Managing Fire Sensitive Ecosystems in Fire Prone Environments

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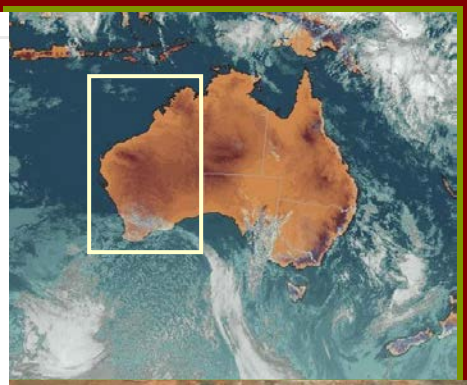
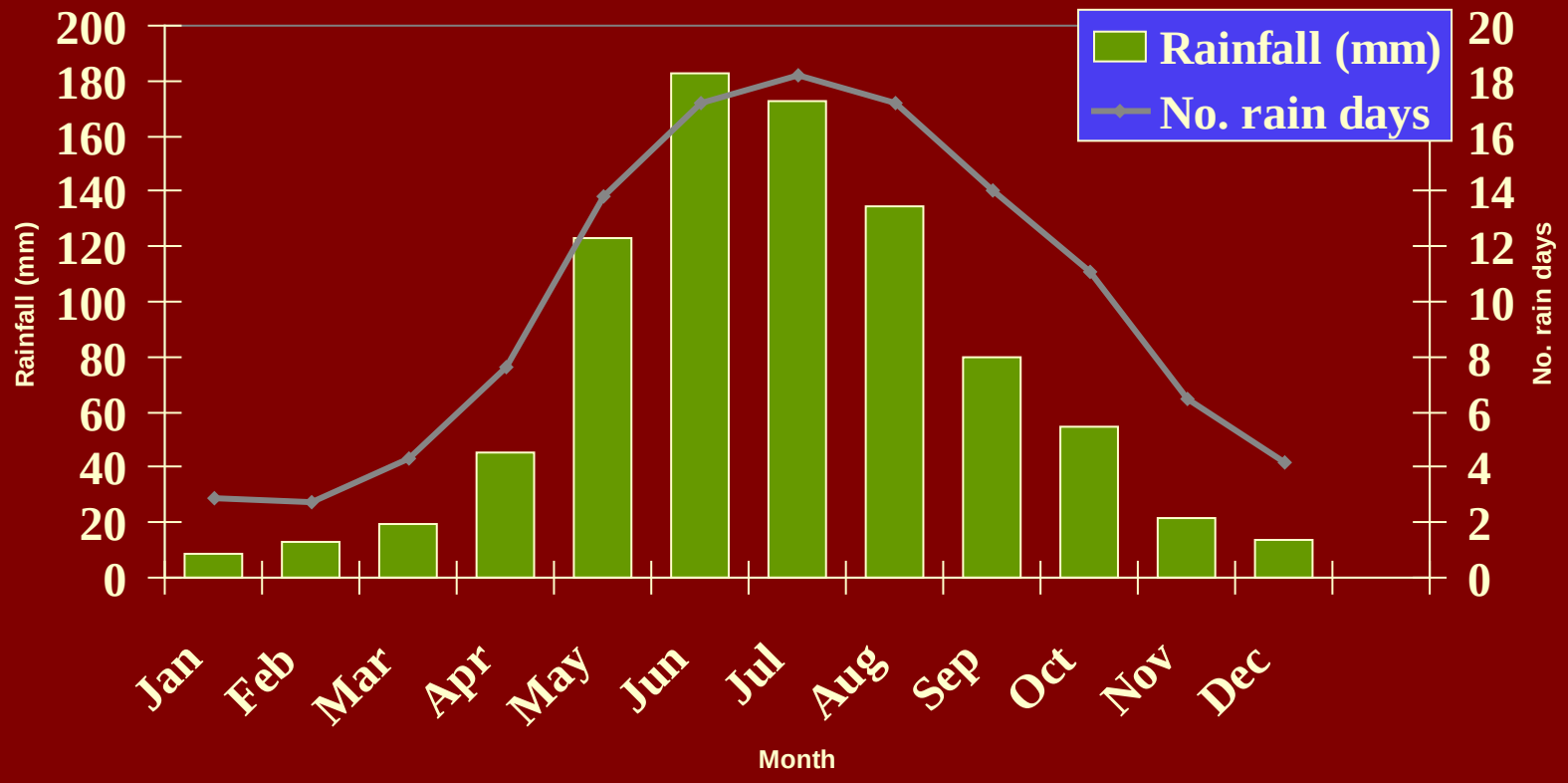
South-West Australia – A Global Biodiversity Hotspot



