Australian Sustainable Development Institute

Bushfires in a changing world

23 March 2009

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Acknowledgment

We would like to pay respect to the Indigenous members of our community by acknowledging the traditional Nyungar owners of this land.

Contribution of Prescribed Burning to Wildfire Control and Biodiversity Conservation

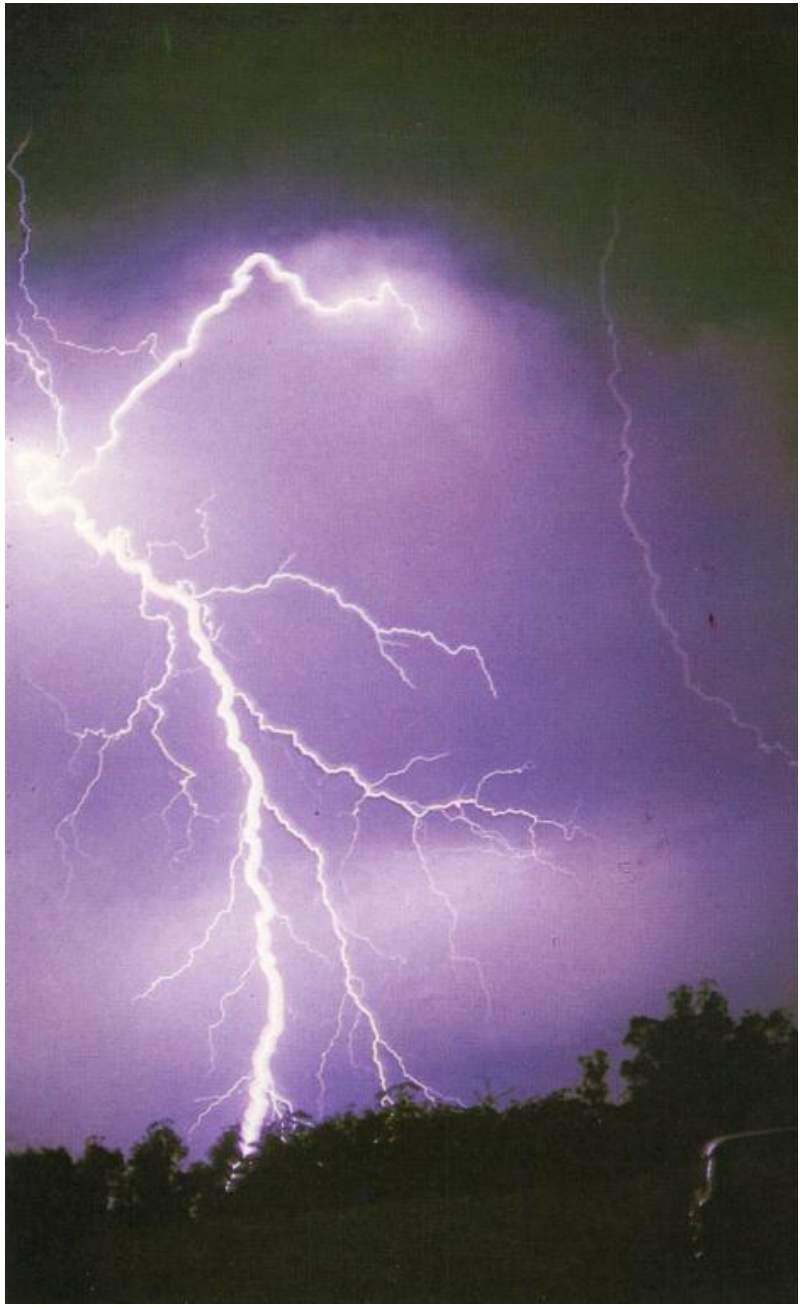
Rick Sneeuwjagt
Fire Management Services, DEC

March 2009

Climatic Indicators – WA Dry Forests & Woodlands

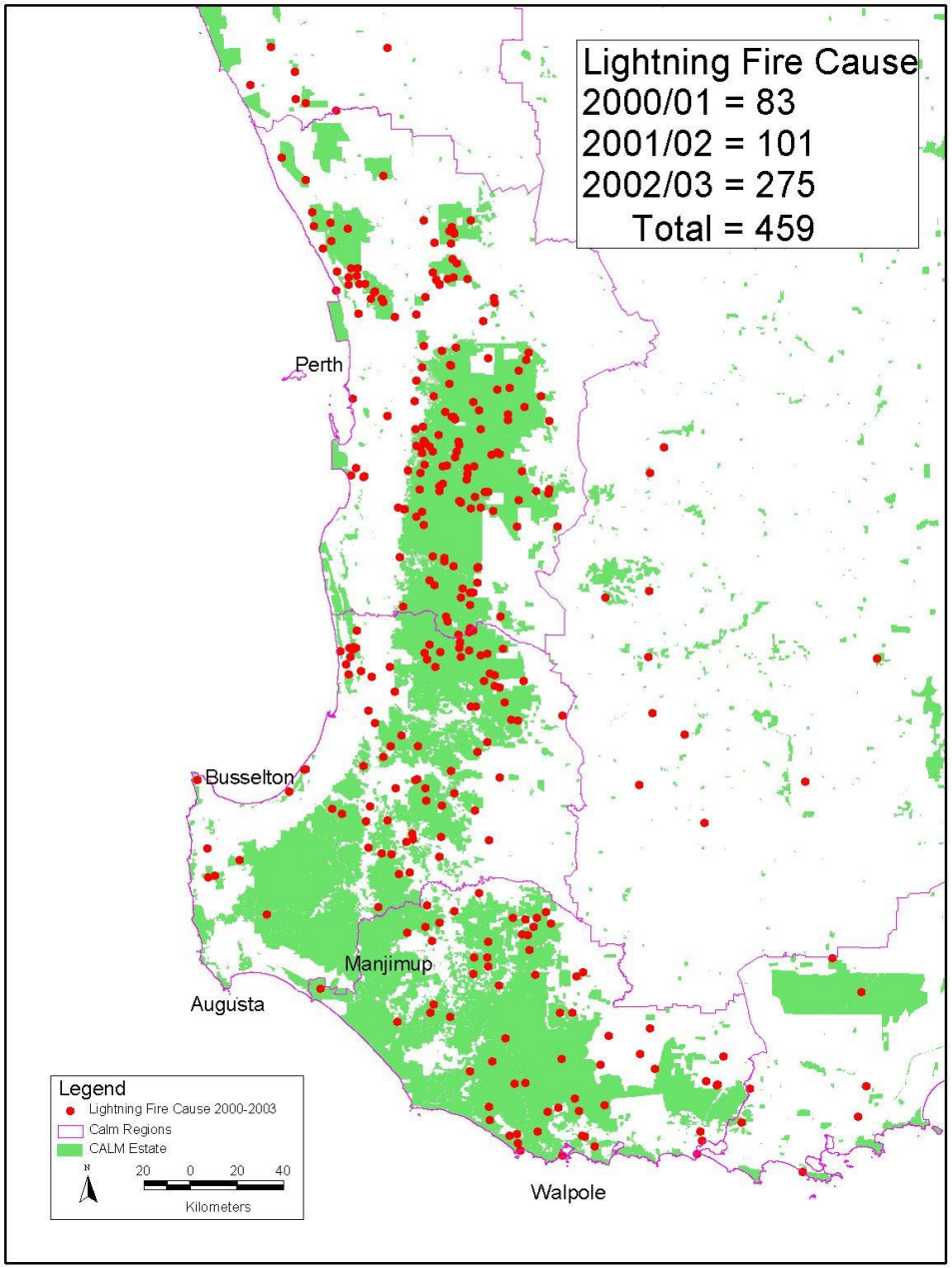
- Mediterranean Type (Hot dry summer, cool, moist winter)
- 140-180 dry fuel days annually
- Dry, hot & strong winds
- Annual summer drought
- Large number of lightning-caused wildfires in most years
- Litter accumulation; flammable shrubs & bark
- Region characteristics as “fire prone”

South-west forests are fire prone and fire dependent



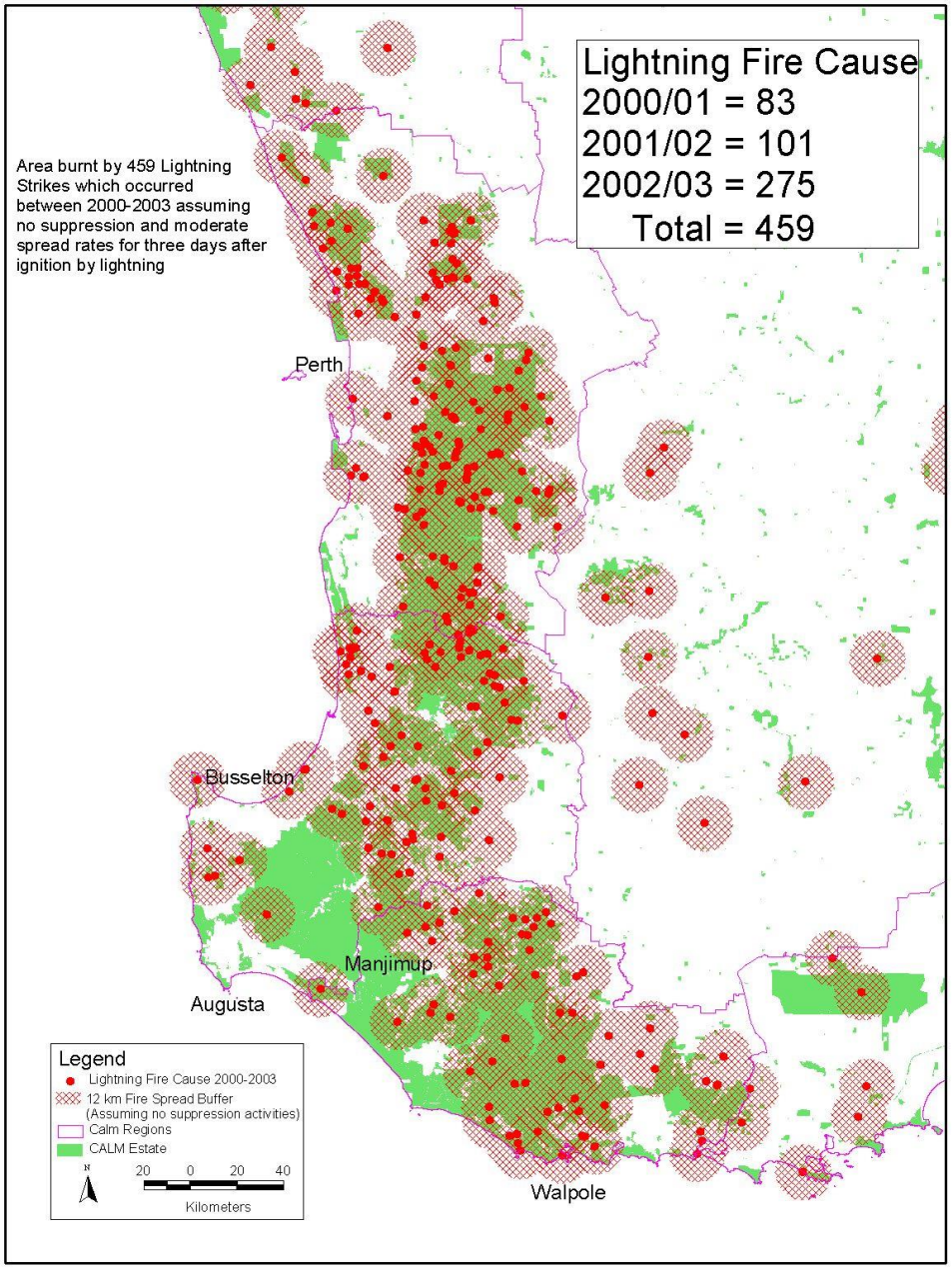
Lightning is a common cause of fires

15 to 50% of all bushfires each year



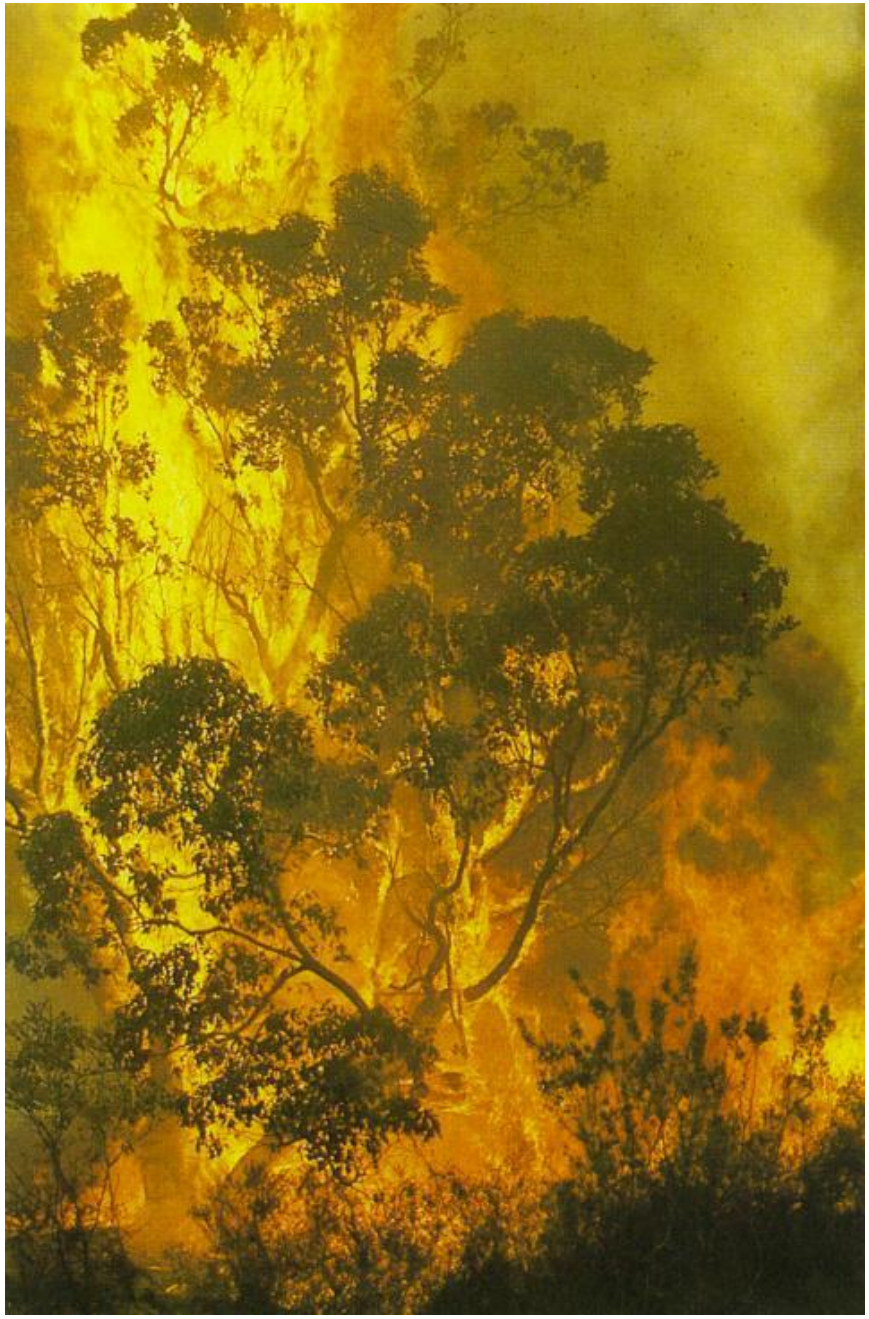
Lightning-caused fires (2001-2003)

459 on DEC lands



Unrestrained Lightning Fires (2000-2003)

- 459 Fires
- Spread over 3 days
- ROS 200 m/hr -24hours
- ~80% of forest burnt
- Conservative scenario



Heavy, old fuels feed intense fires- uncontrollable in summer conditions

Dwellingup 1961:

Comparison of wildfire impact in recently burnt and long unburnt forest.

