



Australian Brumby Alliance (ABA)

Brumby Resource Information-3.6

www.australianbrumbyalliance.org.au

Brumby Biodiversity Values

Introduction

Grazing has helped shape and develop riparian ecosystems over thousands of years in North America, through the co-evolution of native plants and grazing regimes. The Australian Continent ecosystem was shaped and developed by *Australian Mega Fauna* grazing across the landscape, until their extinction soon after the Aboriginal people came to Australia. The Brumby has worked towards replacing many grazing values lost after Mega Fauna died out.

Brumby Impact Claims

National park literature frequently claims that Brumbies are a threat to national park ecology, however, it fails to identify what proportion is caused by Brumbies (if any), versus damage from other species, at higher population levels, also capable of producing such impacts.

Ecological Forces of Grazing

The ecological forces—herbivory, physical impact, and deposition—of grazing ungulates have shaped natural grazing ecosystems around the world. Grazing ecosystems evolved with and depend upon herbivory, heavy hoof action, nitrogen deposits, and decomposing carcasses of large migratory ungulates. When introduced into ecosystems that did not evolve with frequent grazing, these forces can alter biological communities and ecosystem function. Grazing animals contribute to nutrient cycling by depositing nitrogen-rich urine and dung, and their carcasses can provide an important contribution to the food web and their hoof action, pawing, and wallowing, grazing animals trample plants, break up soil surfaces, incorporate seed into the soil, and compact soils.

<http://www.fws.gov/invasives/staffTrainingModule/methods/grazing/impacts.html>

Brumbies can assist Bio-Diversity

This is not to say that we should not manage overabundant Brumby populations, but that too many of *any* species, including humans, can cause environmental problems. To manage appropriately we need scientifically based research, on *any* factor that may, or may not, result in an impact in order to keep healthy environments and species for future Australian generations to enjoy.

Government, Park authorities and many environmentalists want Wild Horses (Brumbies) to be removed from areas they have lived in for 100-200 years because their homeland is now designated a national park. This Australian Brumby Alliance (ABA) paper, will put forward many ways Brumby grazing can benefit other species, such as birds, butterflies and insects, and that there well may be species that are disadvantaged, if Brumby grazing did not occur.

To manage effectively we need new robust, scientific research - not outdated concepts.

The following information will show how grazing, particularly Brumby grazing at sustainable levels, can increase biodiversity; and that without that sustainable level of grazing, species that are now dependent on Wild Horse grazing will be disadvantaged.

Increased Soil Moisture and Nutrient Content

- Horse faeces contain less thoroughly decomposed vegetable matter than would a ruminant's which more greatly aid in building the nutrient-rich humus component of healthy soils. This leads to better water retention and nutrient level for root absorption. http://www.naturalhorse.com/archive/volume7/Issue3/article_5.php
- Manure from livestock may contribute as much as 35 % of soil organic matter [Steinfeld et al. 1996] and helps maintain soil structure, water retention and drainage capacity.
- Organic components of faeces and urine from grazing animals can build soil organic matter reserves, resulting in soils having increased water-holding capacity, increased water-infiltration rates, and improved structural stability. These changes can *decrease* soil loss by wind and water erosion (Hubbard et al. 2004).
- The passage of herbage through the gut and out as faeces modifies the nitrogen cycle, so that grazed pastures tend to be richer in nitrogen than ungrazed ones. [Ref-7]
- Grazers enhance mineral availability by increasing nutrient cycling within patches of their waste and increasing nitrogen availability to plants (Holland et al. 1992).

Intermediate Disturbance

Connell (1978) *proposed that species diversity was maximised under intermediate levels of disturbance. At low levels of disturbance, diversity is reduced by competitive exclusion, possibly resulting in the dominance of a particular species, desirable or undesirable.* [Ref-4]

The Australian Alps exclusion plots illustrate *competitive exclusion*. The inside of grazing excluded area shows a Bio-mass of tall, dry grasses, with little light reaching the sandy soil below. While outside the exclusion area exists Bio-Diversity that arises from green grass on soil enriched ground that birds and insects can benefit from. The hoof-action of large grazing ungulates can incorporate plant material into soils and increase organic matter. [Ref-3]

How Seeds Spread

Janzen is the researcher who has done the most studies on seeds in horse manure. Among his conclusions are: Seeds are primarily dispersed by gravity, wind, surface water movement, soil erosion, birds, ants, dung beetles and rodents.

