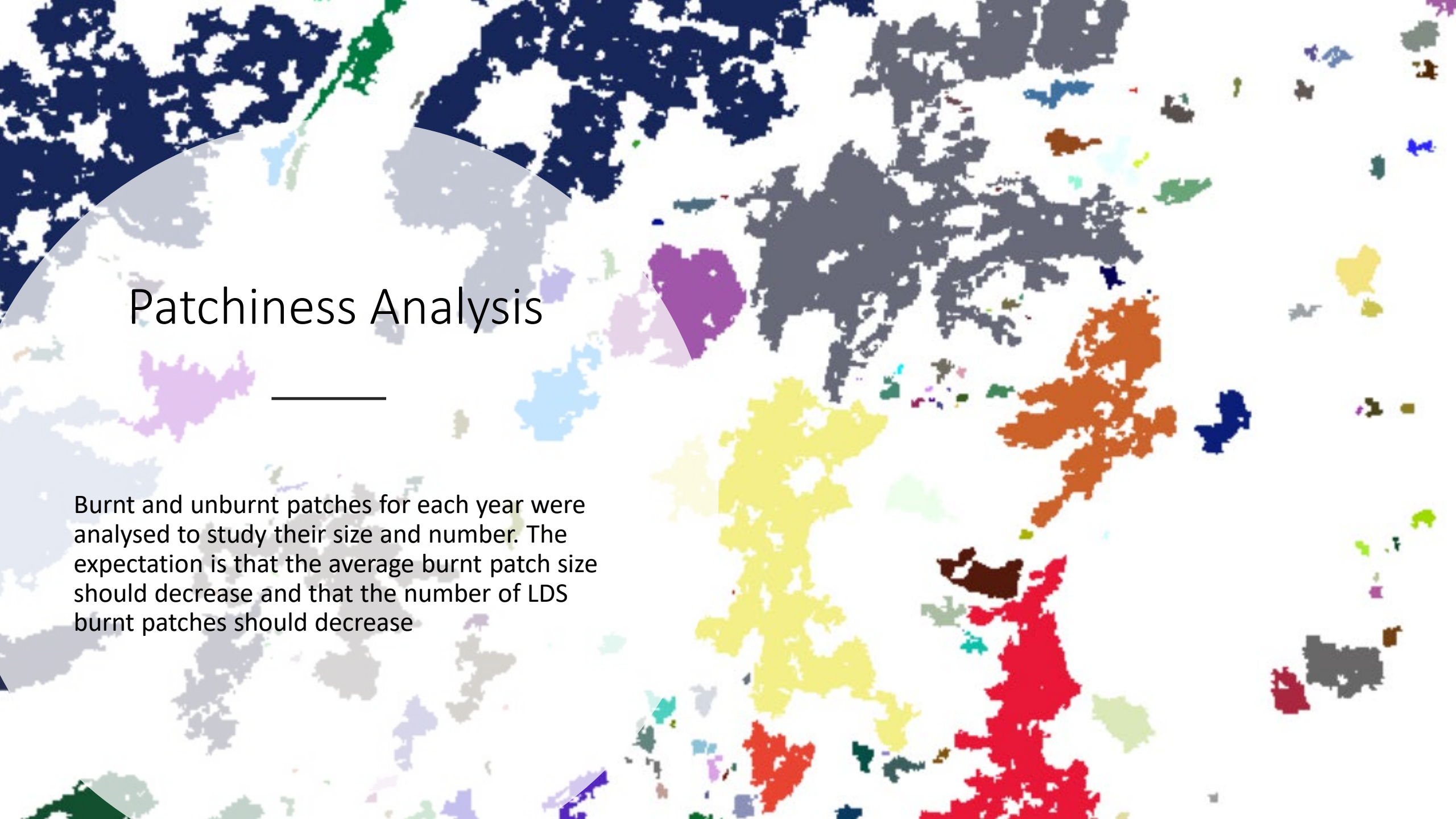
Time Since Last Burnt

- The calculation of the number of years since an area has been burnt in a 10-year period. A higher number of years since an area was burnt, generally means a higher fuel load in that area, making it more susceptible to high severity fires but increasing the potential for higher biodiversity.