A Mediterranean-type climate, annual 'fire season'



Fire Adaptations

Fire Independent Communities

- Fire has no beneficial role

Fire Maintained Communities

- Fire regime tolerant
- Fire regime sensitive

Fire maintained communities

1. Fire regime tolerant

   can tolerate or benefit from a range of fire regimes

The most flammable parts of the landscape:

- drier for longer
- continuous surface fuels
- recover quickly to pre-fire state
- rapid fuel re-accumulation
- fire resilient species
- high proportion of resprouters

Fire maintained communities

2. Fire regime sensitive
   maintained by infrequent fires

The less flammable parts of the Landscape:

- wetter for longer, or
- discontinuous surface fuels
  - recover slowly to pre-fire state
  - slow fuel re-accumulation
- fire sensitive plant species
- high proportion of obligate seeders
- habitat specific fauna

Fire Independent Communities

Low flammability or non-flammable parts of the (biotic) landscape:

- independent of fire
- degraded by fire
- no fire adaptations
- occur in fire shadows & refugia
- uncommon, relictual (Gondwanan) landscape elements
- high conservation significance

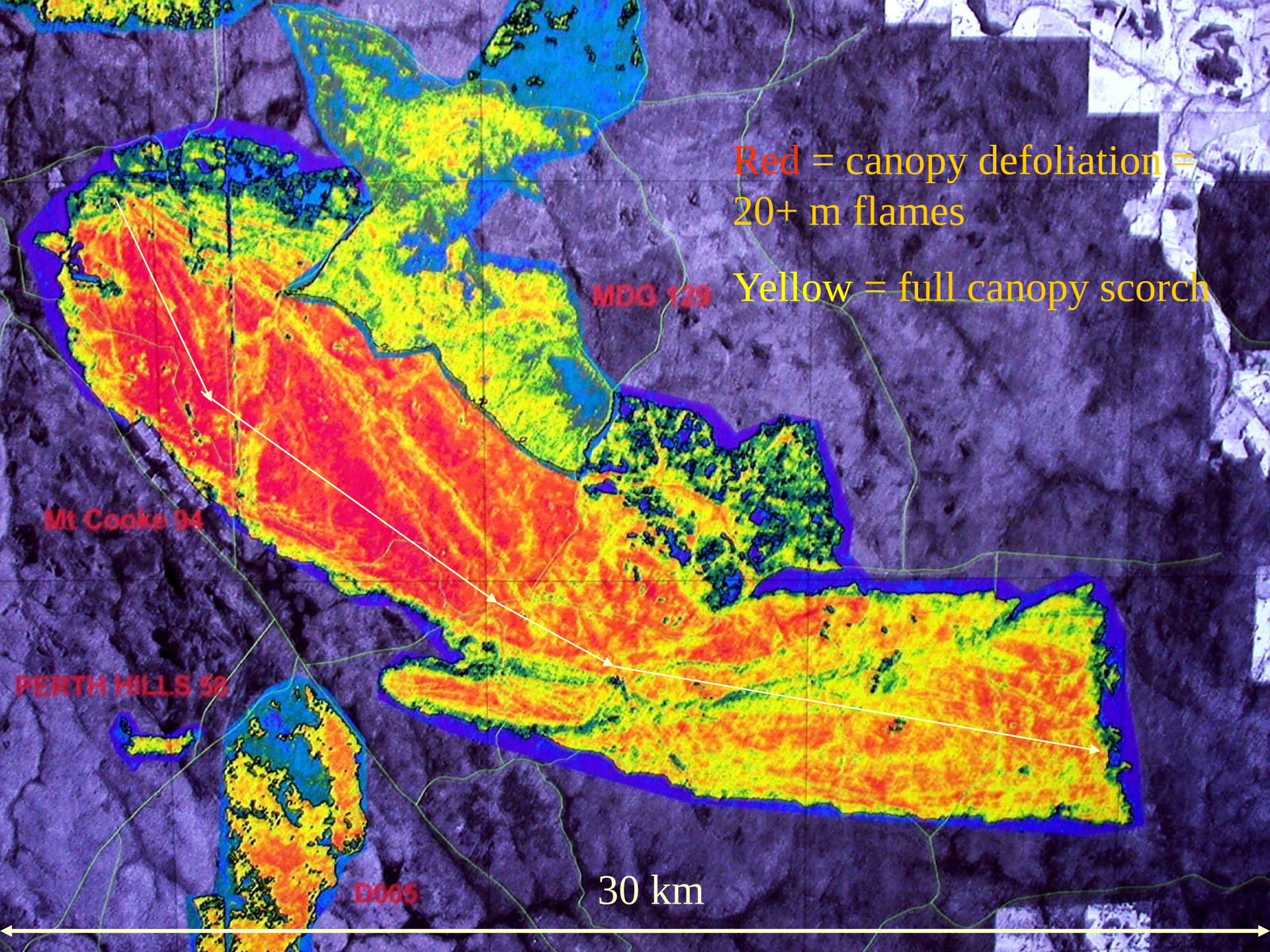
Rock Outcrops

Fire independent & fire sensitive communities

- Formed during the mid Jurassic
- <10% of landscape
- Biotic islands
- Relictual fauna
- High levels of endemism & rarity
- Can provide fire refuge
- Embedded in flammable landscapes

A fire management strategy for protecting rock outcrop communities in the Monadnocks Conservation Park

