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

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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.
Moisture differentials are a naturally-occurring feature

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

Gilreath-Brown et al., 2019
doi.org/10.1371/journal.pone.0220457
Fuel moisture affects fire behaviour. Moisture differentials can be used to manage fire extent and 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.

Adapted from Burrows DEC Tech Rep 17, 1987

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 overall fire severity
- Increase risk of fire escape
- Increase period of smoke production
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.