



Prescribed burning as a conservation tool: the impacts of fuel moisture

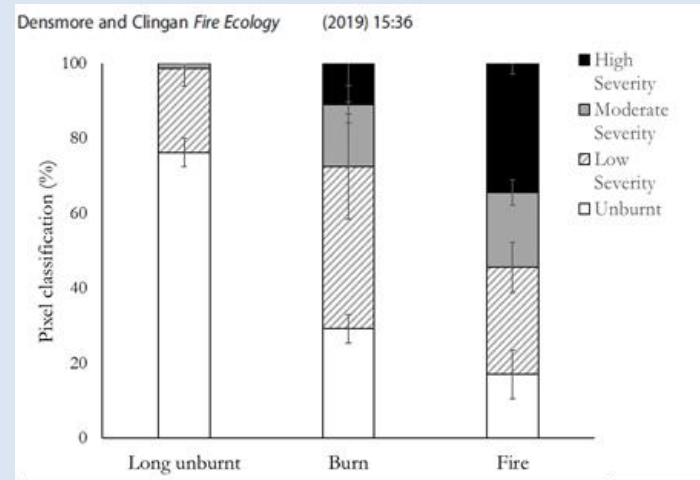
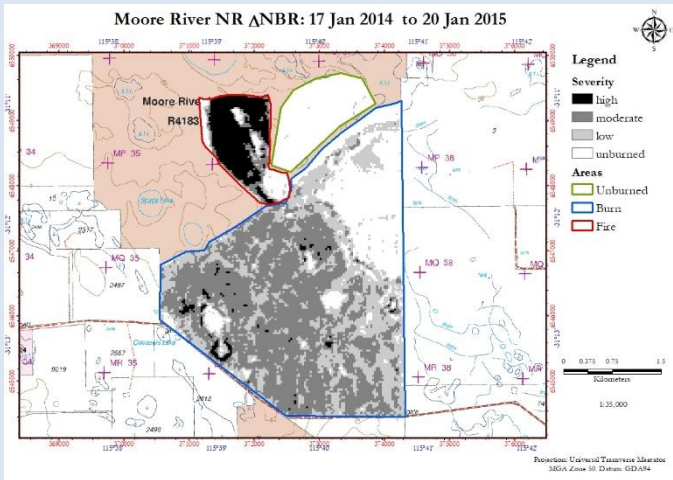
Dr Valerie Densmore, WA Department of Biodiversity, Conservation and Attractions

National Fire Fuels Science Webinar **20 May 2020**

The practice of hazard reduction: what are the potentials and limitations?

Prescribed burning = opportunity to manage fire impact

☞ Hazard reduction burns are prescribed to constrain fire within a specified range of behaviours (e.g., intensity) & extent that promote conservation values.

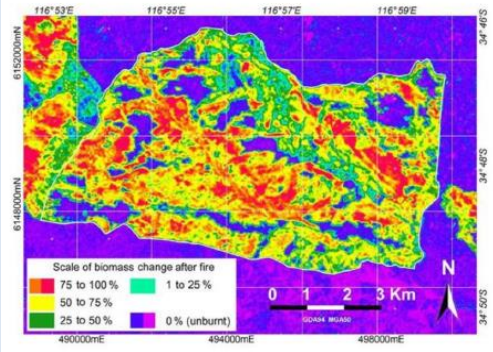


Spatial mosaics provide refuges & promote biodiversity

🔥 Extent: size, location and patchiness (internal heterogeneity) ~ spatial mosaic.