Minimum Fire Interval

- An intersection of the annual fire mapping to determine the minimum time (number of years) between fires over 10-year periods. If the interval between fires in an area is less than or equal to the minimum interval required for obligate seeder plant species to grow from seed, mature and set seed, then one can expect local extinctions.

Patchiness Analysis

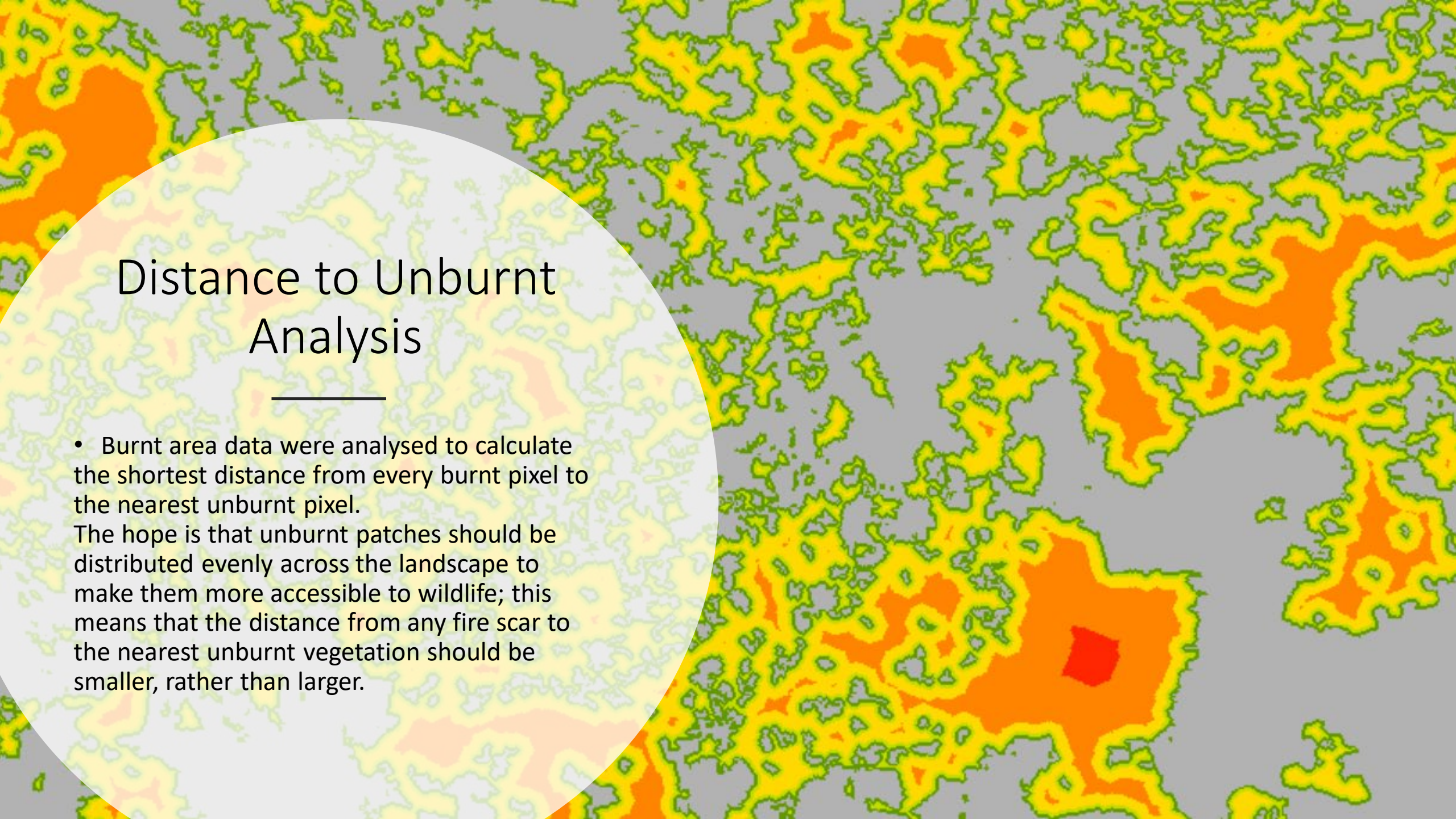


Burnt and unburnt patches for each year were analysed to study their size and number. The expectation is that the average burnt patch size should decrease and that the number of LDS burnt patches should decrease

Distance to Unburnt Analysis

- Burnt area data were analysed to calculate the shortest distance from every burnt pixel to the nearest unburnt pixel.

