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Semi-arid Rangelands: Managing Grazing Pressure

Produced for the CRC for Premium Quality Wool undergraduate program by;
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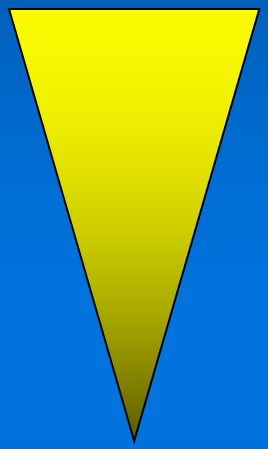
Rangelands: the grazing process
1. species selection



- ephemerals
- more palatable perennials
- reserve species (lower palatability)
- species that are rarely / never eaten

- differential periods of rest from grazing:
  - favours low palatability species
  - discourages high palatability species

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Source: Wilson and Harrington (1984)

Rangelands: the grazing process
2. spatial distribution of grazing pressure

- non-uniform grazing pressure:
  - high pressure: areas with palatable species and low tree / shrub density
  - low pressure: areas with species of low palatability species and mod. / high tree and shrub densities
- location of water supply:
  - declining pressure with increased distance from water, but relatively uniform within 3 km of water
  - high dependency on water in saltbush communities

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Source: Wilson and Harrington (1984)

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Impact of grazing on community composition and productivity

Community	*Nature of change*	*Effect*
Saltbush (*A. vesicaria*) shrubland, NSW	*A. vesicaria* replaced by *Sclerolaena spp* or grasses	No change in animal production, increased susceptibility to erosion
Mitchell (*Astrebla*) grassland, Qld.	Reduction in *Aristida spp*, increase in ephemerals	Increased animal production, less seed in wool.
Hummock (*Triodia pungens*) grasslands, WA	*Eragrostis spp* and *Eriachne spp*. lost and replaced by *T. pungens*	Carrying capacity halved
Mulga (*Acacia aneura*) woodland, WA	Increased component of *Aristida spp*	Reduced animal production
Poplar Box (*Eucalyptus populnea*) woodland	Replacement of perennial grasses by shrubs	Reduced animal production, increased susceptibility to erosion, reduced soil moisture status

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Source: Wilson and Harrington (1984)

Total Grazing Pressure

- Grazing pressure exerted on rangeland pastures is derived from:
  - livestock: sheep and cattle
  - feral animals: rabbits and goats
  - native mammalian herbivores: kangaroos
- Diet selectivity relative to sheep:
  - **cattle**: less selective, eating more of dominant species (grass or saltbush) and less of smaller grasses, medics and forbs
  - **goats**: more browse (≥ 2m) so more of palatable trees and shrubs BUT obtain most of forage needs from same herbage species as sheep and similar selectivity
  - **kangaroos**: more grass and less browse and forbs
  - **rabbits**: green feed & certain woody shrub / tree seedlings

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Source: Wilson and Harrington (1984)

The influence of kangaroos on sheep productivity in the semi-arid woodlands of western NSW

- **Mulga woodland, 170 km n/west of Cobar:**
  - free of inedible shrub
  - containing a wide variety of perennial grasses
- **Merino wether hoggets:**
  - 20-25 kg, 6 mths age
  - new group each year for three years
- **Kangaroos:**
  - mainly western greys + few reds
- **Stocking rates:**
  - sheep only: 0.3 to 0.8 sheep per hectare
  - equal no.s of sheep & kangaroos: 0.2 to 0.53 sheep per ha

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Source: Wilson (1991)