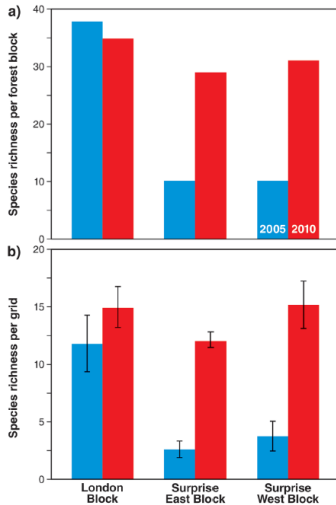
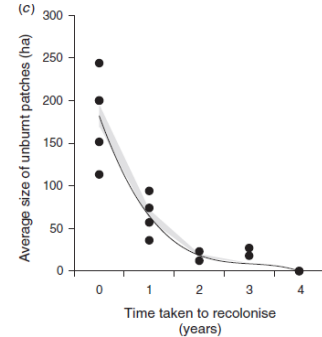
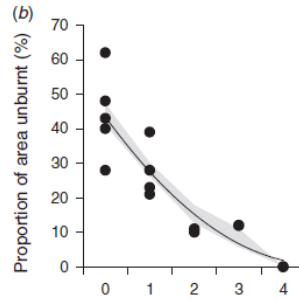
Journal of the Royal Society of Western Australia, 100(2): 32–45, 2017

B. Ward *et al.*



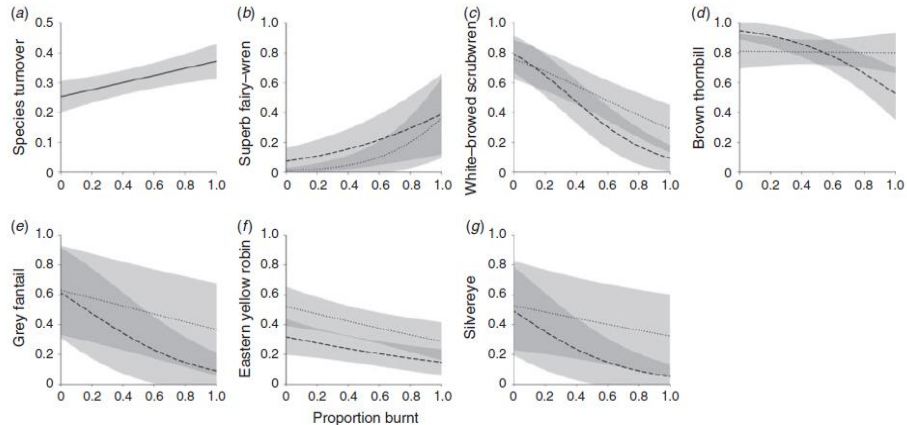
International Journal of Wildland Fire 2016, 25, 608–617
<http://dx.doi.org/10.1071/WF15138>

K. Bain *et al.*



International Journal of Wildland Fire
<http://dx.doi.org/10.1071/WF14123>

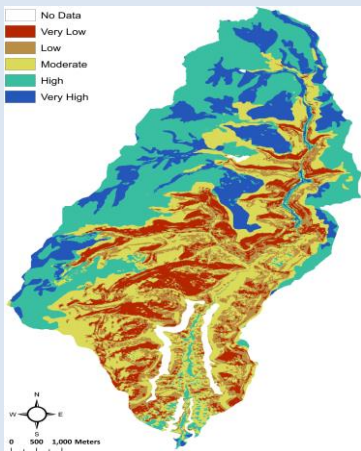
H. Sitters *et al.*
 2015



Moisture differentials are a naturally-occurring feature



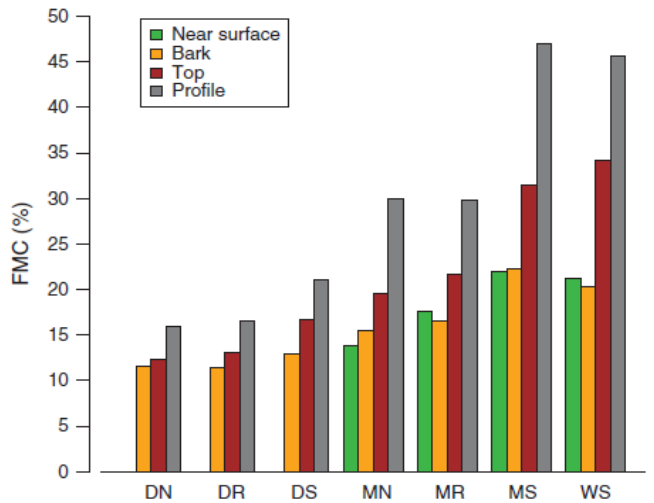
- 🔥 Natural variations in fuel moisture across landscapes.
- 🔥 Valleys, Riparian areas
- 🔥 Sheltered aspects
- 🔥 Differences may be seasonal or semi-permanent
- 🔥 Wetlands
- 🔥 Vegetation structure