- Fire exclusion
- Fire suppression


Red = canopy defoliation = 20+ m flames
Yellow = full canopy scorch
MDG 129
Mt Cooke 94
PERTH HILLS 58
D005
30 km

Some acute impacts of intense wildfire on fire sensitive and fire independent rock outcrop communities

- Large area affected (~18,000 ha)
- Destruction of rock moss swards and *Borya* meadows
- Massive overstorey tree death, structural simplification
- High animal mortality
- Soil erosion & stream sedimentation
- Complete landscape burn-out - no refugia
- Habitat simplification (seral stages) over large area

Main Lessons Learned

- Attempting to exclude fire over large areas allowed heavy fuel loads to accumulate in the landscape resulting in severe wildfire
- In fire-prone environments, fire exclusion will eventually fail, with unacceptable environmental and social consequences
- Surrounded by long unburnt forest fuels, rock outcrops, riparian zones and other fire sensitive & fire independent communities cannot function as fire refuges, but become funeral pyres

Main Lessons Learned

An alternative fire management strategy for the Monadnocks Conservation Park:

Proactive fire use - regular introduction of low intensity, patchy fire into flammable parts of the landscape is essential to:

- manage fuel build-up
- protect fire sensitive rock communities from lethal wildfires by allowing fire refugia to function as such
- provide habitat (seral) diversity at appropriate scales
- reduce the size, intensity, damage potential and suppression difficulty of landscape wildfires