(Alan McArthur)

2 year old fuel

>25 year old fuel

Dwellingup 2007
Comparison of fire intensity between fuel ages burnt under extreme fire danger. (McCaw)

A = head fire in fuel> 20 years old

B = boundary between 20 year old and 2 year old fuel

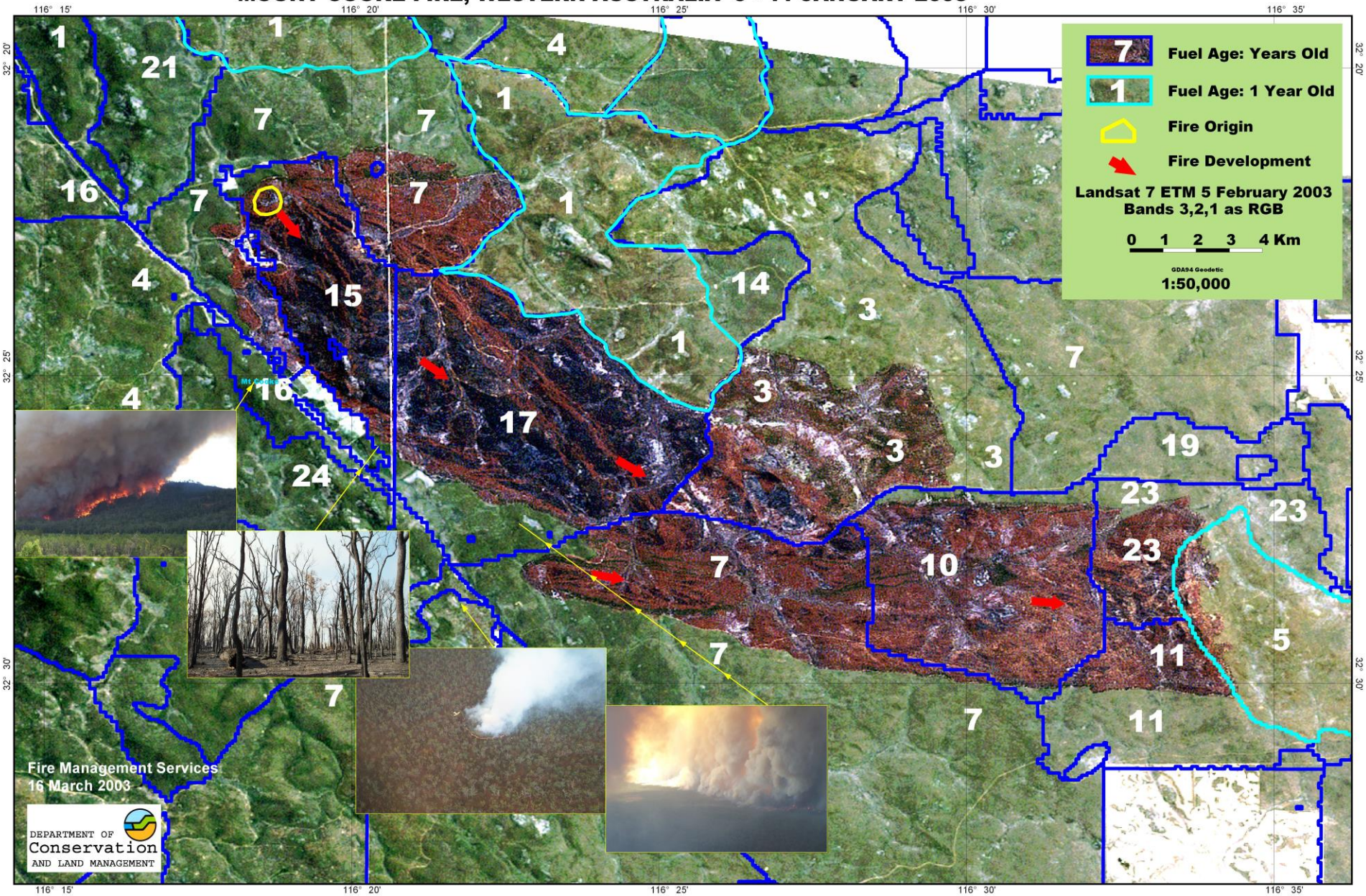
C = pocket of low intensity within 2 year old fuel