Gilreath-Brown *et al.*, 2019
doi.org/10.1371/journal.pone.0220457

Int. J. Wildland Fire
2018, 27, 190–202

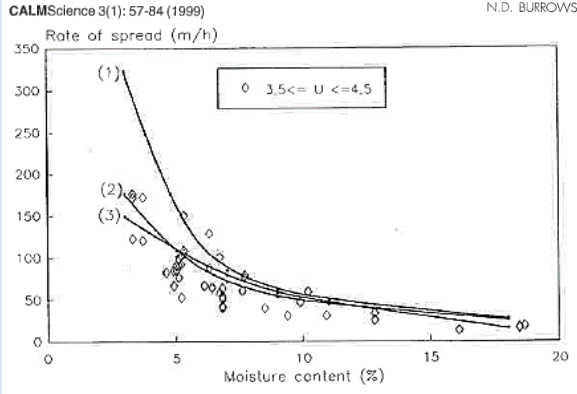
A. Slijepcevic *et al.*



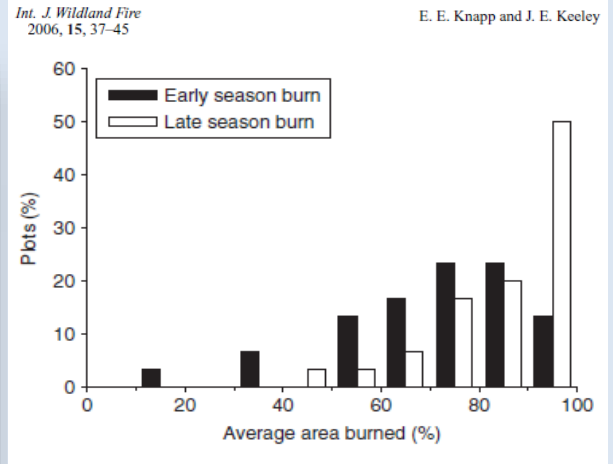
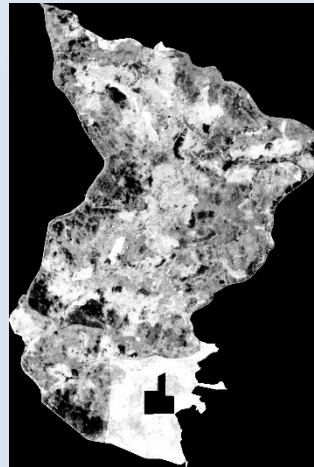
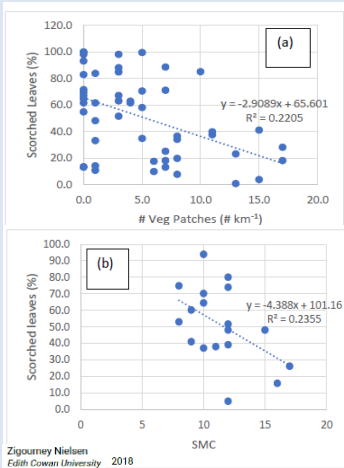
Moisture differentials can be used to manage fire extent

🔥 Fuel moisture affects fire behaviour.

🔥 Moisture differentials used to reduce fire intensity & protect sensitive areas during PB.

