Grazing as a tool for biodiversity conservation in temperate grassy ecosystems

Native grassland/ Pasture type

	Summer Dec Jan Feb	Autumn Mar Apr May	Winter Jun Jul Aug	Spring Sep Oct Nov
1a) High Conservation Value (HCV) grassland/grassy woodland Very diverse range of native species (60-110) including many grazing sensitive orchids, lilies, wildflowers, sub-shrubs and grasses. Main grasses include Kangaroo, Snow, Weeping and Native Sorghum. Avoid grazing when native forbs and grasses establishing, growing and seeding **1b) High Diversity Native Pasture** Diverse range of native species (40-60) including native wildflowers and legumes. Grasses - Kangaroo, Weeping, Red-leg and Wallaby Grasses. Graze as per 1a) HCV	🚫	SHORT DURATION pulse grazing to reduce bulk, only if native perennial grass sward very dense. Grasses generally more palatable to stock earlier rather than later in this phase or consider burning, slashing/mowing.	🚫	

Native grasses seeding and establishing   **Native forbs germinating and establishing,/seeding**

2 Moderate Diversity Native Pasture Range of more grazing tolerant native species (20-40) including some wildflowers and legumes. Grasses - Red-leg, Wallaby, Spear, Wire. Some exotic annuals	🚫	Pulse graze or rest to maintain high perennial pasture cover and to restrict annual exotics growth and seeding	🚫	Pulse graze or burn every 1-3 years as needed to reduce exotic annuals 🚫

Exotic annuals germinating   **Exotic annuals seeding**

3a) Low Diversity Native Pasture Mostly grazing tolerant native plants (1-20) primarily grasses - Spear, Redleg, Wire. Main grazing in late winter and early spring to reduce exotic annual grasses - Brome, Annual Ryegrass, Silver Grass, Barley Grass, Wild Oats. **3b) Fertilised Native Pasture** Mostly annual exotics (Annual Ryegrass, Silver Grass, Brome, Barley Grass, clover/medics) with some phosphorus and grazing tolerant native grass species such as Wallaby, Weeping and Red-leg. Graze as per low diversity pasture	🚫	Preferably rest to build up perennial native grasses, ground cover and seed reserves. Higher native grass cover will in turn help suppress exotic annuals		Pulse graze or burn annually to reduce exotic annuals 🚫

🚫 = REST: In most years avoid grazing during this period as native forbs are germinating (June/July); establishing and growing (into mid-Spring); with native grasses / forbs flowering and seeding (mid Spring – mid Summer); and native grasses potentially establishing early/mid Autumn.

1a) HCV high forbs (grazing sensitive) / low annuals

1b) Highly Diverse high forbs / low annuals

2 Moderately Diverse Mod forbs /mod annuals

3a Low Diversity Low forbs /high annuals

3b Fertilised Low forbs/ high annuals

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This diagram should be used as a guide only – there is no single 'recipe'. The underlying assumptions are:

- Each site will differ depending on its history; the season, rainfall and temperatures will vary annually therefore the best guide to the management needed *will be the life cycle stage of the target species (is it germinating, growing, flowering or seeding?), the abundance of exotic annuals and the bulk of native grasses*

- Grazing is based on rotational grazing principles:- high intensity & short duration with long rests between to maintain and build-up desirable species, their seedbank persistence and perennial native groundcover; ensure annual grasses are grazed before seedheads emerge

- No fertiliser is being applied and native pasture is low in phosphorus; fertiliser can increase annual and exotic weeds and decrease native species

- Pasture is not stressed by below average rainfall, fire, flood, frost

- Grazing is targeting the herbaceous layer only (although there is more potential for increased tree and shrub regeneration)

- Grazing is only one tool – consider in conjunction, or alternatively using other management techniques eg. fire, nutrient and weed management, slashing, re-seeding and pasture cropping (fertilised pasture only) and/or mowing esp. when grasses less palatable

- For commercial grazed pastures for ongoing production, preferably aim for low stocking rates < 4 DSE (Dry Sheep Equivalent) especially in dry conditions or moderate (4 - 6 DSE) in good seasons, maintain biomass/ dry matter (+1500kg /ha), keep groundcover between 70 - 100% and no fertiliser application

- the native grass and forb germination/establishment periods indicated here reflect ideal germination combinations of temperature and moisture – germinations can also frequently occur at other suitable times of year

This is a simplified diagram - we recommend it is used in conjunction with more detailed management information such as Dorrough, Stol and McIntyre (2008) "Biodiversity in the Paddock: A Land Managers Guide'; Rawlings, K. et al (2010) 'A Guide to Managing Box Gum Grassy Woodlands'; Langford et al (2004) 'Managing Native Pastures for Agriculture and Conservation' NSW DPI; Grassy Box Woodlands Conservation Management Network **www.gbwcmn.net.au**; Communities in Landscapes **www.cil.landcarensw.org.au**; Florabank **www.florabank.org.au**;

Plant common names with (*genus and species*):- Kangaroo Grass (*Themeda australis*), Snow Grass (*Poa sieberiana*), Weeping Grass (*Microlaena stipoides*), Native Sorghum (*Sorghum leiocladum*) Red-leg Grass (*Bothriochloa macra*), Wallaby or White top (*Austrodanthonia* spp.), Spear Grass (*Austrostipa* spp.), Wire Grass (*Aristida* spp.), Brome (*Bromus* spp.), Annual Ryegrass (*Lolium* spp.), Silver Grass or Rat's tail Fescue (*Vulpia* spp.), Barley Grass (*Hordeum* spp.), Wild Oats (*Avena* spp.) Clover/Medics (*Trifolium* and *Medicago* spp.)

Note; 'Pulse' grazing = refers to a high intensity and short duration graze. 'Forbs' = native herbaceous plants (not grasses) such as wildflowers, orchids, lilies, etc

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