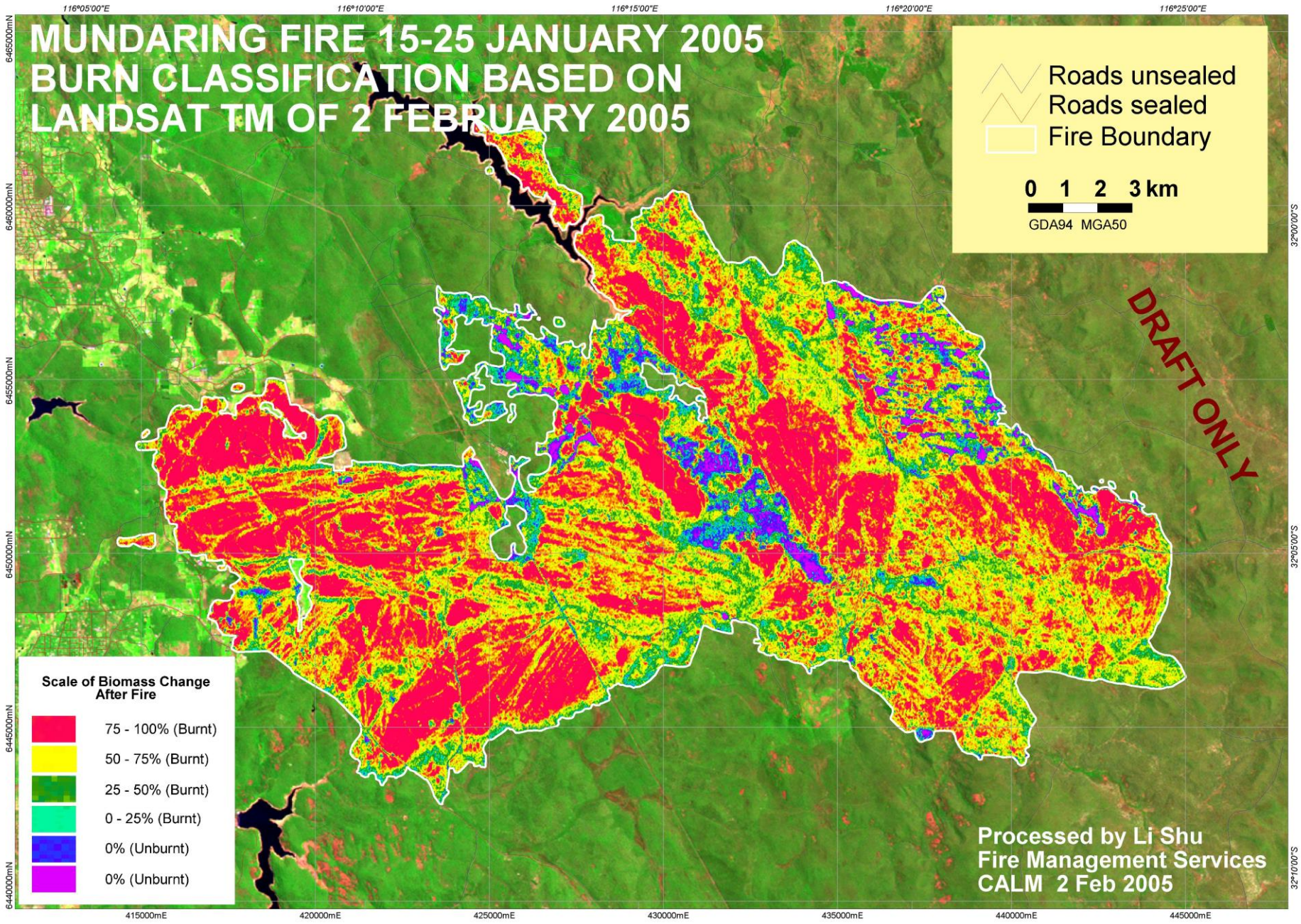
Mt Cooke Fire 10th-11th January 2003

Intense fires fed by heavy old fuels

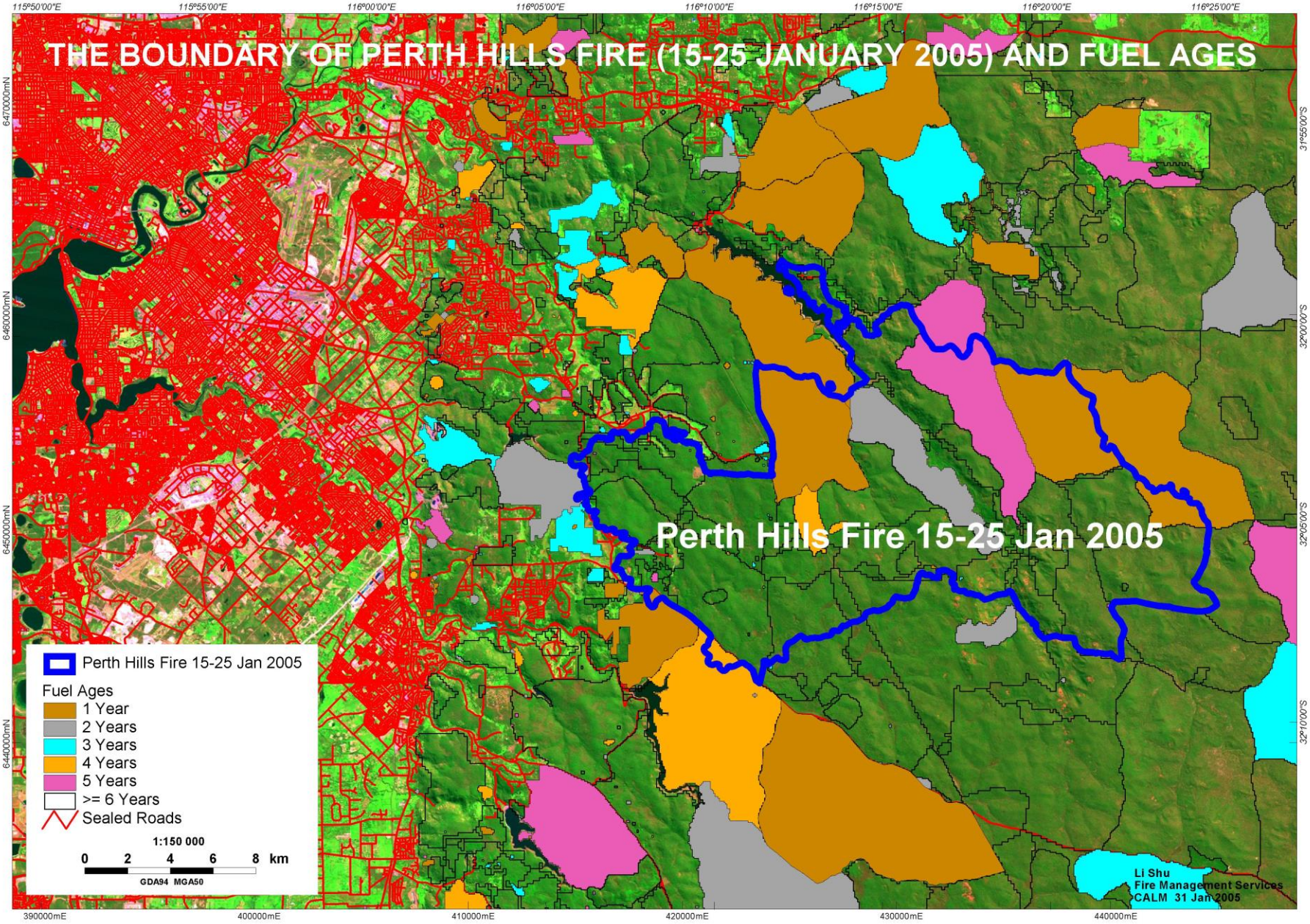
Mt Cooke Fire killed millions of trees

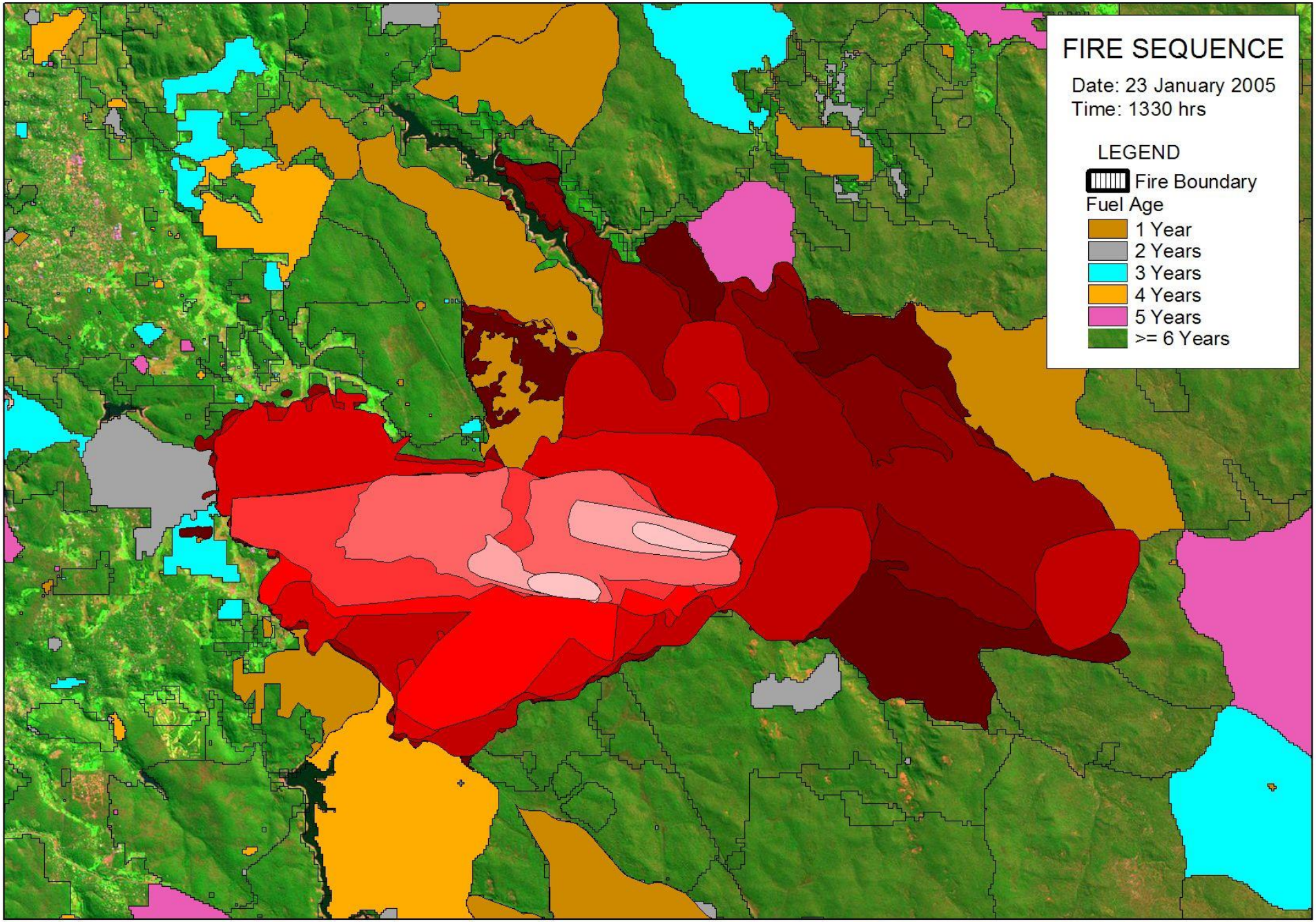
MOUNT COOKE FIRE, WESTERN AUSTRALIA 9 - 11 JANUARY 2003



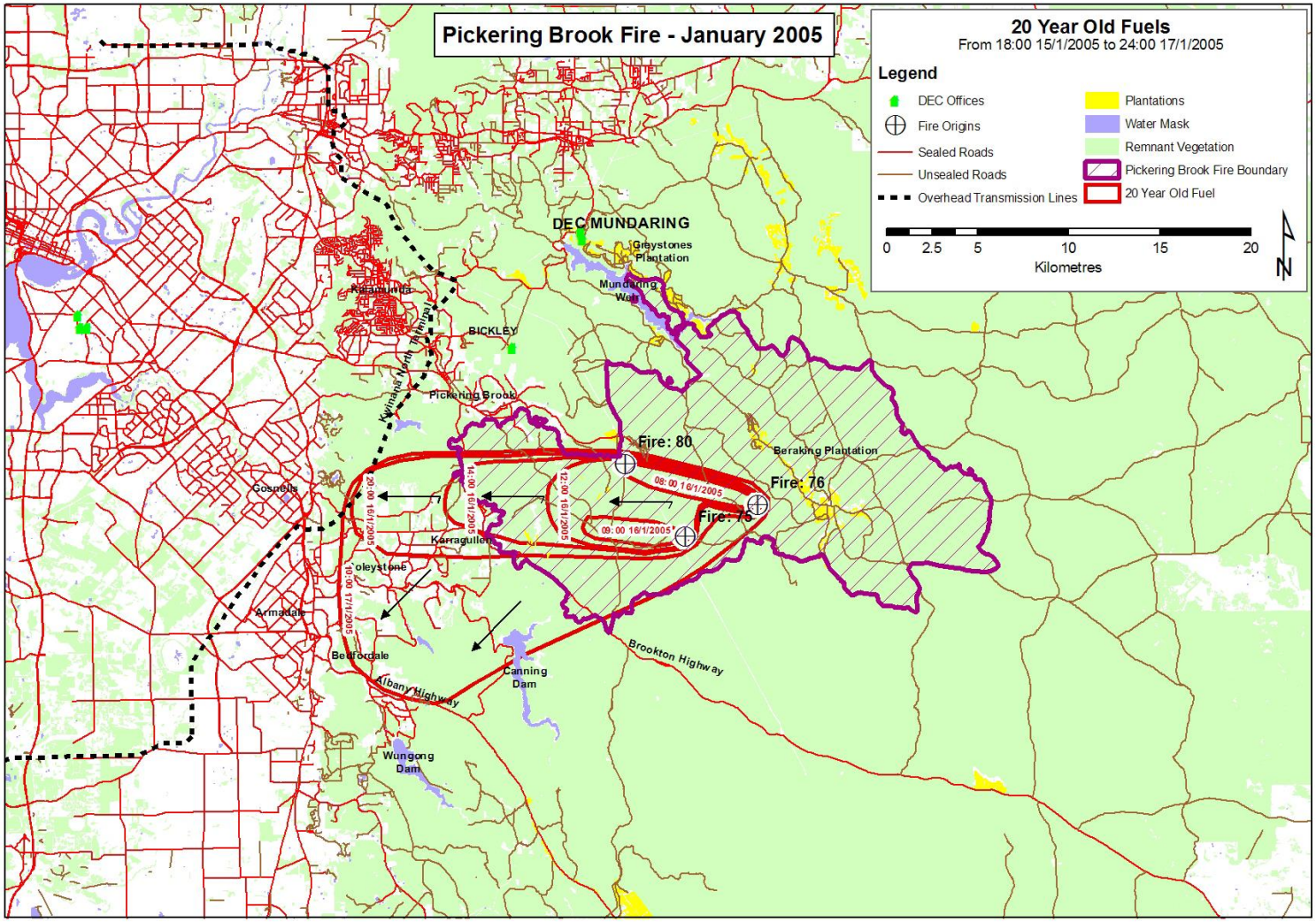

MUNDARING FIRE 15-25 JANUARY 2005
BURN CLASSIFICATION BASED ON
LANDSAT TM OF 2 FEBRUARY 2005
Roads unsealed
Roads sealed
Fire Boundary
0 1 2 3 km
GDA94 MGA50
DRAFT ONLY
Scale of Biomass Change After Fire
75 - 100% (Burnt)
50 - 75% (Burnt)
25 - 50% (Burnt)
0 - 25% (Burnt)
0% (Unburnt)
0% (Unburnt)
Processed by Li Shu
Fire Management Services
CALM 2 Feb 2005
116°05'00"E
116°10'00"E
116°15'00"E
116°20'00"E
116°25'00"E
6465000mN
6460000mN
6455000mN
6450000mN
6445000mN
6440000mN
32°00'00"S
32°05'00"S
32°10'00"S
415000mE
420000mE
425000mE
430000mE
435000mE
440000mE
445000mE

High intensity fire within the harnessed water

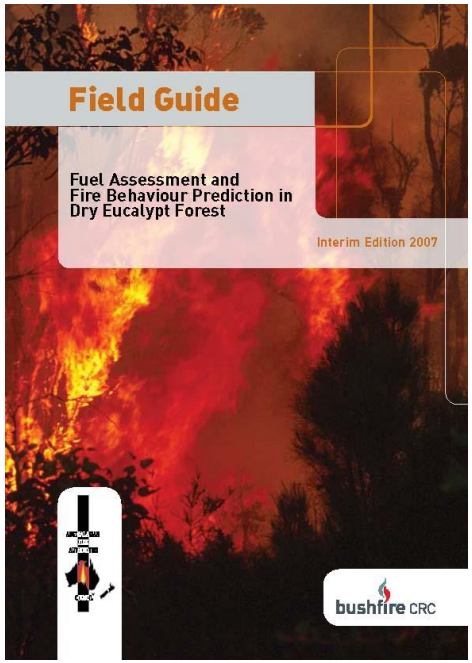

THE BOUNDARY OF PERTH HILLS FIRE (15-25 JANUARY 2005) AND FUEL AGES
115°50'00"E
115°55'00"E
116°00'00"E
116°05'00"E
116°10'00"E
116°15'00"E
116°20'00"E
116°25'00"E
6470000mN
6460000mN
6450000mN
6440000mN
31°55'00"S
32°00'00"S
32°05'00"S
32°10'00"S
Perth Hills Fire 15-25 Jan 2005
Perth Hills Fire 15-25 Jan 2005
Fuel Ages
1 Year
2 Years
3 Years
4 Years
5 Years
>= 6 Years
Sealed Roads
1:150 000
0 2 4 6 8 km
GDA94 MGA50
Li Shu
Fire Management Services
CALM 31 Jan 2005
390000mE
400000mE
410000mE
420000mE
430000mE
440000mE


FIRE SEQUENCE
Date: 23 January 2005
Time: 1330 hrs
LEGEND
Fire Boundary
Fuel Age
1 Year
2 Years
3 Years
4 Years
5 Years
>= 6 Years

Projected Fire Perimeter under a 20 Year Old Fuel Scenario (P. Cheney)



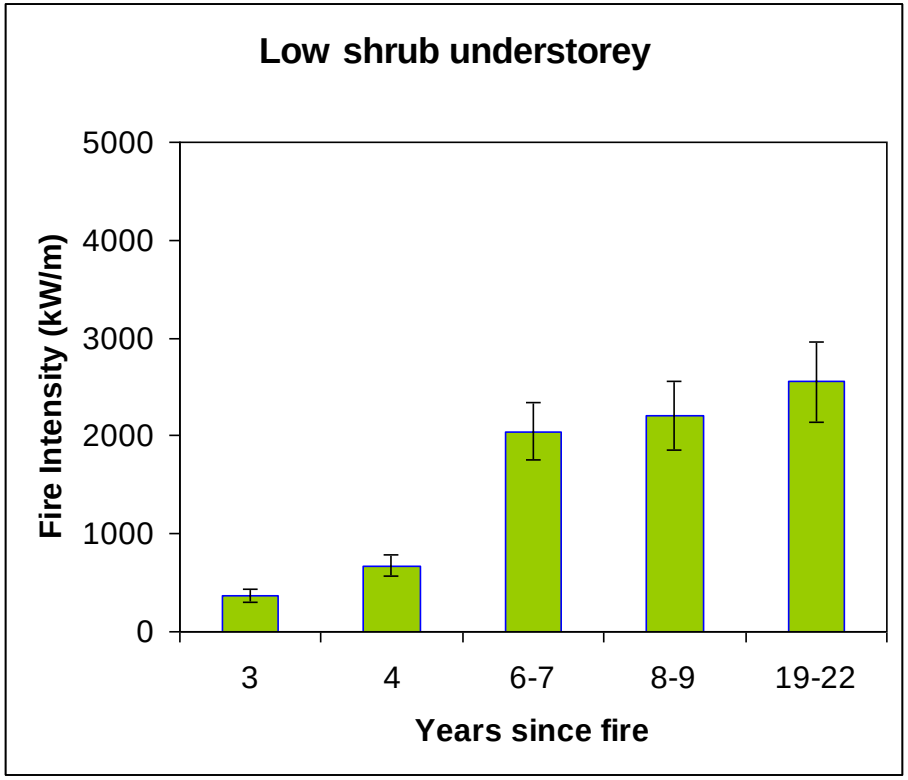
Project Vesta fire behaviour experiments (CSIRO & CALM)

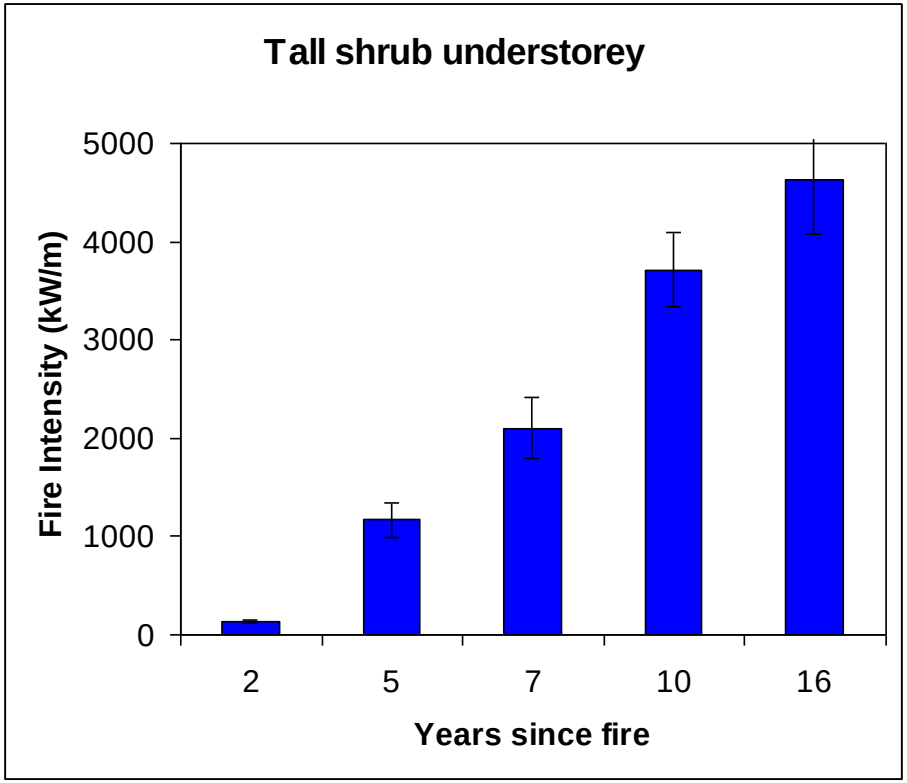


Vesta…

- *provides a robust and practical system for fuel assessments*
- *provides a better fire behaviour prediction system to predict the spread, flame height and spotting of wildfires.*
- *demonstrates the effectiveness of hazard reduction by prescribed burning*

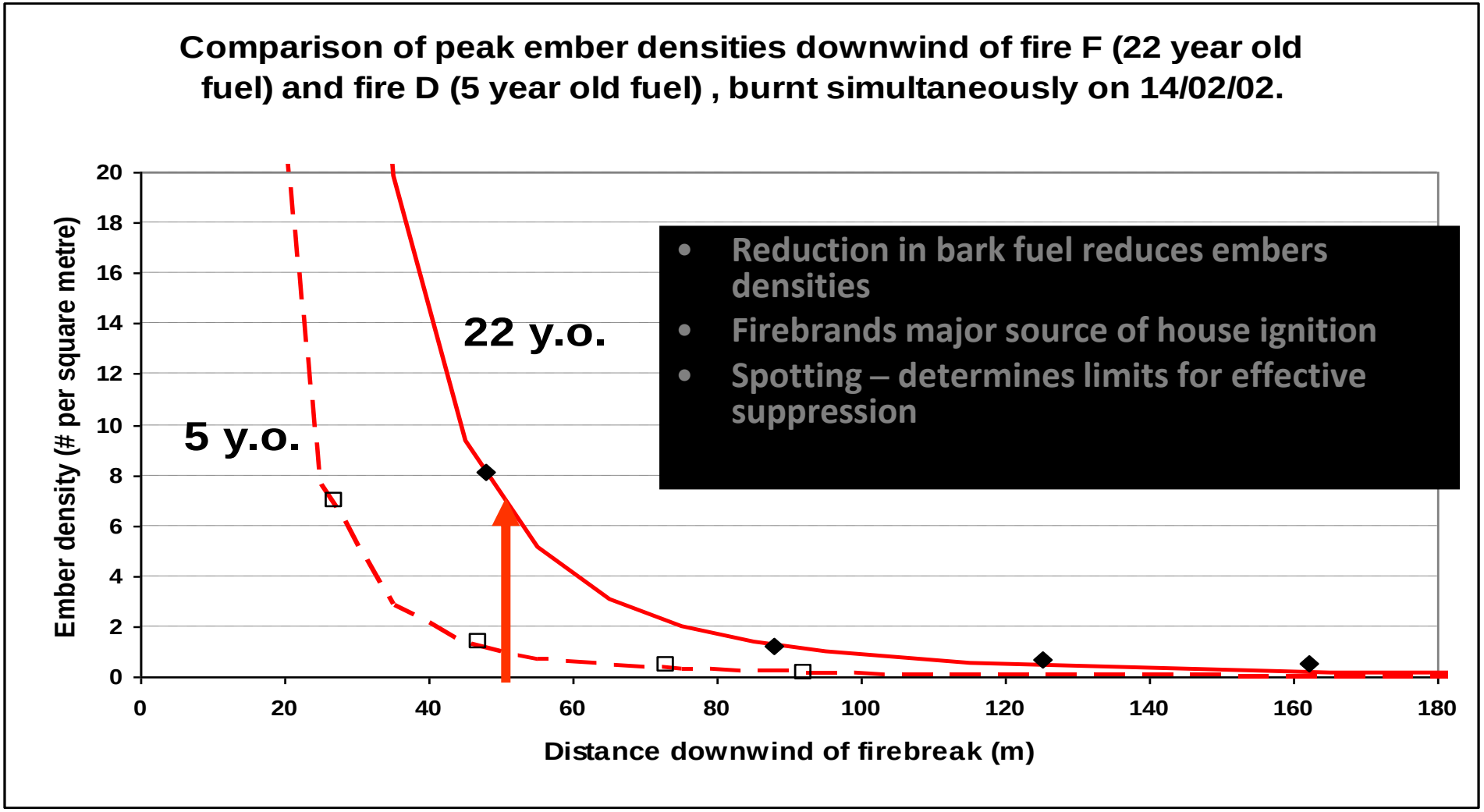
Fire intensity in relation to time since fire for summer fires in dry eucalypt forest