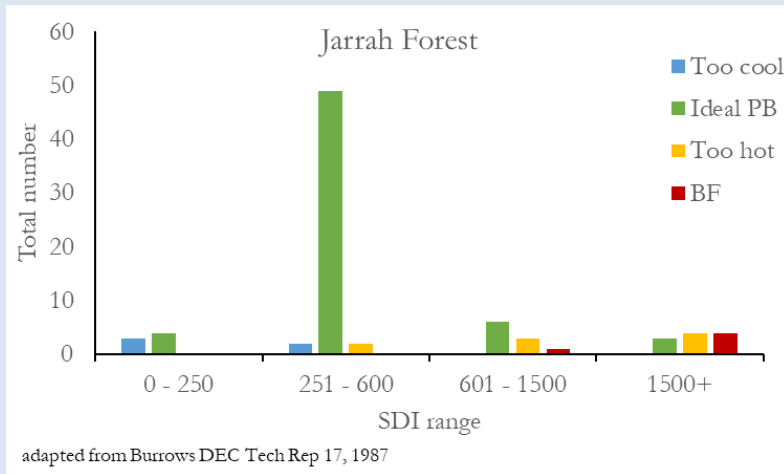


🔥 Moisture differentials at a fine scale can promote spatial mosaics/patchiness

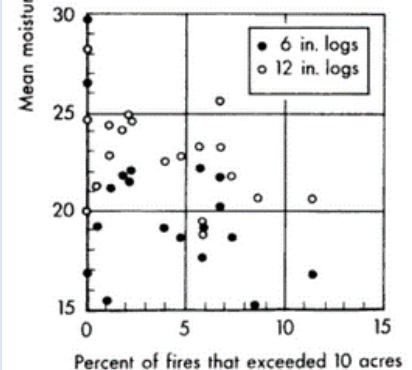
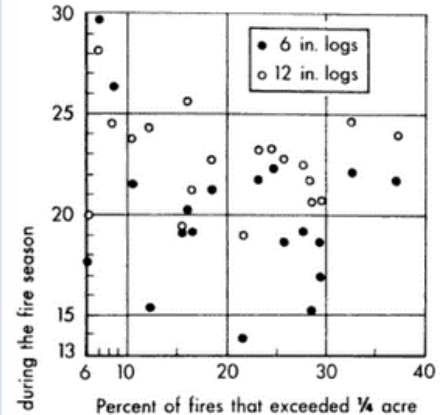


Coarse fuel moisture affects fire behaviour

- 🔥 Coarse woody fuels (CWD) affect fire residence time.
- 🔥 As CWD dries, fire behaviour increases.



A.P.Brackenbush, USDA For Ser, INT-173, 1975



Coarse fuel moisture can complicate prescribed burning

🔥 CWD provide a re-ignition source when moisture differentials decrease & fire danger ratings increase.