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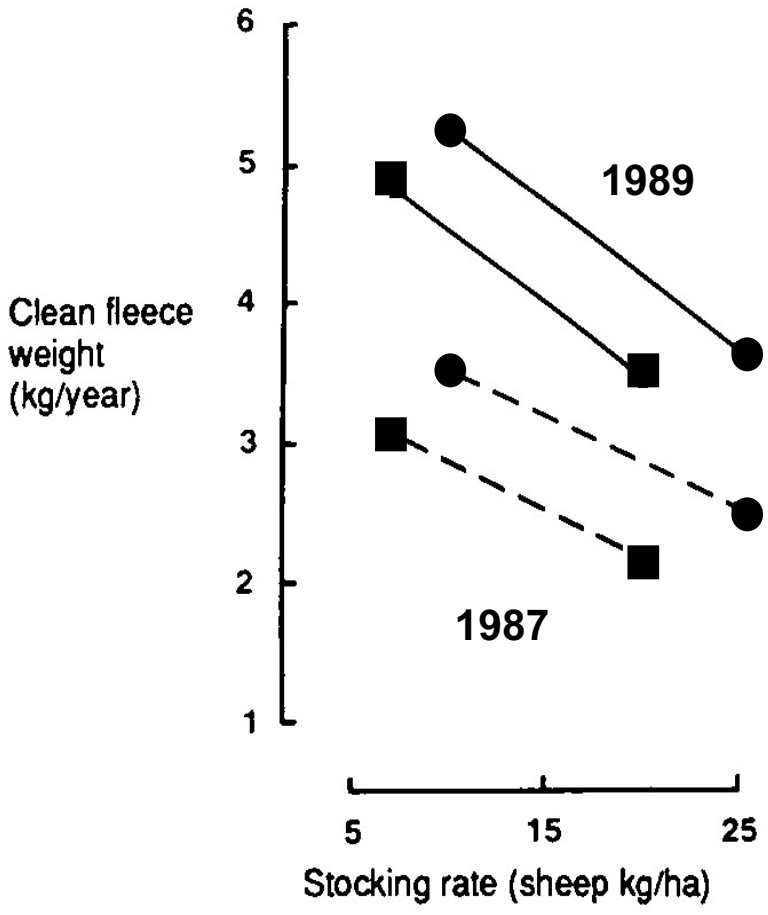
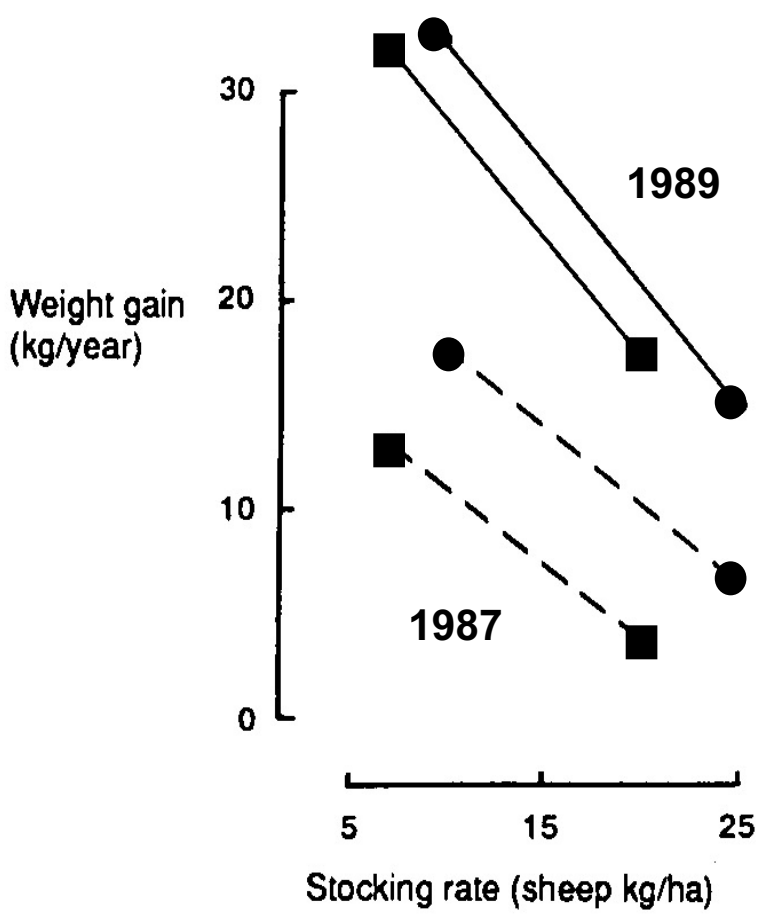
Clean fleece weight, weight gain and sheep stocking rate, with (■) and without (•) 15 kg / ha kangaroo.





