



Ecologically Sustainable Grazing

The effect of grazing animals on biodiversity

Much of the clearing of native vegetation that has occurred in Australia has been to create pasture for grazing animals, and this has had a significant impact on biodiversity. Grazing animals can compact the soil, erode riverbanks and introduce elevated levels of nutrients into waterways. Grazing of native vegetation can result in habitat loss, weed invasion and soil erosion. While the consequences of grazing have largely been environmental degradation and biodiversity loss, grazing can be managed to reduce its impact on the natural ecology of the landscape - and in some cases enhance it. There is also increasing evidence that retaining stands of remnant vegetation on farms has a significant economic benefit.

The benefits of conserving native vegetation.

- Trees modify the microclimate, and the shade and shelter they provide can significantly decrease animal stress. Stock suffering from heat stress will stop eating, whereas stock that are too cold will lose energy. Both scenarios result in an overall loss of condition.
- There is growing evidence that soils around trees contain elevated amounts of organic material and a higher nutrient status, thereby promoting pasture growth. Native vegetation attracts native animals, further contributing to nutrient inputs and there is evidence to suggest that trees draw nutrients upwards from deeper in the soil profile, thus making them accessible to under storey vegetation. In many instances, more palatable grass species have been found beneath trees in pasturelands than in the open areas surrounding them.
- Native vegetation provides habitat for native fauna, which can provide excellent pest control through predation. For example, owls are very effective predators of rats, and birds are known to prey on a range of pest insects. Native species can also help to pollinate pasture grasses.

Trees help increase productivity because they lessen the effects of heat and cold stress. When stock are too hot or cold they use up a lot more energy, which results in lower yields.

- Water availability to the understorey is improved as vegetation (especially trees) can intercept atmospheric moisture and contribute water to the soil surface via fog drip. The roots also help to increase the infiltration capacity of the soil.

Native fauna can help control pests as well as helping to pollinate pasture grasses.

- Vegetation helps to bind the soil surface and prevent erosion, thus preventing the loss of valuable farmland especially along stream banks where denuded banks can be completely washed away.



Cow grazing among vegetation. Photo: Mark Bayley

- Stands of native vegetation provide excellent shelter belts. Shelterbelts can significantly increase livestock and pasture production as well as helping prevent topsoil losses by wind erosion. Shelterbelts can increase productivity by up to thirty percent, to a distance of twelve times the height of the trees.
- Reducing tree cover has a short term benefit but in the long term leads to an overall impoverishment of the biology and ecology of the system, which ends up being to the detriment of stock. Native vegetation cover of around 30% has been shown to be the optimal amount of cover in order to yield maximum income from grazing enterprises (Lockwood *et al.*, 2000).

How to minimize grazing impacts on native vegetation

Possibly the simplest and most effective way of protecting remnant native vegetation is to fence it off from stock. This is not always feasible however, and in these instances other methods such as strategic grazing can be used. Grazing can be managed to ensure a continuous, protective groundcover is maintained by considering timing, intensity and duration.

- **Timing.** Heavy grazing when plants are starting their annual growth cycle can weaken them, and is better suited to when plants are dormant or not growing vigorously (usually in winter). When plants are flowering or setting seed they should be left ungrazed in order to ensure that the plants are able to germinate. The potential for erosion, soil loss and compaction are greatest in the rainy part of the year and spelling during these periods will help protect against these effects.
- **Intensity –** Overstocking can result in a loss of vegetation. Careful monitoring of the land is needed in order to assess the impact of grazing stock. Management of grazing intensity can be used to reduce fuel loads in fire risk areas and/or weed invasion. In some instances stock may preferentially graze out weeds while leaving most of the native vegetation, and this can allow natural recruitment to occur.
- **Frequency –** continuous grazing, especially in riparian areas, can result in bare, eroded soils which can eventually become colonized by undesirable weed species. As well as having many environmental benefits, there is anecdotal evidence that rotational grazing can increase productivity in agricultural systems, in some cases stocking rates have been increased by as much as five times the original amount (Owers, G. 2009, WCA).

Restoring biodiversity in grazed wetlands.

Some strategies that can help restore or enhance biodiversity in grazed wetlands include:

- Fencing off wetland areas and providing off-site watering points for stock – this will alleviate the grazing pressure on wetlands and creeks, allowing the natural riparian vegetation to re-establish which will then result in increased bank stabilization and improved water quality.
- Restoring the natural hydrology in areas that have previously been drained - this will improve water quality, reinstate habitat for birds and fish and help to alleviate the effects of runoff from acid sulfate soils. This will also allow the growth of native wet pasture species such as water couch (*Paspalum distichum*), spike rush (*Eleocharis sp*) and mud grass (*Pseudoraphis sp*). These species have been shown to be highly productive and very nutritious stock fodder.



Reinstating a more natural hydrology can result in improved floodplain grazing and restored habitat values, while still providing flood protection. Photo: Clarence Valley Council.

Grazing can be a useful tool for biodiversity conservation, and paddocks sown with native pasture species often support a diverse array of flora and fauna, and can result in fewer health problems for stock than those grazed on improved and fertilised pastures (Dorrough *et al.*, 2004). Grazing strategies such as rotational grazing, seasonal spelling or the inclusion of wet pasture species can benefit biodiversity outcomes just as the protection of biodiversity can benefit farm productivity. Retaining and protecting existing native remnants, and expanding remnant connectivity through revegetation can help to improve both environmental and economic outcomes.

Information Sources:

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Lockwood M, Walpole SC and Miles CA (2000) Economics of Remnant Native Vegetation Conservation on Private Property, LWRDC Occasional Paper, No /00, Land and Water Resources Research and Development Corporation, Canberra

Wilson, McHenry and Nadolny 2006. Trees, soils and grazing productivity. Web address:

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Dorrough *et al.*, 2004. Livestock grazing management and biodiversity conservation in Australian temperate grassy landscapes. *Australian Journal of Agricultural Research*. Issue 55 pages 279-295

Strategies such as rotational grazing, seasonal spelling, using wet pasture species and planting or retaining native vegetation can benefit biodiversity as well as increasing farm productivity.



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