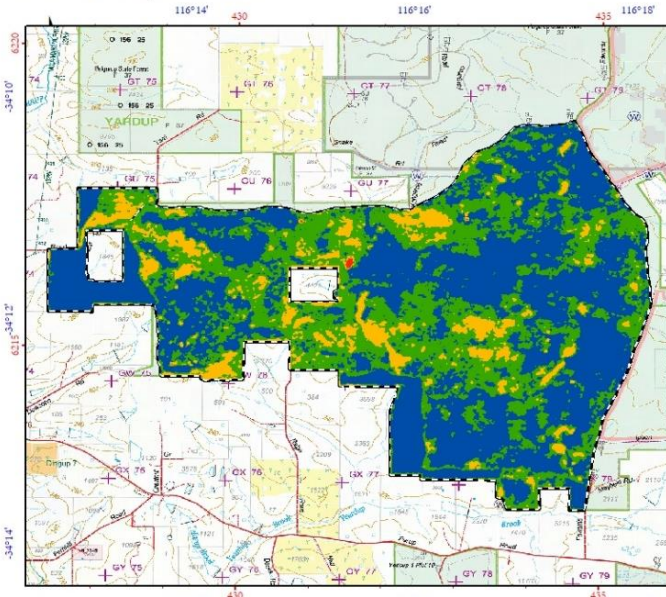
🔥 Decrease spatial mosaics

🔥 Increase risk of fire escape

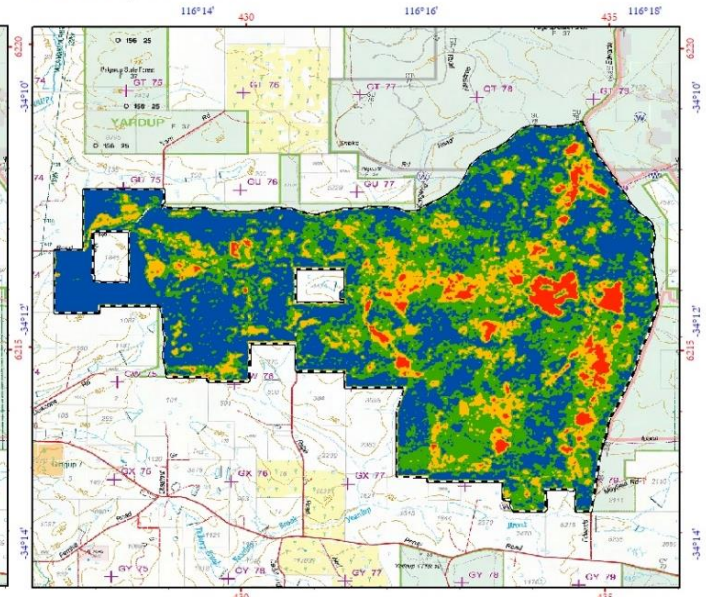
🔥 Increase overall fire severity

🔥 Increase period of smoke production

Interim result, 15th Nov 2018



Final result, 8th Feb 2019



Is climate change affecting coarse fuel moisture?

❖ Drying climates may exacerbate the risk:

- ❖ Less moisture recharge in coarse fuels.
- ❖ Moisture differentials in fine fuels smaller or of shorter duration.

Burrows DEC Tech Rep 17, 1987

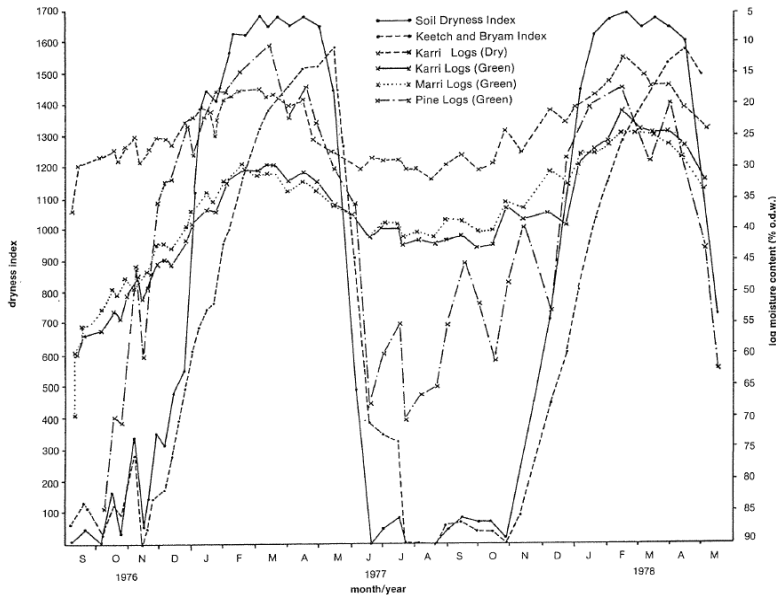


FIGURE 4

Moisture content fluctuation for a range of grounded logs measured in the open at the Manjimup Research Station. Indice values are also graphed.