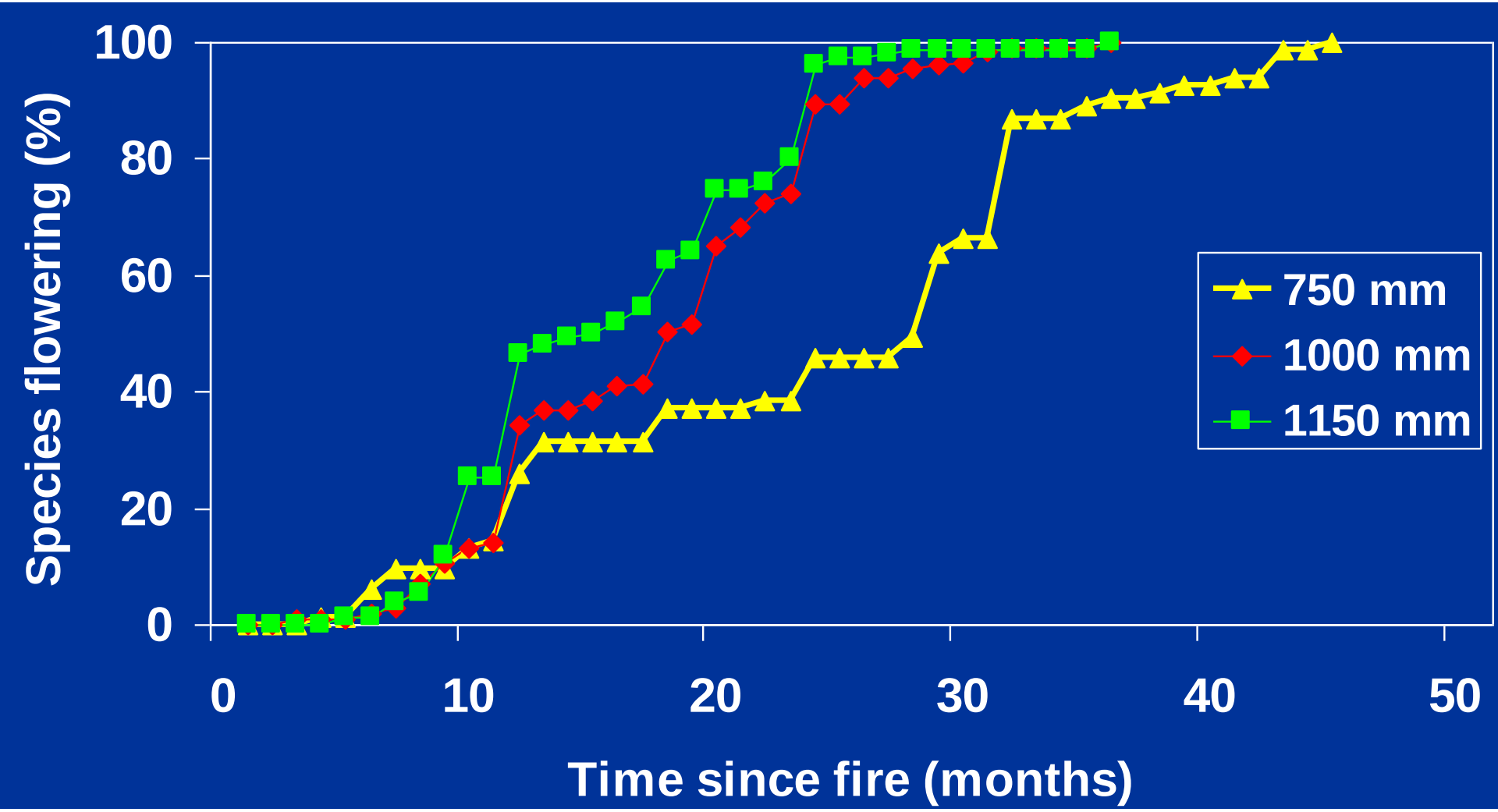


Prescribed Burning

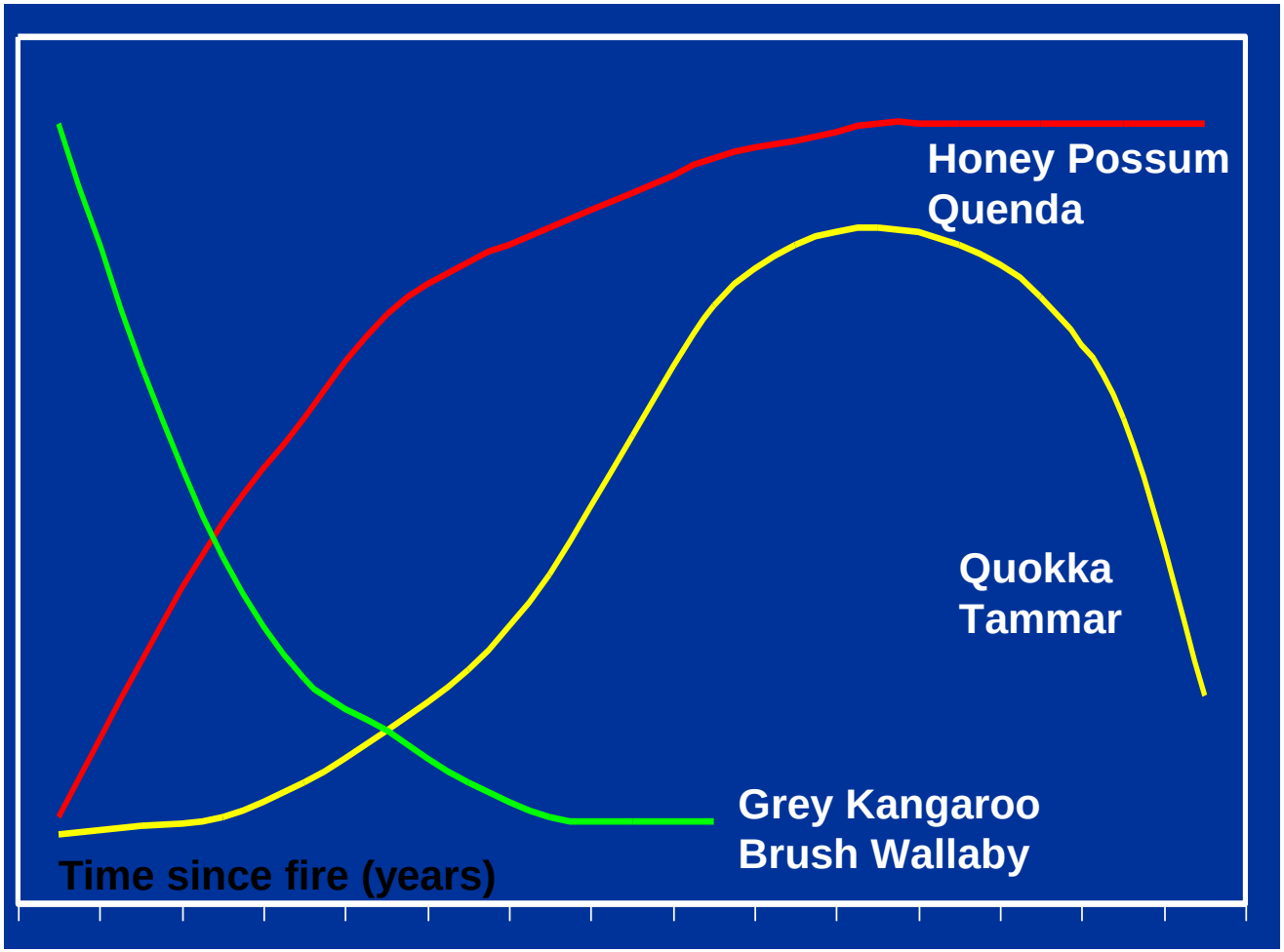
Only practical means to reduce spotting



Time to first flowering after fire for 700 upland forest understorey species

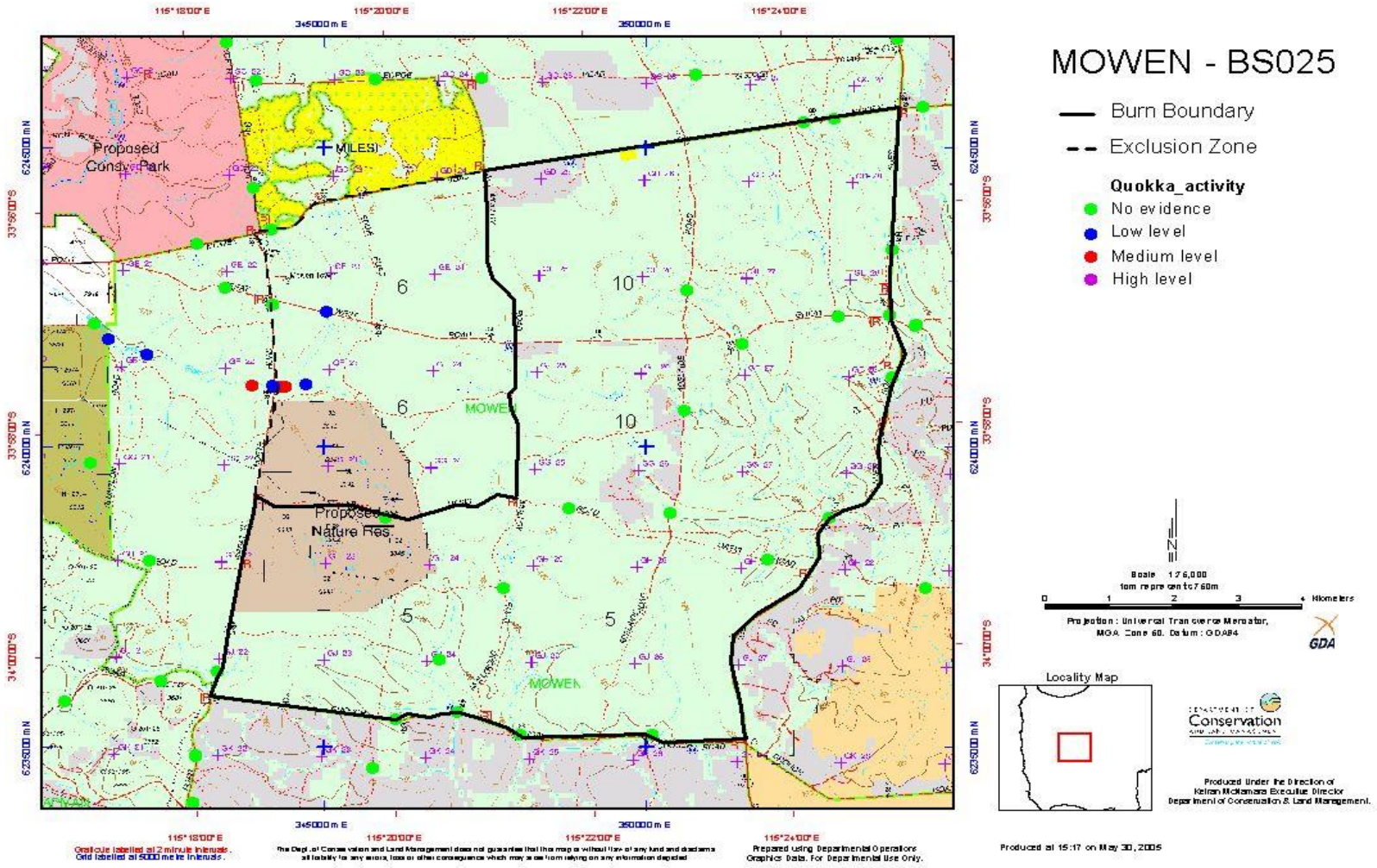


Generalised post-fire population trends for some Jarrah forest mammals

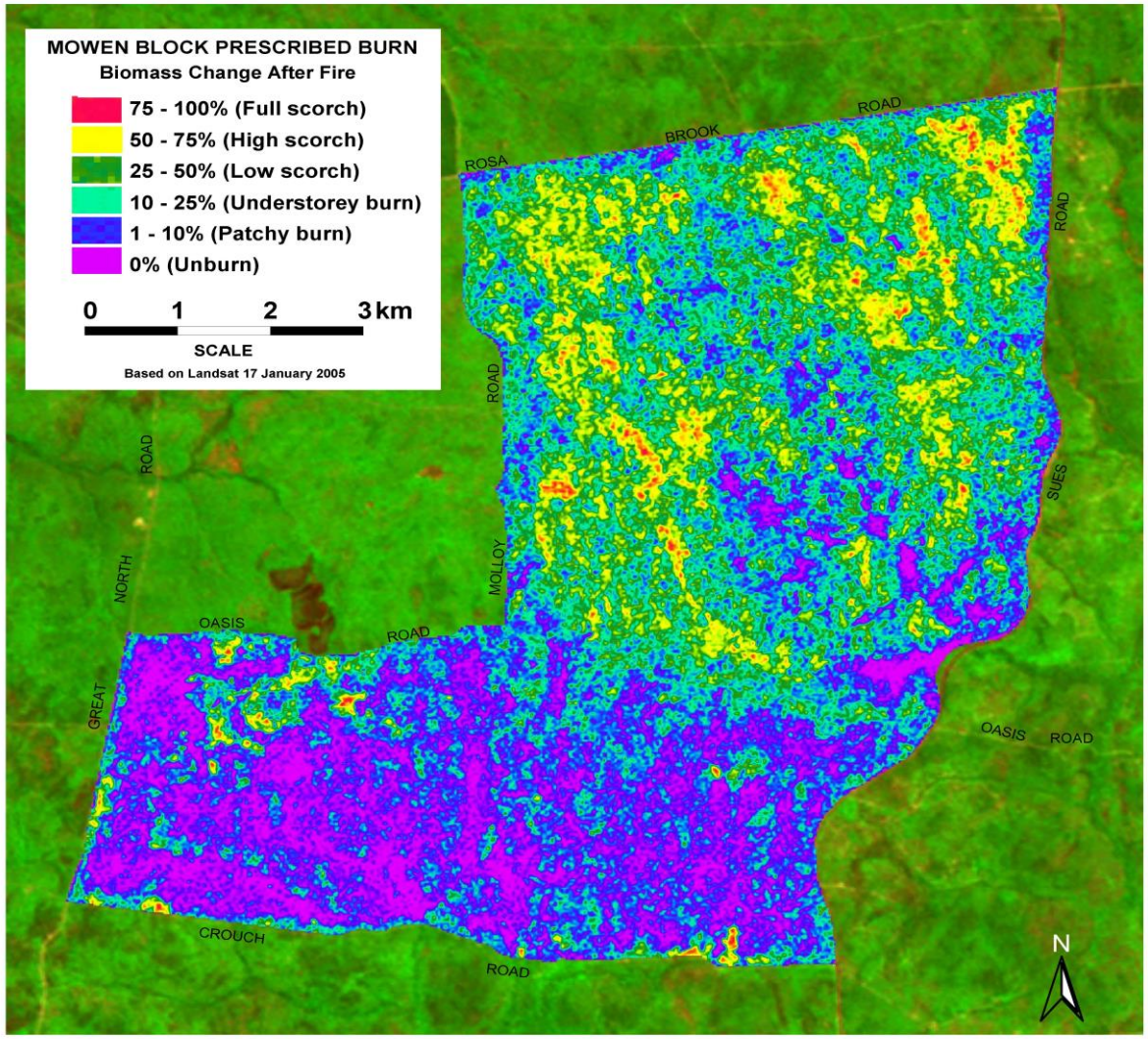


No one fire regime suits all mammals

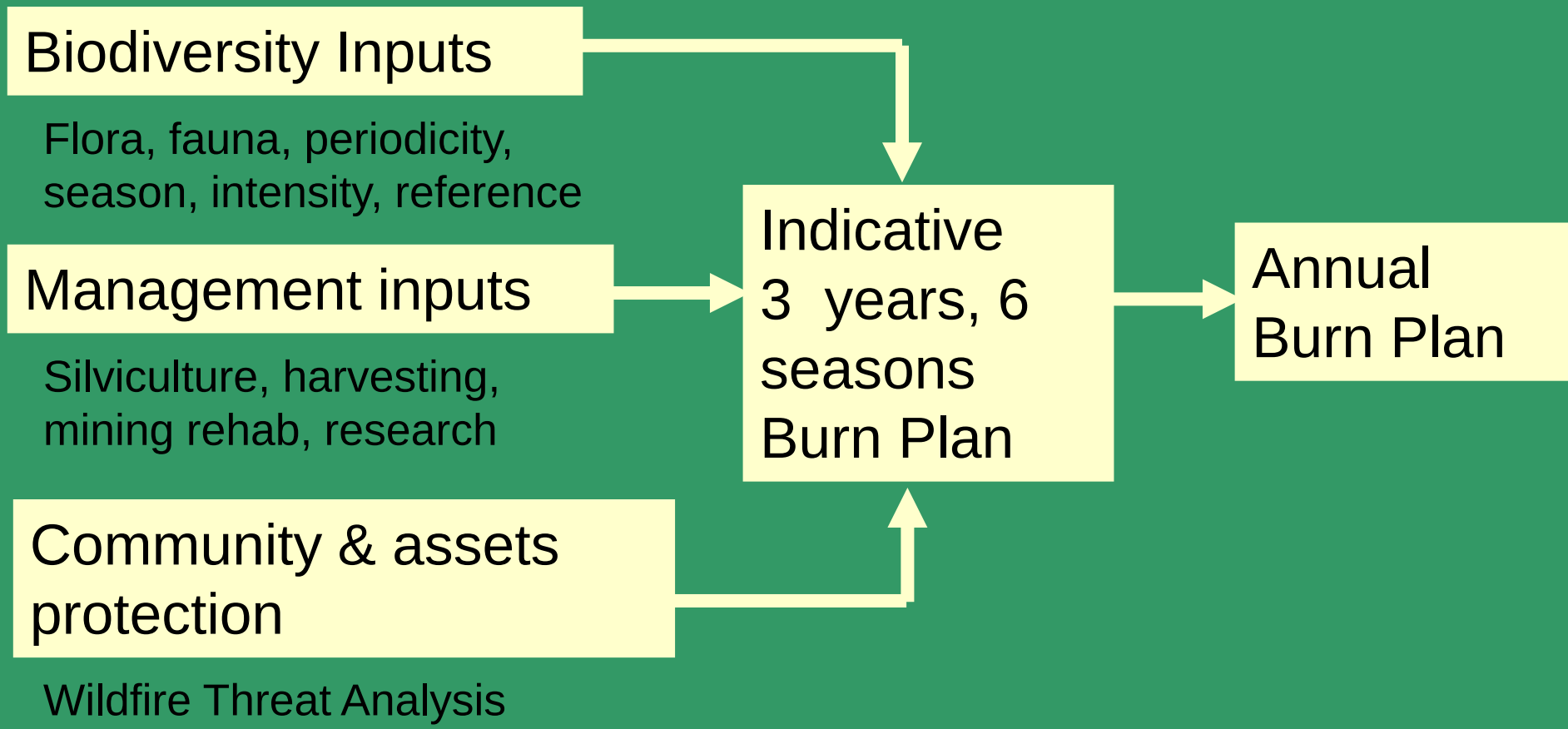
Quokka Habitat Management
Mowen Block 7,000 ha