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Adapted from: Wilson (1991)

Conclusions

- kangaroos competed directly with sheep, with both animal species consuming the same forage species
- relative effect of kangaroo grazing:
  - on forage removal:
    - 1 kangaroo = 0.75 sheep, of equal weight
  - on sheep production
    - 1 kangaroo = 0.6 sheep, of equal weight
- effects of kangaroo grazing diminished when feed was abundant
- sheep productivity in drier times would be increased by controlling kangaroo numbers

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Source: Wilson (1991)

The characteristics of some major woody plants in the semi-arid woodlands

Species	Forage value	Response to normal grazing pressure	Response to immed. effect of fire
Narrow-leaf hopbush (*Dodonaea attenuata*)	V. low	Increase	Decrease
Green turkey-bush (*Eremophila gilesii*)	Nil	Increase	Decrease
Budda (*Eremophila mitchellii*)	Nil	Increase	Sl. decrease
Turpentine (*Eremophila sturtii*)	Nil	Increase	Sl. decrease
Poplar Box (*Eucalyptus populnea*)	Nil	Stable	Stable

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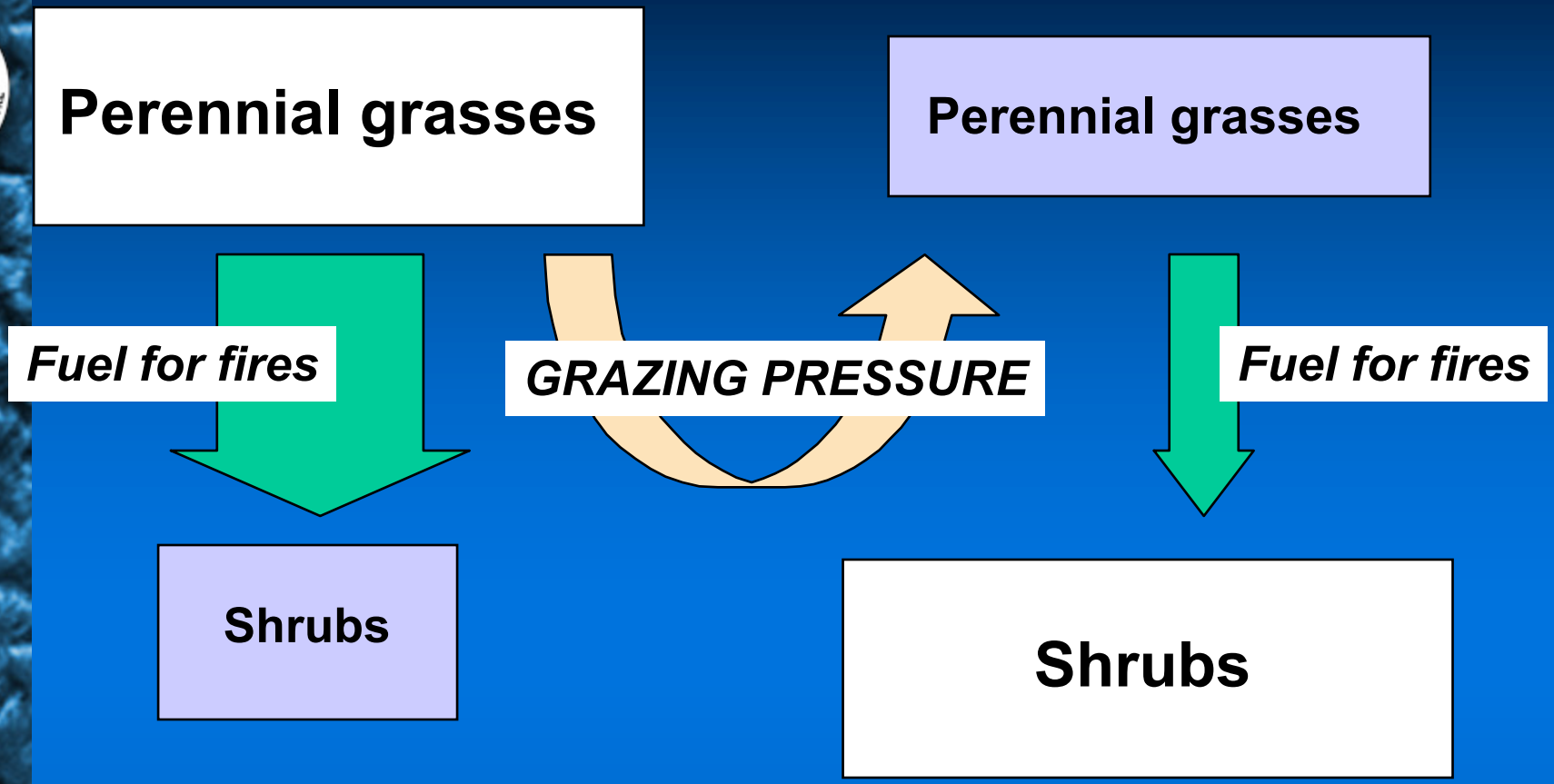
Source: Harrington *et al*. (1984)



