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Effects of Vertebrate Grazing and Environmental Factors on Fuel and Fire Potential in Tasmanian Native Grasslands.

Grazers and fire have been characterised as 'competing' consumers of vegetation biomass. Few studies of fire/grazing interactions have been carried out in Australian vegetation. This study examines how vertebrate grazing affects fire potential in native grasslands in Tasmania.

The study was carried out at three highland and three lowland sites over 18 months. Vegetation biomass (fuel load) was measured in grazed and ungrazed quadrants every three months. Percentage dead fuel (curing) was also recorded at these times, with additional observations being made over summer. Daily values for temperature, humidity, wind speed and rainfall at each site were derived. Soil nutrient levels at each site were also recorded.

Densities of macropods and sheep were estimated from scat (dung pellet) counts, while wombat densities were estimated from spotlight surveys. density estimates were converted into a single index of grazing intensity on the basis of published field metabolic rates. Grazing intensity calculated by this method was related to the amount of vegetation biomass removed by grazers.

A model for predicting grassland fire sustainability was developed. Fuel characteristics and weather conditions were recorded for 78 non-sustaining and 33 sustaining test fires. The probability of fires sustaining was related to dead fuel, moisture, fuel load and percentage dead fuel. Threshold values for fire sustainability were identified.

Grazing substantially reduced vegetation biomass in short-grass grasslands, but had no effect in tussock grasslands.
this difference appeared to relate to differences in palatability.

Grazing has no consistent effect on percentage dead fuel. This variable was strongly related to soil moisture, though this relationship varied amongst the dominant grass taxa.

Fires were predicted to be sustaining on substantially fewer days in grazed relative to ungrazed vegetation at short- grass sites, while there was no difference at tussock sites. The differing results between structural types reflected differences in vegetation palatability. At short -grass sites most biomass is consumed by grazers and fires are unlikely, while at tussock sites grazing has little impact on fuel loads and fires can occur whenever weather

conditions are favourable. Sites can potentially move between short-grass and tussock grass if disturbance regimes are altered.

The degree of 'competition' between fire and grazers for vegetation biomass appears largely determined by vegetation palatability. The widespread assumptions that indigenous Tasmanians frequently burnt lowland grasslands and that burning is preferable to grazing as a management tool in native grasslands require reconsideration in light of the findings of this study.