Mowen Block Outcomes

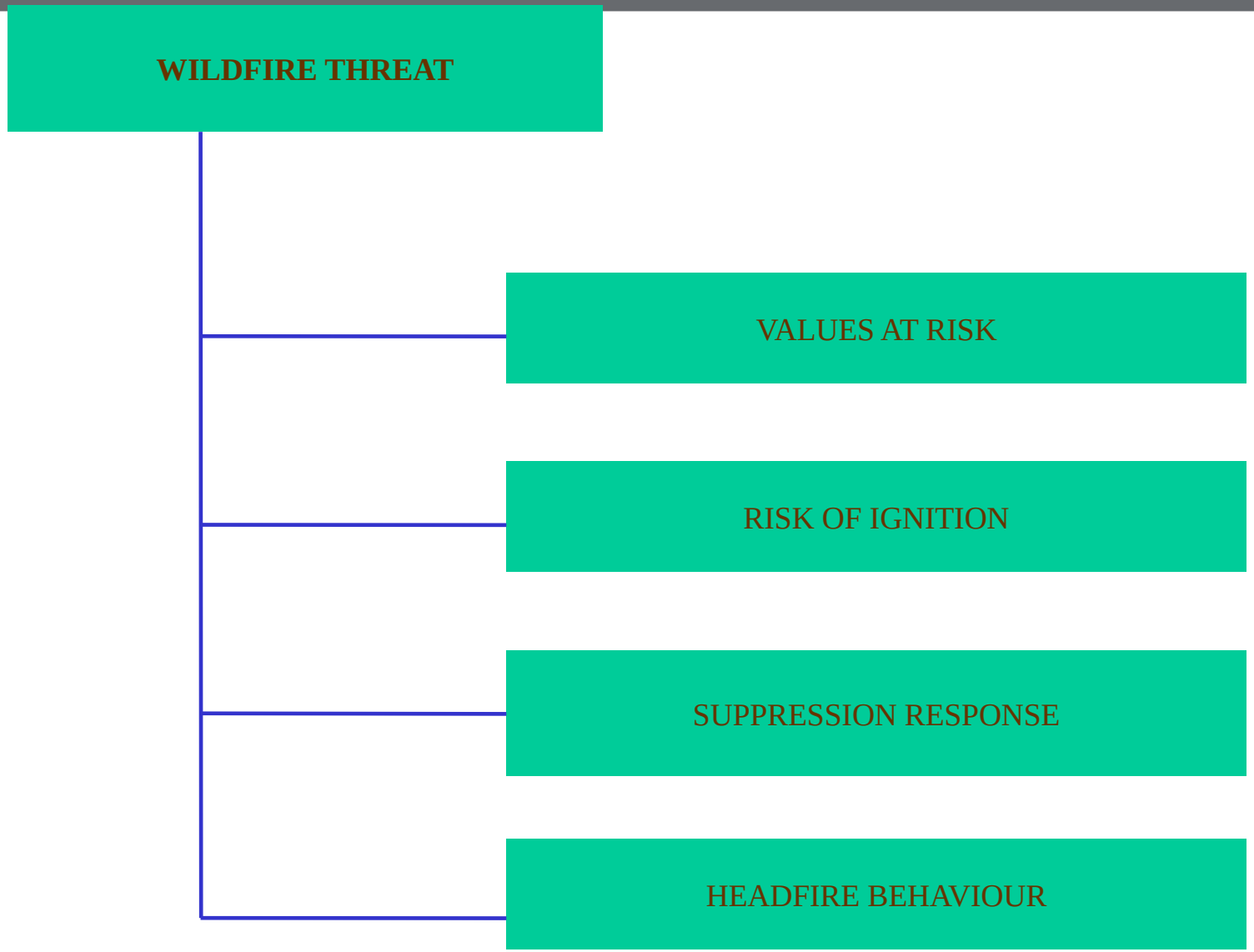


Integrated Fire Management

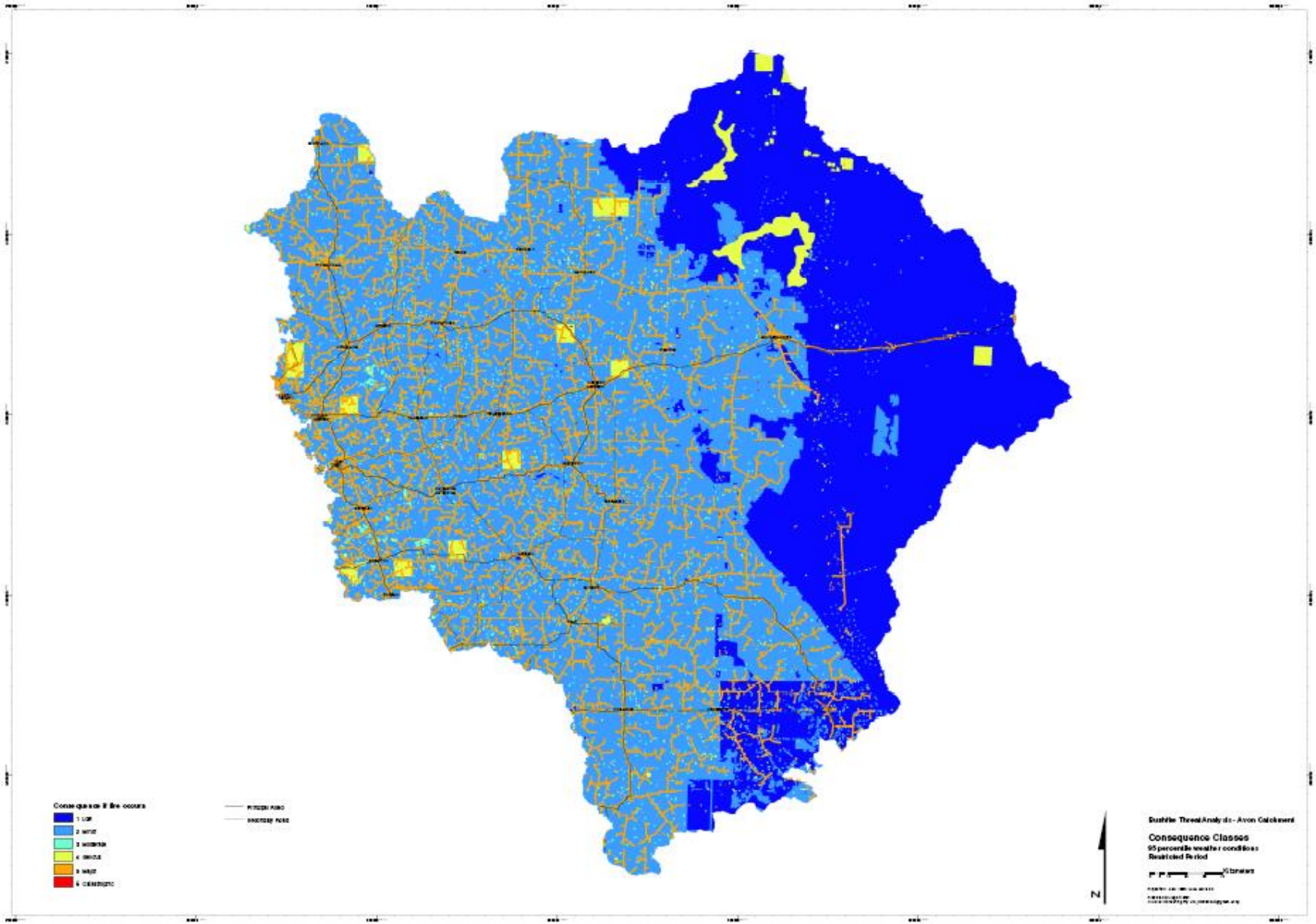


Fire Diversity Maintains Biodiversity

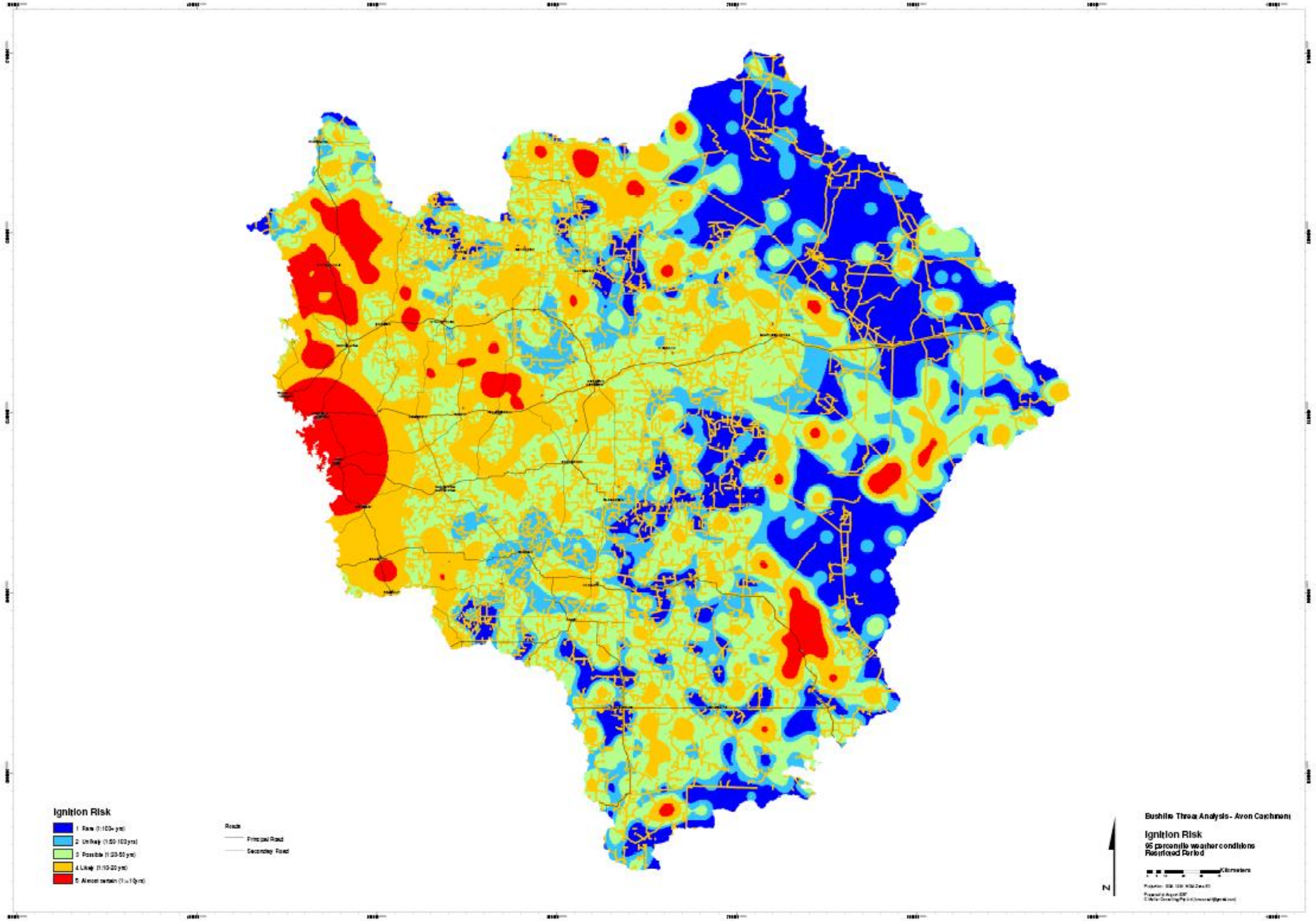
- **For Biodiversity**
  - An interlocking mosaic of patches of vegetation representing a range of fire frequencies, intervals, seasons, intensities and scales need to be incorporated into ecologically-based fire regimes if they are to optimise the conservation of biodiversity.


