

# A Hierarchical Classification of Wildland Fire Fuels for Australian Vegetation Types

M.G. Cruz <sup>a,\*</sup>, J.S. Gould<sup>a</sup>, J.J. Hollis<sup>ab</sup>, W.L. McCaw<sup>c</sup>

<sup>a</sup> CSIRO, GPO Box 1700, Canberra, ACT 2601, Australia

<sup>b</sup> Currently with New South Wales Rural Fire Service, PO Box 2234, Queanbeyan, NSW 2620, Australia

<sup>c</sup> Department of Parks and Wildlife, Manjimup, WA 6258, Australia

\*Corresponding author: E-mail address: [miguel.cruz@csiro.au](mailto:miguel.cruz@csiro.au)



**Figure S1.** Hummock grasslands (HG2) dominated by *Triodia* spp., Lorna Glen, WA. Source: Jennifer Hollis, DPaW.



**Figure S2.** Dense hummock grasslands (HG3) dominated by *Triodia* spp., Mill Stream NP, WA. Source: Jennifer Hollis, DPaW.



**Figure S3.** Open grassland (G2) dominated by Mitchell grass (*Astrebla* spp.). Source: Jennifer Hollis, DPaW.



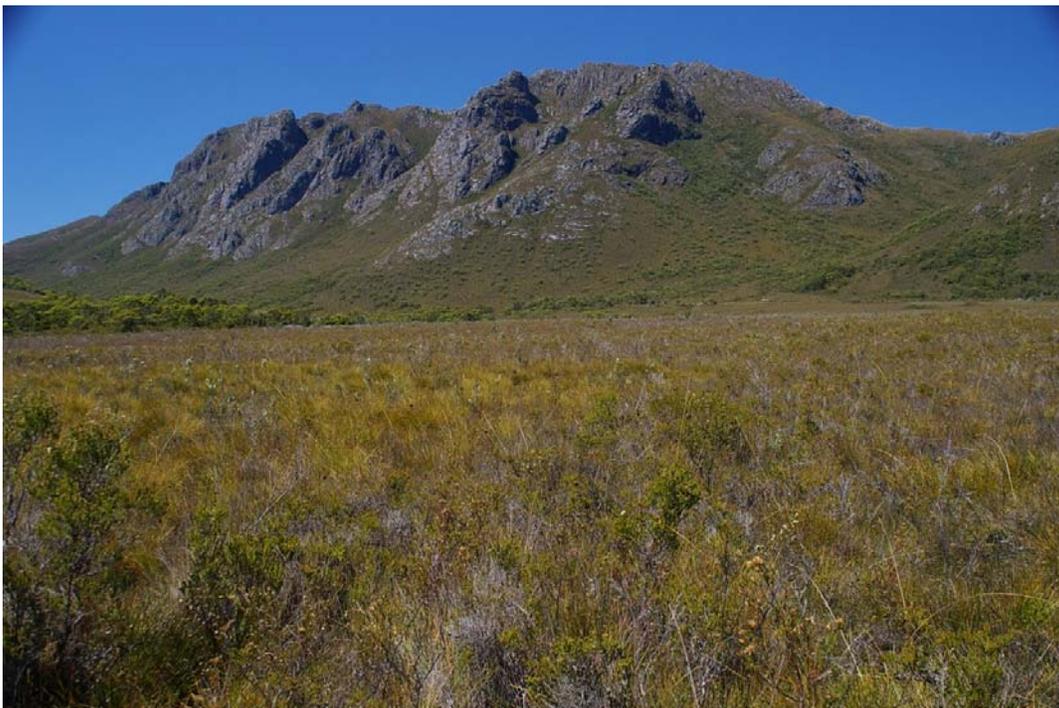
**Figure S4.** Typical grazed grassland (G4\_2) found in southern Australia. Source: Jim Gould, CSIRO.



**Figure S5.** Ungrazed grassland (G4\_3), southern Australia. Source: Susan Kidnie, CFA.



**Figure S6.** Low open shrubland (SL2\_g2) of pearl bluebush (*Maireana sedifolia*) and speargrass (*Austrostipa scabra*) in arid WA. Source: Department of Agriculture and Food, WA.