- a successful burn requires at least 80 g/m^2 of grass mass as fuel:
  - grazing pressure influences ability to achieve adequate fuel supply
  - rainfall pattern needed for this amount may occur only 1 in 20 years
  - lack of management experience and confidence in use of prescribed fire

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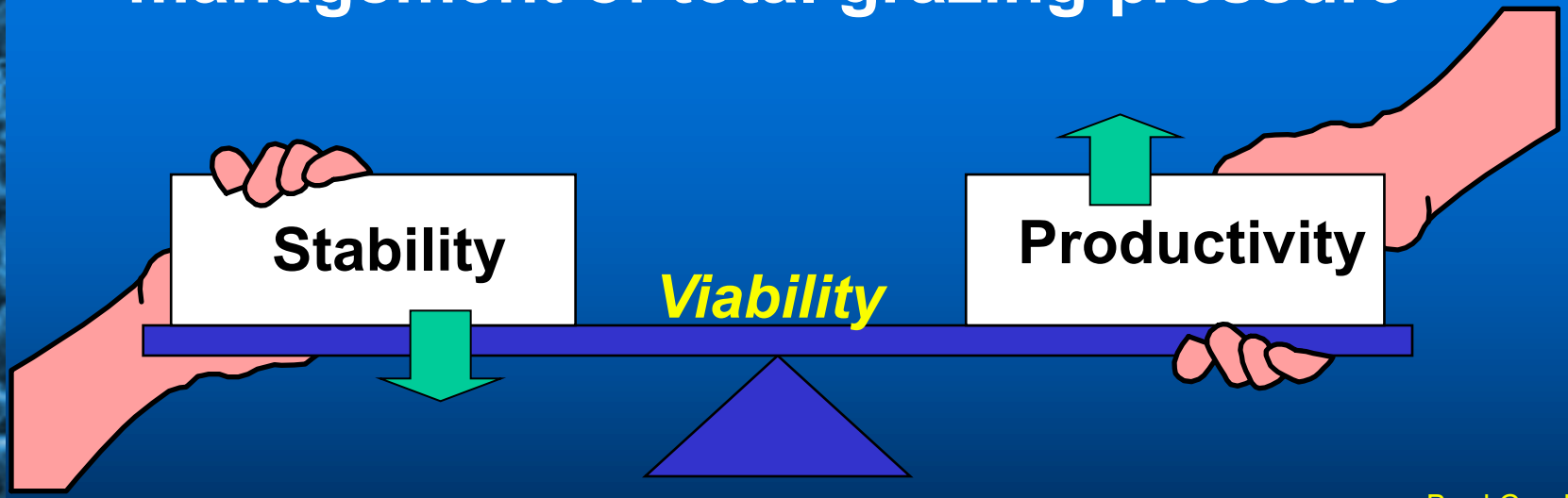
Source: Hodgkinson *et al*. (1984)

Five principles of grazing management of rangelands

- "conservative" stocking
- an appropriate distribution of grazing pressure
- strategically timed spelling
- early destocking in dry times
- management of total grazing pressure



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Source: *Grice (1994)*

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