WILDFIRE THREAT
VALUES AT RISK
RISK OF IGNITION
SUPPRESSION RESPONSE
HEADFIRE BEHAVIOUR

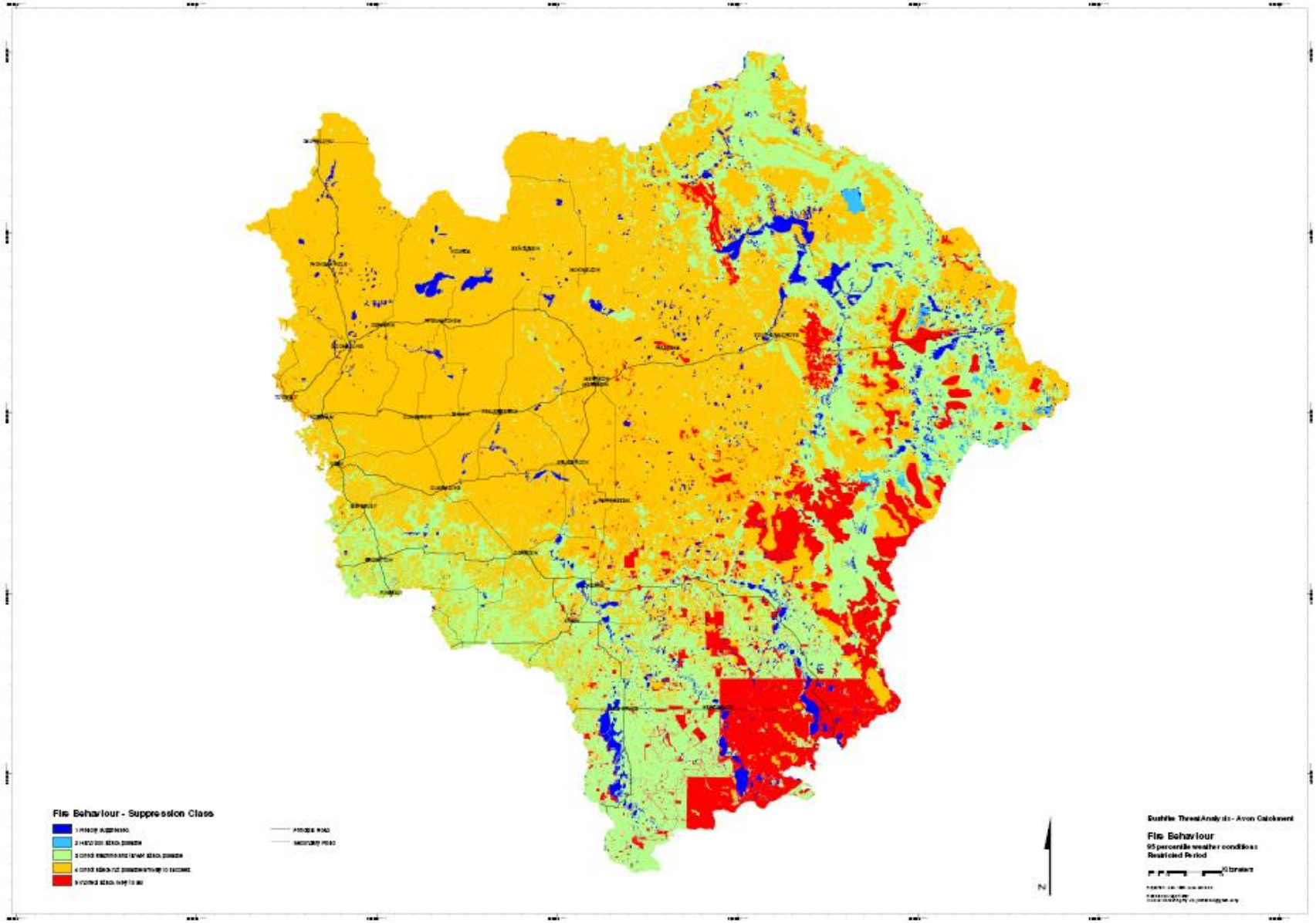
Map of Avon Consequence Class



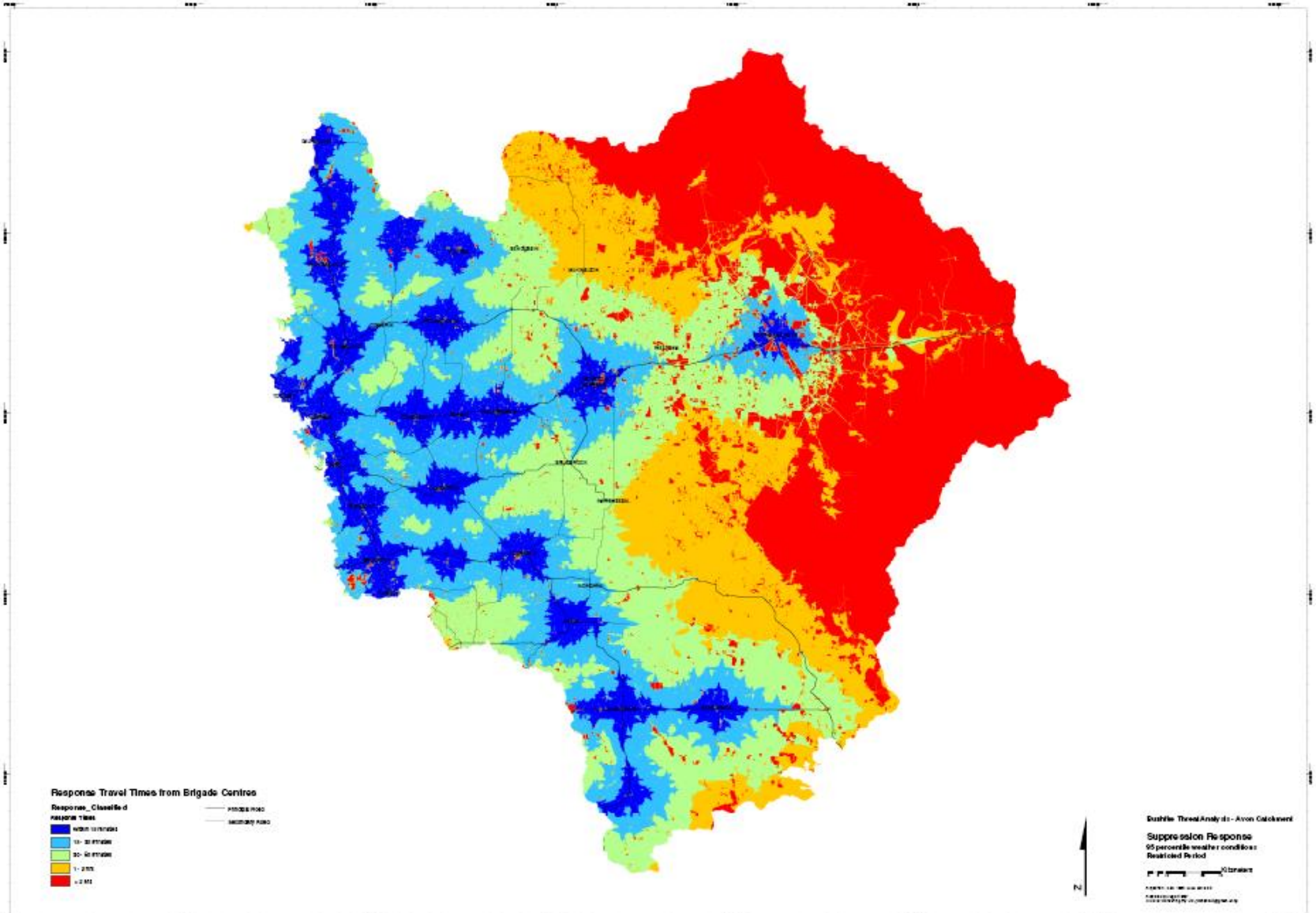
Ignition Risk - Avon



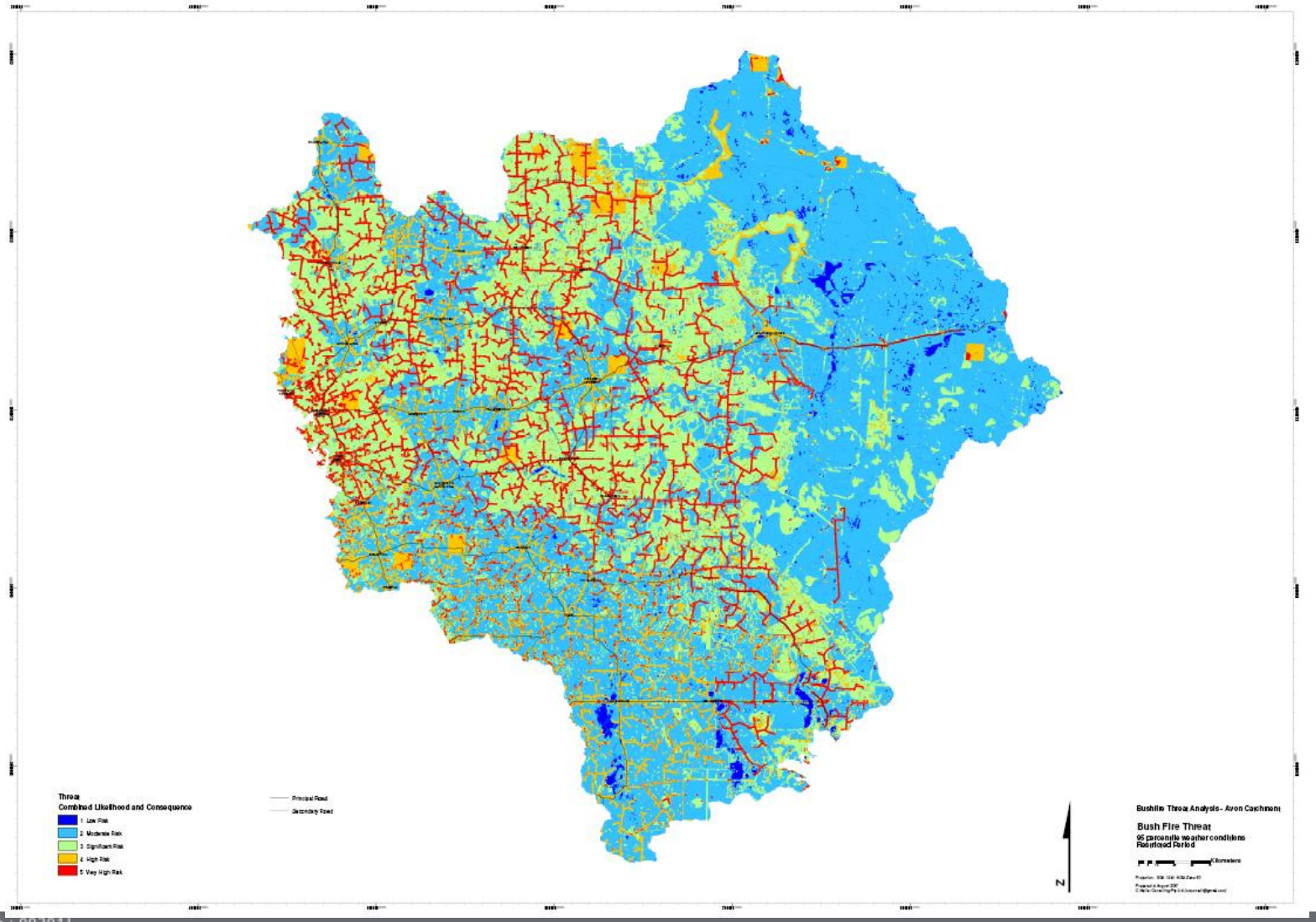
Fire Behaviour - Avon



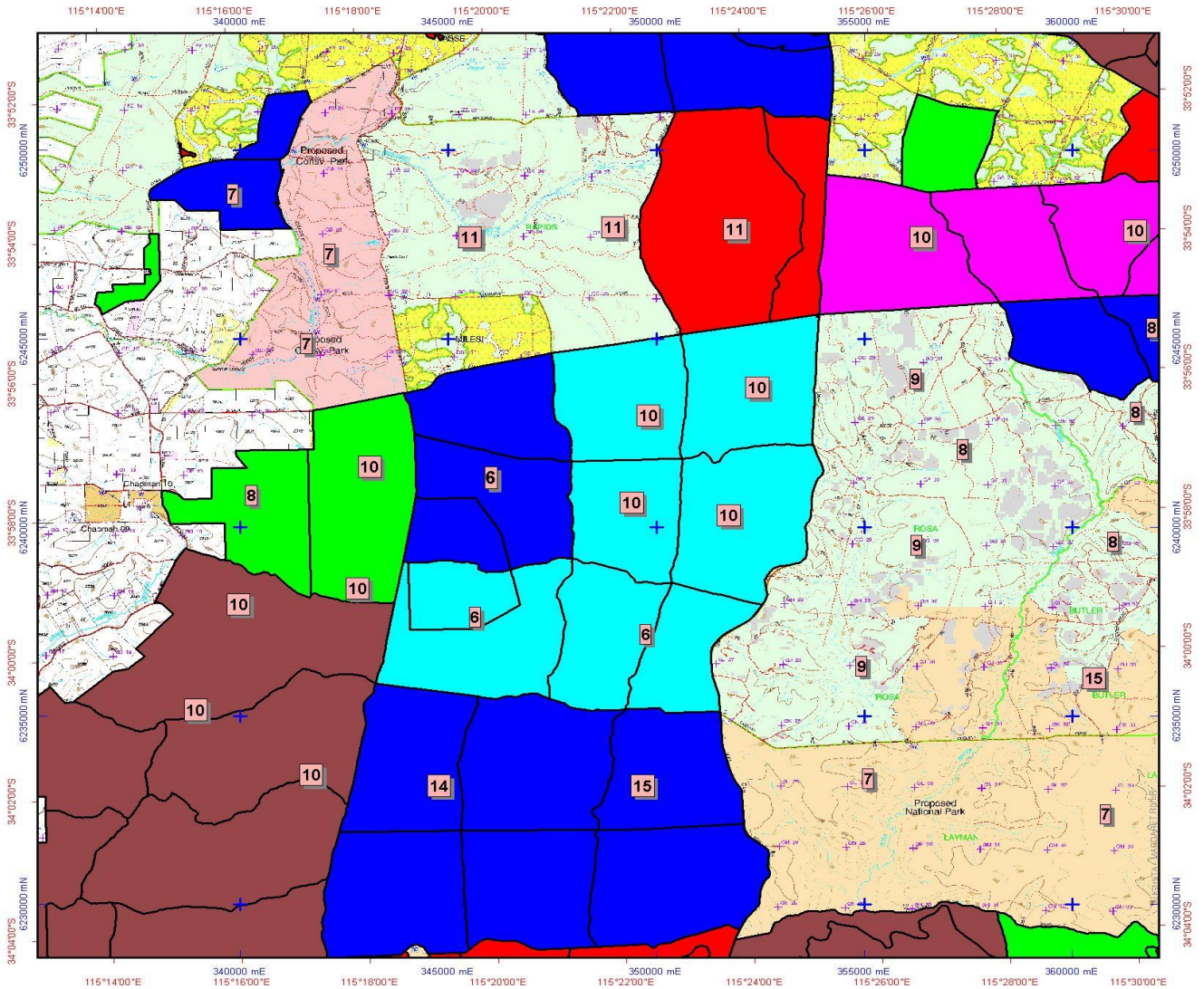
Suppression Response - Avon



Bushfire Threat/Risk – Avon Catchment



Future Management – Maintenance of range in Vegetation Age Classes



3 Year Indicative Program
SW Region Prescribed Burning

Legend

- Spring 2007
- Autumn 2007
- Spring 2006
- Autumn 2006
- Spring 2005
- Mowen BS025 Boundary

13 = Years Since Last Burnt

N

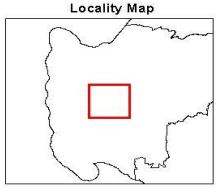
Scale 1:100,000
1cm represents 1000m

0 2 4 6 8 Kilometers

Projection: Universal Transverse Mercator,
MGA Zone 50. Datum: GDA94

GDA

Locality Map



Produced by Marc Barendrecht
Under the Direction of
Keiran McNamara Executive Director
Department of Conservation & Land Management.