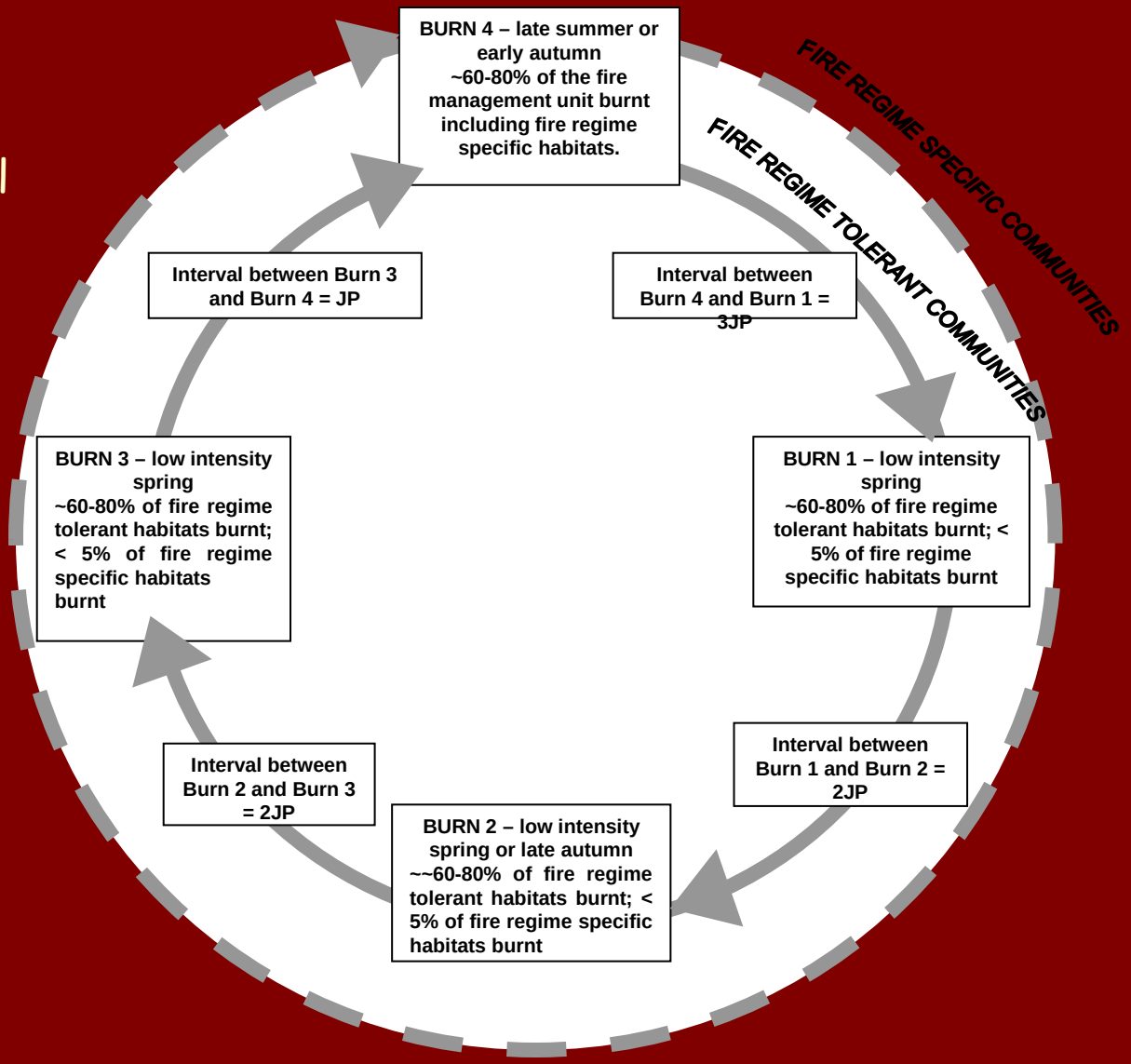
An alternative fire regime

Setting fire intervals:

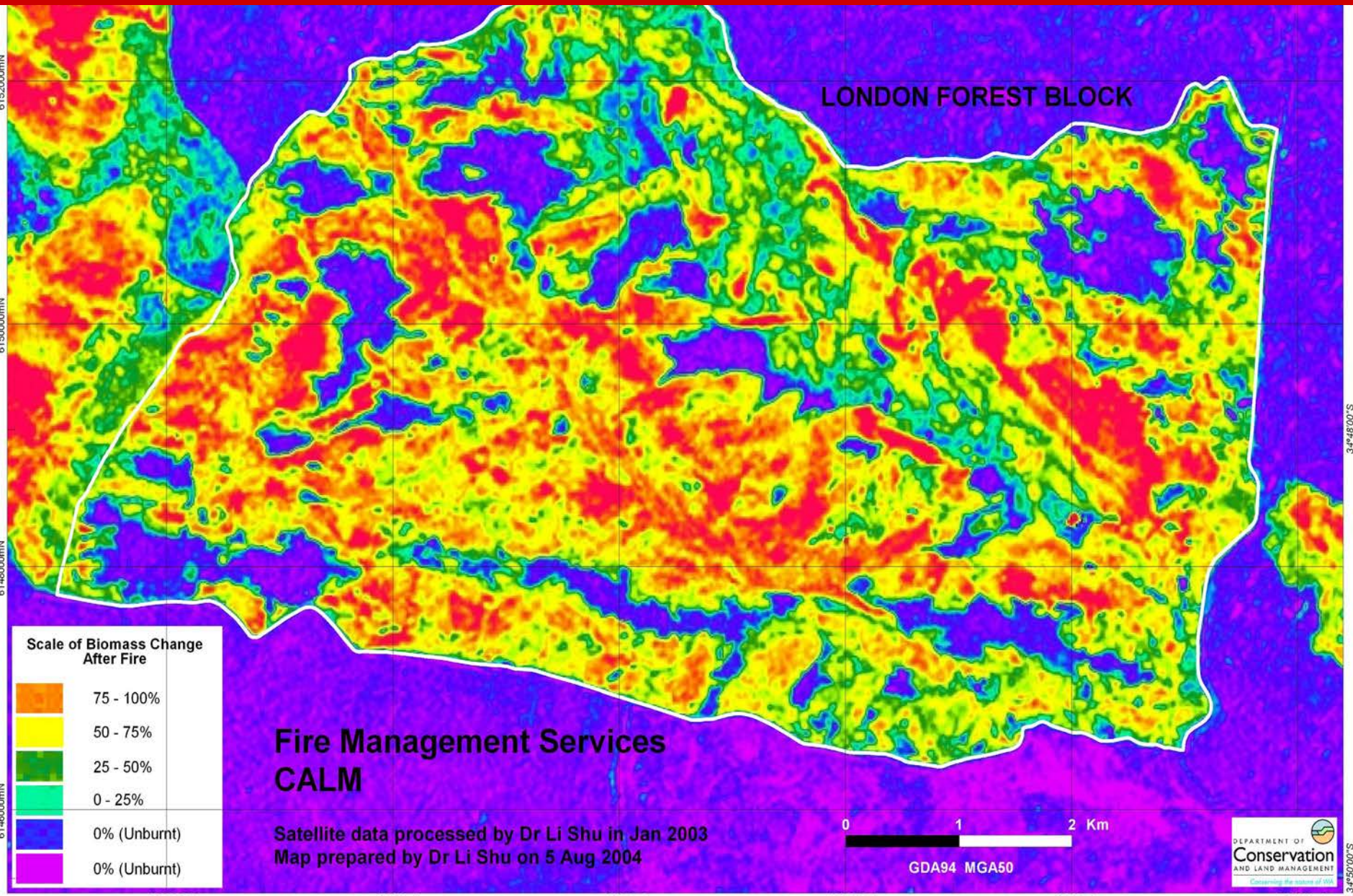
- Vital attributes of focal & keystone plant species, including juvenile period and longevity
- Fuel accumulation rates

Controlling fire intensity and patchiness:

- Flammability differentials
- Seasonal conditions
- Low fuel buffers
- Lighting pattern



Burn severity based on the proportion of vegetation cover removed by fire – differential Landsat TM



THANK YOU