**Figure S7.** 25-year old buttongrass moorland growing in low productivity site characterised as SL3\_g3. Southwest TAS. Source: Jon Marsden-Smedley, University of Tasmania.



**Figure S8.** Semi-arid shrublands of southwest WA, classified as open shrubland (SM2). Source: Jennifer Hollis, DPaW.



**Figure S9.** Coastal heathland of the southwest WA classified as a shrubland with understorey of lower shrubs, grasses and sedges (SM3\_sl3). Source: Lachie McCaw, DPaW.



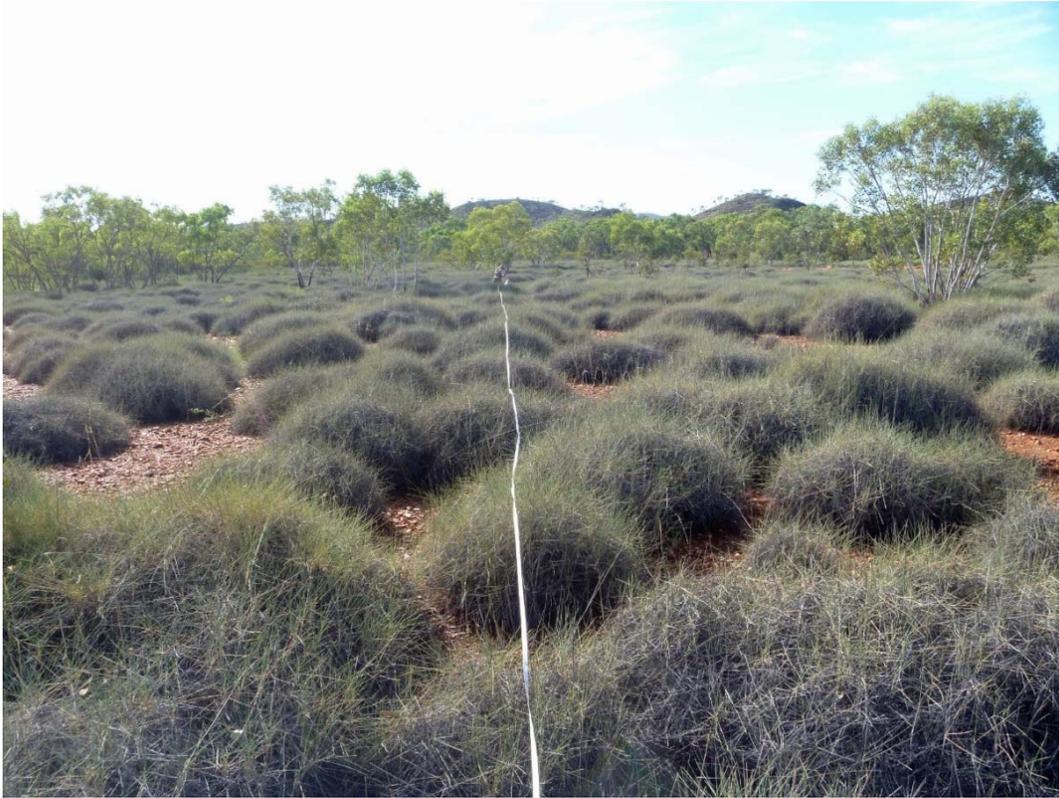
**Figure S10.** Heathland with understorey of buttongrass moorland characterised as SM3\_g3. White Spur, Southwest TAS. Source: Jon Marsden-Smedley, University of Tasmania.



**Figure S11.** Tall open shrubland with sparse shrubby understorey (ST2\_sm3) typical of central Australia, Uluru-Kata Tjuta National Park, NT. Source: Jennifer Hollis.



**Figure S12.** Mallee-heath shrubland characterised as tall open shrubland with a heath understorey (ST2\_sm3), Ngarkat Conservation Park, SA. Source: CSIRO.