Graticule labelled at 2 minute intervals.
Grid labelled at 5000 metre intervals.

Prepared using Departmental Operations
Graphics Data. For Departmental Use Only.

Produced at 16:03 on June 15, 2005

Areas of Unplanned Fires and Prescribed Burns Collie Area 1936 to 1988 (Lang 1997)

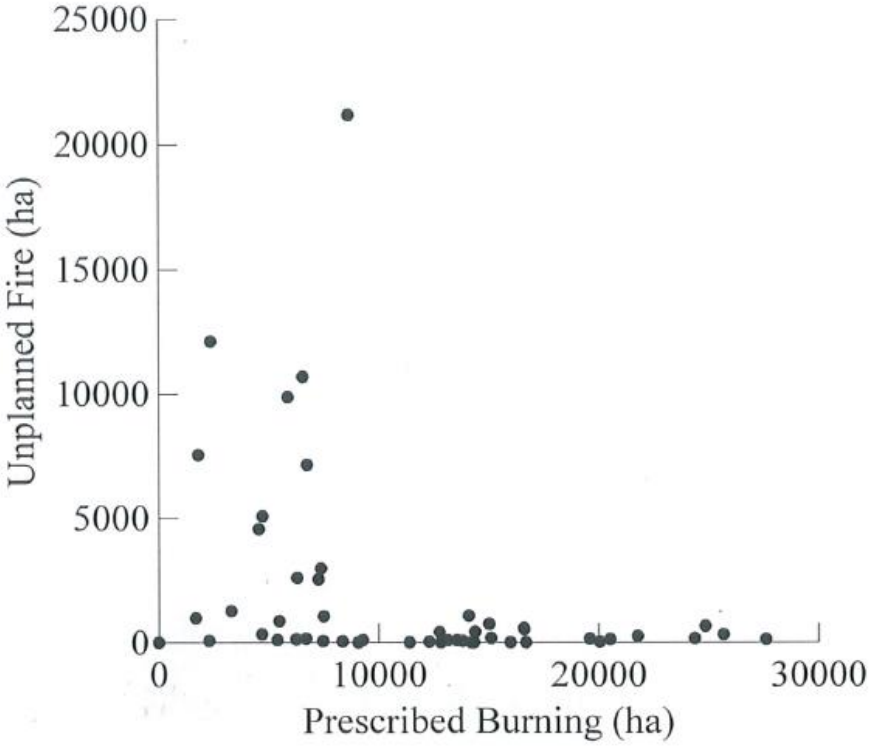


Figure 4.5 *A scatterplot plotting area burned by unplanned fires per year against area burned by prescribed burns per year.*

Trends in Unplanned Fires and Prescribed Burning for Collie Divn in 1937/8 to 1987/8 (Lang 1997)

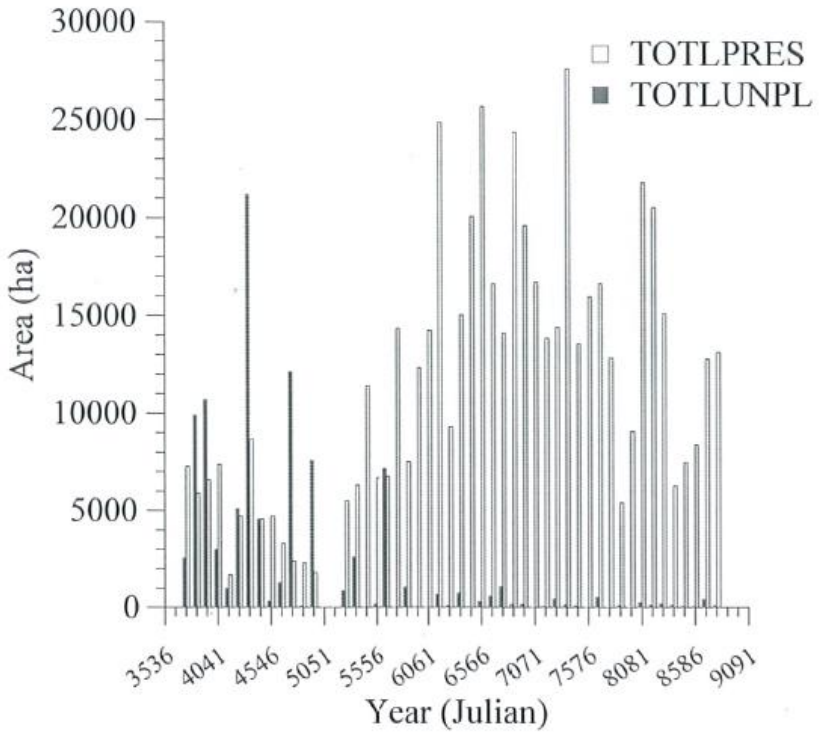


Figure 4.3 *The area burned by prescribed burning (TOTLPRES) and unplanned fires (TOTLUNPL) on public land from 1937-38 to 1987-88.*

Area of Unplanned Fires and Prescribed Burns for Perup Area 1936 to 1990 – Abbott (1993)

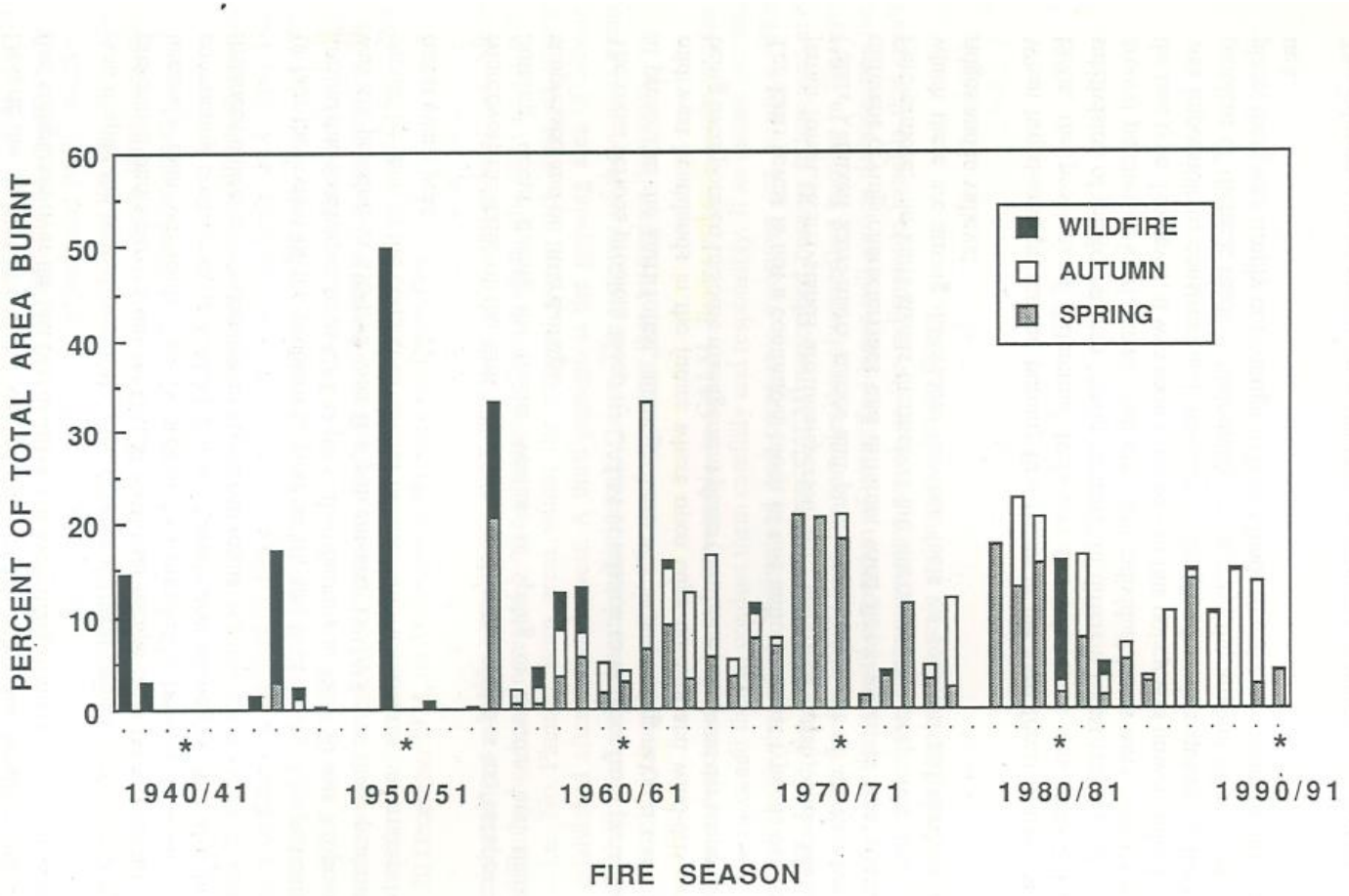
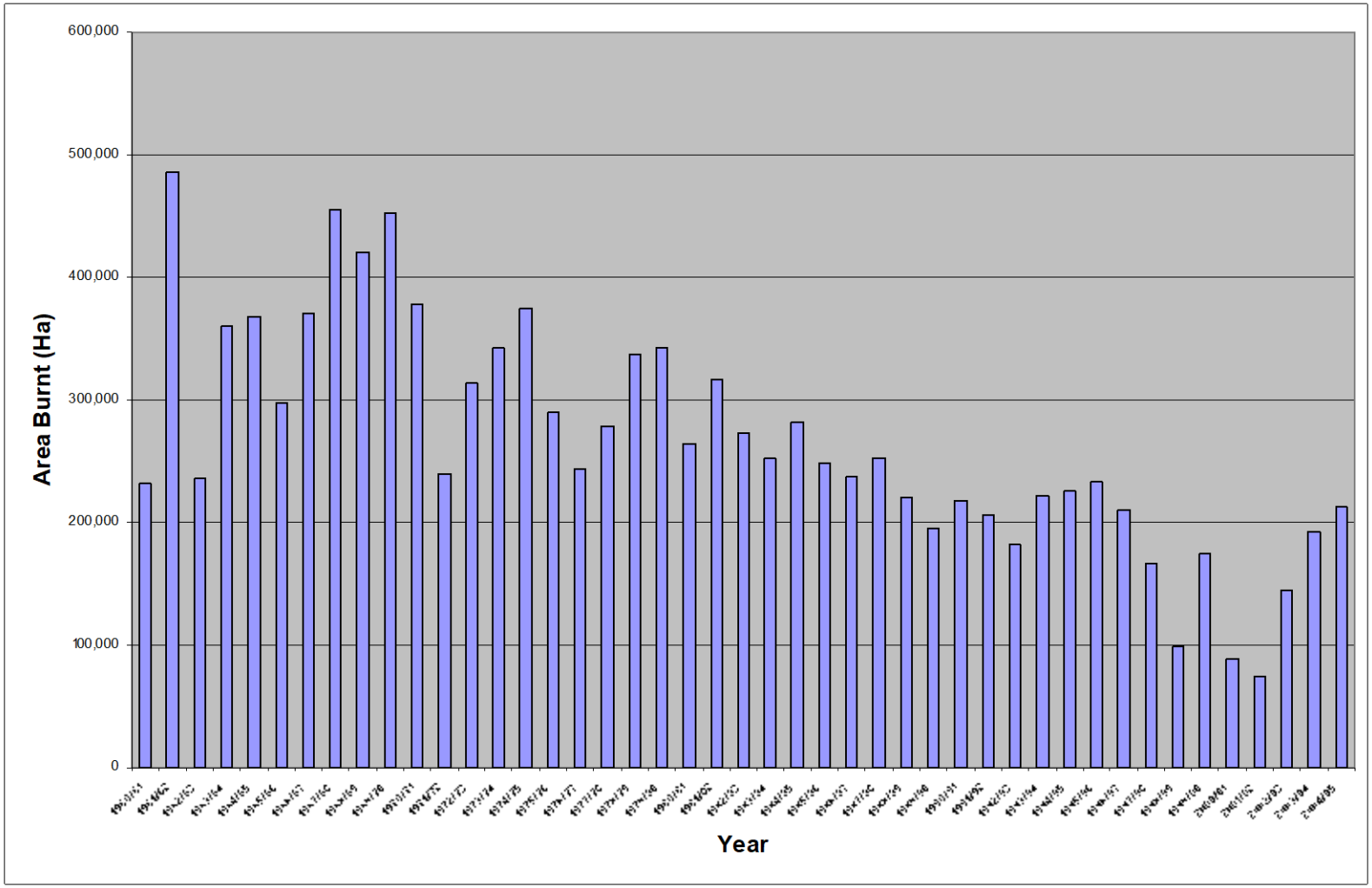
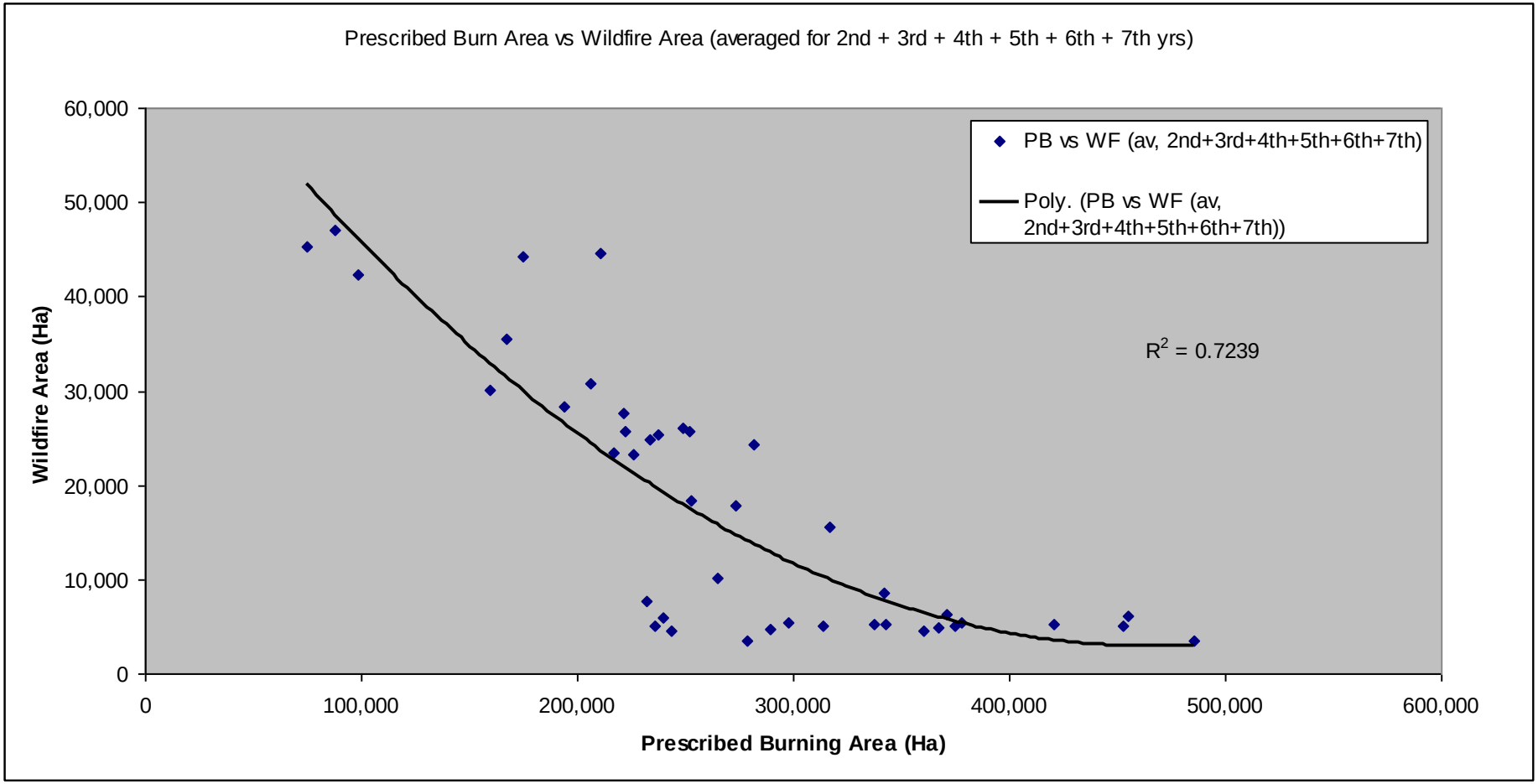