The hope is that unburnt patches should be distributed evenly across the landscape to make them more accessible to wildlife; this means that the distance from any fire scar to the nearest unburnt vegetation should be smaller, rather than larger.



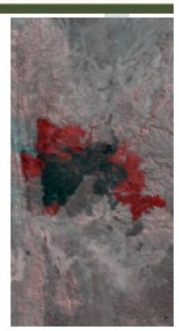
NAFI North Australia and Rangelands Fire Information

DCBR Darwin Centre for Bushfire Research, Charles Darwin University

FNQ Spatial Data Services

RINYIRRU NATIONAL PARK

Savanna Monitoring and Evaluation Metrics



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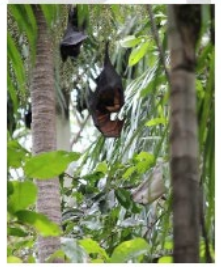
bushfire&natural HAZARDSCRC

FNQ Spatial Data Services

NITMILUK NATIONAL PARK

Savanna Monitoring and Evaluation Metrics



NAFI North Australia and Rangelands Fire Information

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bushfire&natural HAZARDSCRC

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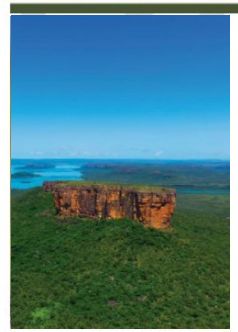
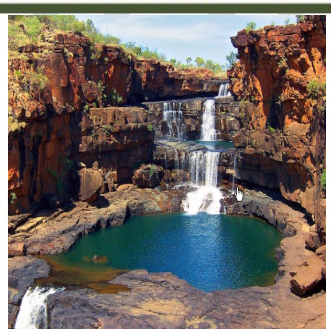
PRINCE REGENT NATIONAL PARK