**Figure S13.** Open shrubland dominated by *Eucalyptus leucophloia* with scattered *Acacia* spp. and a dense spinifex understorey (ST2\_hg3), near Mt. Isa, QLD. Source: Paul Williams, James Cook University.



**Figure S14.** Semi-arid Mallee-spinifex shrubland characterised as tall open shrubland with a spinifex understorey (ST3\_hg2), Victoria. Source Natasha Schedvin, DELWP.



**Figure S15.** Closed tall coastal shrubland dominated by Drooping Sheoak (*Allocasuarina verticillata*), Coast Tea-tree (*Leptospermum laevigatum*), and Coast Wattle (*Acacia longifolia* spp. *Sophorae*) classified as a tall closed shrubland (ST4). Source: Jim Whelan, DELWP.



**Figure S16.** Northern Australia tropical grass woodland characterised as low woodland with tussock grasses understorey (WL2\_g3). Source: CSIRO.



**Figure S17.** Snow gum (*E. pauciflora* spp. *Niphophila*) woodland with heath understorey in sub alpine environments characterised as a woodland with low shrub understorey (WL2\_sl4). Kosciuszko National Park, NSW. Source: CSIRO



**Figure S18.** Woodland with grass understorey (WM2\_g3), Northern Kimberley, WA. Source: Lachie McCaw, DPaW, WA.



**Figure S19.** Woodland with shrub understorey (WM2\_sm2) in the Great Western Woodlands, WA. Source: Lachie McCaw, DPaW.



**Figure S20.** Wandoo open forest characterised as a low open forest with low shrub understorey (FL3\_sl4). Preston National Park, WA. Source: DPaW.



**Figure S21.** Dry sclerophyll forest dominated by stringybarks eucalypts (*E. obliqua*, *E. macrorhyncha*) with open understorey of low shrubs, sedges and grasses classified as an open forest (FM3\_sl2), VIC. Source: CSIRO.



**Figure S22.** Understorey view of open forest of mixed eucalypt species (dominated by *E. dives*, *E. radiata* and *E. mannifera*) with a well-developed tall shrub layer (FM3\_st3), VIC. Source: Greg Mattingley, Parks Victoria.



**Figure S23.** Karri (*E. diversicolor*) forest characterised as tall open forest with tall shrubby understorey (FT3\_st3), Southwest WA. Source: Jennifer Hollis, DPaW.



**Figure S24.** Multi strata tall open forest with understorey of small trees, tall shrubs and ferns (FT3\_st3), Eastern VIC. Source: Brad Fisher, DELWP.



Figure S25. Understorey of low closed forest (FL4) of *Melaleuca leucadendra* Mackay, QLD.



Figure S26. Tropical rainforest, characterised as closed forest (FM4R), Southeast QLD. Source: CSIRO.



**Figure S27.** Understorey of temperate rainforest, characterised as tall closed forest (FT4R), TAS. *Source:* CSIRO.



**Figure S28.** Fuel structure in radiata plantations. Top: effect of pruning in reducing vertical fuel continuity. Bottom: Mature stand after 2<sup>nd</sup> thinning. Southeast SA. Source: CSIRO.



**Figure S29.** Detail of understorey and ladder fuel structure at 6 years in a short rotation Eucalyptus (*E. globulus*) plantation in low productivity site, Central VIC. Source: CSIRO.



**Figure S30.** Understorey of blady grass (*Imperata cylindrica*) in young medium rotation blackbutt (*E. pilularis*) plantation in northern coastal NSW. Source: Phil Lacy.



**Figure S31.** Example of fuel arrangement around isolated houses in rural southern Australia, NSW. Source: CSIRO.



**Figure S32.** Detail of vineyard understorey. Grasses growing between rows are typically mowed. Source: CSIRO.



**Figure S33.** Fuel profile in 2-year old sugarcane plantation in Northern NSW. Source: CSIRO.



**Figure S34.** Flammable wetland dominated by herbaceous species. The density of above-water biomass, mostly grasses, sedges and rushes, will support fire propagation when site is inundated (as in picture). Drought and lowering of water table will increase flammability of the wetland. Source: CSIRO.