Figure 9 Wildfire and prescribed burning history in the Perup area (from Abbott *et al.* 1993)

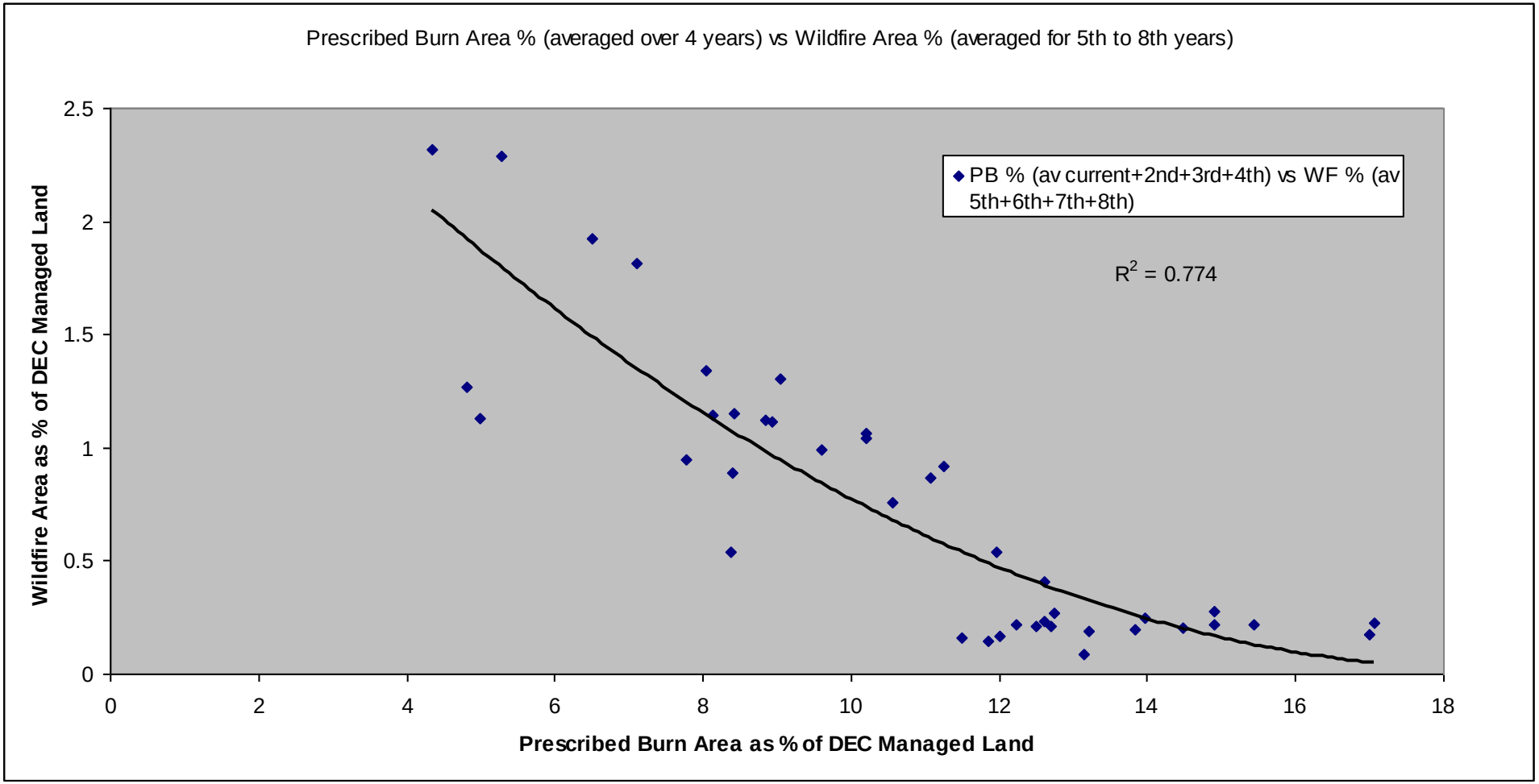
Areas of Prescribed Burning SW of WA 1961/62 to 2007/08



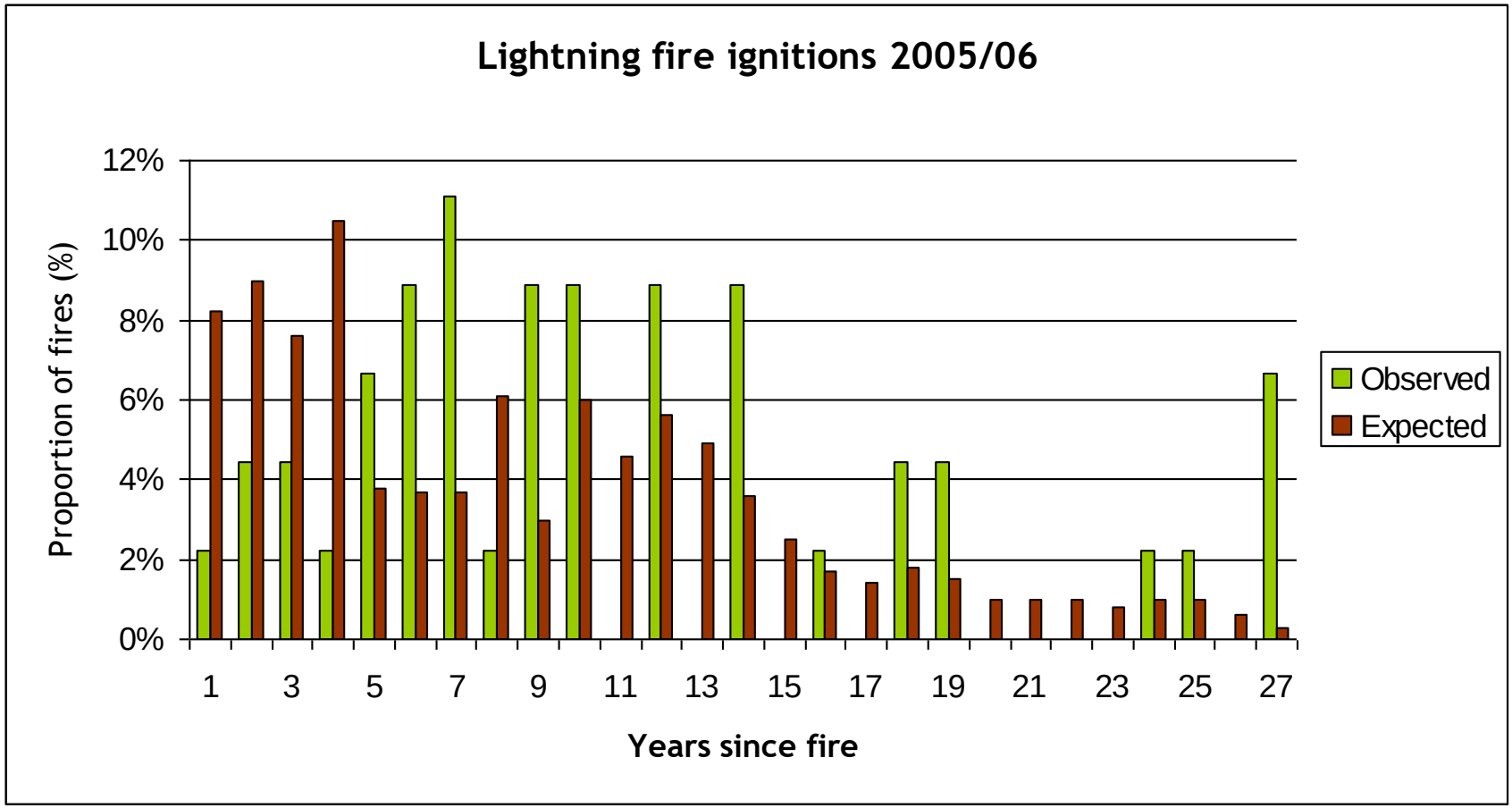
Relationship between Prescribed Burning Area (single year) and Wildfire Area (next 6 years)



Prescribed Burn Area % vs Wildfire Area % (next 4 yrs)

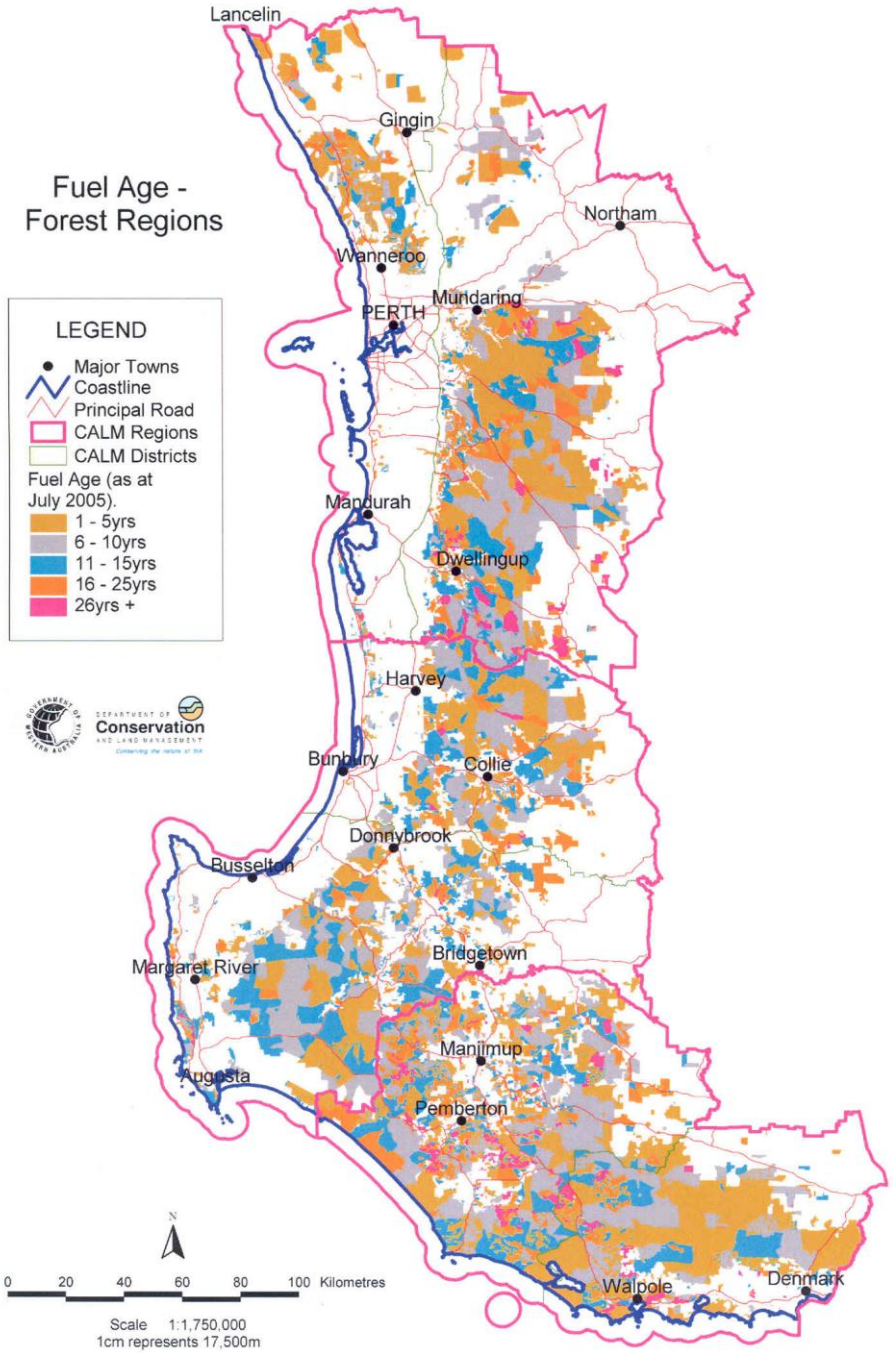


Lightning fire ignition in south-west Australian forests: fewer ignitions in fuels < 5 years old



To be effective fuel reduction burns should

- Cover a significant proportion of landscape (about 48% < 7 yr)
- Be strategically located across land based on WTA to restrict major fire runs and ‘ember storms’.
- Not just “Thin Red Line” adjacent to towns
- Linked to low fuels (burns & wildfires)
- At least 2 km deep and cover >65% of individual burn area
- Accessible to fire suppression crews. Very Intense fires can be contained within low fuel areas only if ground forces are sufficient


Fuel Age - Forest Regions
LEGEND
Major Towns
Coastline
Principal Road
CALM Regions
CALM Districts
Fuel Age (as at July 2005).
1 - 5yrs
6 - 10yrs
11 - 15yrs
16 - 25yrs
26yrs +
Department of Conservation and Land Management
Lancelin
Gingin
Northam
Wanneroo
Mundaring
PERTH
Mandurah
Dwellingup
Harvey
Bunbury
Collie
Donnybrook
Busselton
Bridgetown
Margaret River
Manjimup
Augusta
Pemberton
Walpole
Denmark
N
0 20 40 60 80 100 Kilometres
Scale 1:1,750,000
1cm represents 17,500m

Comprehensive Fire Prevention

Prescribed Burning is only one element of effective fire control and fire management.

Other critical elements include;

- Early Detection and rapid Response (air/ground)
- Adequate numbers of well trained & equipped fire crews & leaders
- Reliable cost-effective equipment, communications and IT systems
- Maintained access, water points, firebreaks
- Science based fire prediction and fire ecology decision support systems
- Cooperative arrangements with neighbours and other fire agencies
- Arson investigation and prevention and Community education

Constraints to Prescribed Burning

- Limited days for safe, effective burning
- Too wet; or too dry; or too windy & risky
- Increased complexity esp in heavy fuels
- Smoke/ash impact on city, airport , public roads, water bodies, grapes, events
- Other fire control commitments
- Strong opposition by interest groups
- Reduced Bushfire brigade/FESA burning on private lands
- Threat of legal claims etc etc

Conclusion

- Case Studies, Fire Behaviour Research and Statistical evidence is overwhelming that, if properly designed, located and applied throughout the landscape---
- ***PRESCRIBED BURNING is highly effective in restricting area and impacts of large UNPLANNED FIRES under severe summer conditions***

Thank You
Any Questions?