Savanna Monitoring and Evaluation Metrics



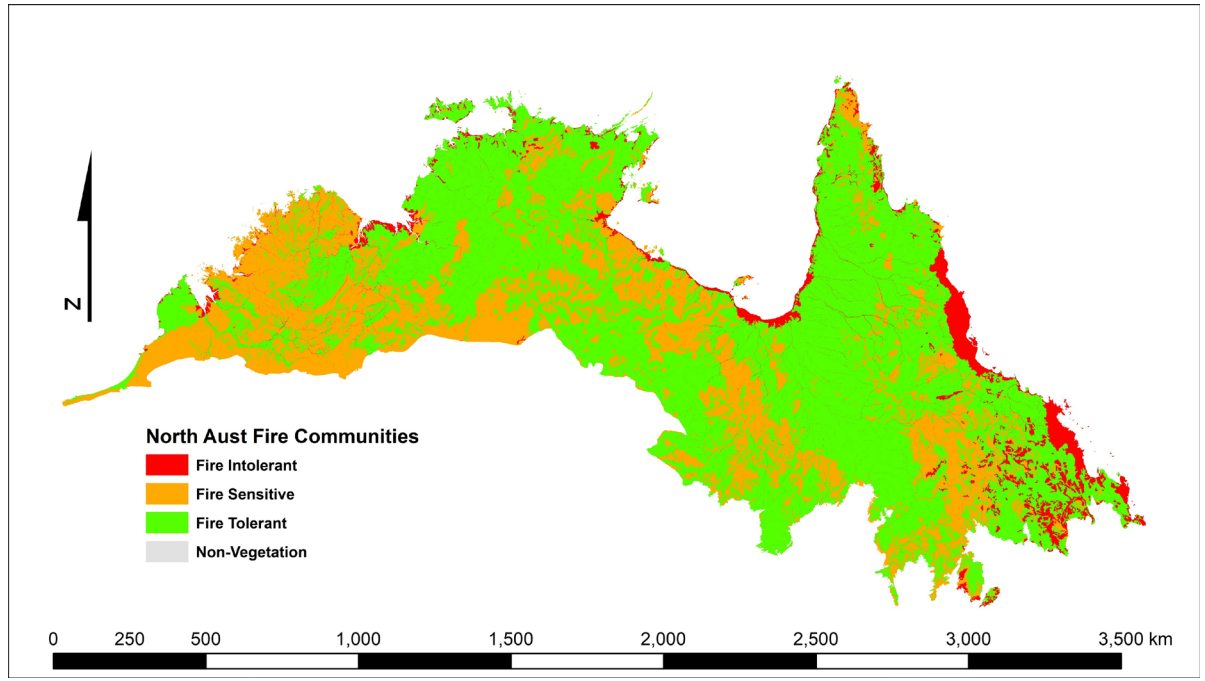


Introduction to the SMERF dashboard

NT Parks, Wildlife and Heritage - NAFI Based Integrated Conservation Strategies Fire Indicators Table (v 31 May 2019)

TOP END

	Garig Gunak Barlu National Park ICS	VERY POOR	POOR	FAIR	GOOD	Documented "End State" Target in 5 years
FIRE TOLERANT COMMUNITIES	NAFI - FIRE TOLERANT COMMUNITIES % Burnt/Year NAFI - FIRE TOLERANT COMMUNITIES % Unburnt over 3 years by late hot fires >July	**Habitat burnt** within the year is 100% by late hot fires. Less than 10% with (>) 3 **Years long unburnt by late hot fires**.	**Habitat burnt** within the year is greater than (>) 75% by late hot fires. Greater than (>) 10% with (>) 3 **Years long unburnt by late hot fires**.	**Habitat burnt** within the year is less than (<) 50% by late hot fires. Greater than (>) 20% with (>) 3 **Years long unburnt by late hot fires**.	**Habitat burnt** within the year is less than (<) 30% by late hot fires. Greater than (>) 40% with (>) 3 **Years long unburnt by late hot fires**.	**FAIR** Habitat burnt within the year is less than (<) 50% by late hot fires. Greater than (>) 20% with (>) 3 Years long unburnt by late hot fires.
	FIRE TOLERANT COMMUNITIES BURN PATCHINESS BY LATE HOT FIRES >JULY - Specific measures to be determined	Massive fire scars.	Large fire scars.	Moderate sized fire scars.	Small very patchy fire scars	**FAIR** Moderate sized fire scars.
FIRE SENSITIVE COMMUNITIES	NAFI - FIRE SENSITIVE COMMUNITIES % Burnt/Year NAFI - FIRE SENSITIVE COMMUNITIES % Unburnt over 5 years by late hot fires >July.	**Habitat burnt** within the year is greater than (>) 50% by late hot fires. Less than (<) 50 % with (>) 5 **Years long unburnt by late hot fires**.	**Habitat burnt** within the year is greater than (>) 30% by late hot fires. Greater than (>) 50% with (>) 5 **Years long unburnt by late hot fires**.	**Habitat burnt** within the year is less than (<) 15% by late hot fires. Greater than (>) 60 % with (>) 5 **Years long unburnt by late hot fires**.	**Habitat burnt** within the year is less than (<) 5% by late hot fires. Greater than (>) 70% with (>) 5 **Years long unburnt by late hot fires**.	**FAIR** Habitat burnt within the year is less than (<) 15% by late hot fires. Greater than (>) 60 % with (>) 5 Years long unburnt by late hot fires.
	BURN PATCHINESS BY LATE HOT FIRES >JULY - Specific measures to be determined	Massive fire scars.	Large fire scars.	Moderate sized fire scars.	Small very patchy fire scars	**FAIR** Moderate sized fire scars.
FIRE INTOLERANT COMMUNITIES	NAFI - FIRE INTOLERANT COMMUNITIES % Burnt/Year NAFI - FIRE INTOLERANT COMMUNITIES % Unburnt over 3 years by ANY FIRE	**Habitat burnt** per year >20% burnt by late hot fires. Less than (<) 70 % (>)10 Years long unburnt.	Habitat burnt per year >10-20% burnt by late hot fires. Greater than (>) 70 % (>) 10 Years long unburnt.	Habitat burnt per year >5-10% burnt by late hot fires. Greater than (>) 80% with (>) 10 Years long unburnt.	Habitat burnt per year 0-5% burnt by late hot fires. Greater than (>) 90% (>) 10 Years long unburnt.	**FAIR** Habitat burnt per year >5-10% burnt by late hot fires. Greater than (>) 80% with (>) 10 Years long unburnt




SMERF