Horses are the *least* contributors to weed spread. CalTrans [the California Department of Transportation], logging, mining, construction projects bring in more weed seeds than stock." <http://www.equisearch.com/uncategorized/weed-free-horse-feed/>

The primary vectors of weed seed spread are wind, water, avians, and rodents. There is no documented evidence of the horse spreading weeds.
<http://www.americantrails.org/resources/wildlife/horseenvironment.html>

Benefits to other organisms

- The less-digested faeces also feed the ecological food chain, benefiting many organisms and species from tiny microorganisms to beetles and bugs, worms, birds, rodents, lizards, and larger animals that feed upon these. [Ref-2]
- Animal urine and faeces "recycle nitrogen, phosphorus, potassium and other plant nutrients and return them to the soil". It also acts as rations for insects and organisms found within the soil. These organisms "aid in carbon sequestration and water filtration". Nutrients and organisms, all of which are necessary for soil to be prosperous and capable for production. <https://en.wikipedia.org/wiki/Grazing>

Stimulates Plant Growth [Ref4]

- Proper grazing management can stimulate plant growth, maintain optimal leaf area, enhance nutritive value, remove excessive litter, accelerate nutrient cycling, and manipulate botanical composition (Manske 1998; Manske 2000; Vallentine 1990).
- With the removal of some above ground herbage, the remaining leaves are exposed to greater light intensities, increasing their photosynthetic capacity and stimulating growth. Root growth and processes similarly benefit from the removal of excess forage. Increases in light intensity induce root respiration and nutrient uptake (Manske 1998; Briske and Richards 1995). Grazing can also stimulate plant growth through the removal of apical dominance, causing plants to stool and have secondary tillers, increasing herbage yield and cover. After each defoliation, adequate rest periods are needed to allow for nutrient recharge to maintain the new foliage. *Brumbies provide rotational grazing over large areas and so automatically provide 'rest periods'.* [Ref-2]
- In the tall grass and fescue prairie, excess litter can retard growth in the spring, prevent seedling establishment and decrease forage production (Weaver et al. 1934; Laycock 1994). The removal of excess litter by grazing exposes plants to light and warmer temperatures, increasing herbage yield and cover. [seen in Alps exclusion plots]

Grazing reduces Fire Intensities

- Fire frequency, intensity, and behaviour are dictated largely by type, condition, and quantity of vegetation (DiTomaso and Johnson 2006). Grazing alters fuel-load characteristics by changing plant community composition, structure, and biomass. Altered fuels can change fire-return cycles, fire intensity, and spread patterns. This can result in further changes in plant community composition as fire-intolerant populations give way to fire-tolerant ones. ***Grazing can be used to intentionally manipulate fire fuel-loads in prescribed burning programs*** (DiTomaso and Johnson 2006) [Ref-3].
- Additionally, management in many parks makes use of grazing to help lower fire hazards by reducing the amount of potential fuel, such as large build-ups of forage. When the land is not grazed, dead grasses accumulate. These dead grasses are often a large fire hazard in the summer months. <https://en.wikipedia.org/wiki/Grazing>
- Horse spread their grazing pressure over vast areas, which helps to reduce parched, dry and flammable vegetation and so lower the risk of catastrophic wildfires. [Ref-2]

It is common to use livestock grazing as a means to reduce fire hazards in forests in areas as diverse as those in the Mediterranean, British moorlands, and South Africa. [Ref7]

Effects of Grazing on Invasive Plants

Proper grazing management can promote desirable vegetation and reduce invasive plant populations. <http://www.fws.gov/invasives/staffTrainingModule/methods/grazing/impacts.html> [Ref-3].

Grazing can also be used as a control mechanism for invasive and undesirable species, while *removal of grazing may not improve the competition balance/relationship for native plants* [Ref4].

Grazing benefits small selective herbivores [<https://en.wikipedia.org/wiki/Grazing>]

Many small herbivores follow larger grazers, who skim off the highest, tough growth of plants, exposing tender shoots. Livestock grazing encourages plant growth, consequently increasing forage production. The grasses that are stimulated through grazing provide a habitat for many species. When grass is grazed, the dead litter grass is reduced and allows for the birds to utilize it. Just as importantly, it increases species richness. When grazing is not used, many of the same grasses grow, for example, brome and bluegrass, consequently creating a monoculture. Although grazing can be problematic for the ecosystem at times, it is clear that *well-managed grazing techniques can reverse damage and improve the land*.

New Emerging Concepts to Consider

Niche construction - considers the evolutionary consequences of ecosystem engineering and the coevolution between organisms and their environment. Niche constructors can enable other species to live in otherwise physically stressful environments by providing critical resources such as moisture, shade, favourable soil chemistry and refuges (Crain and Bertness, 2006). As cultural processes typically operate faster than natural selection, Laland and colleagues concluded that cultural niche construction is likely to have more profound consequences than gene-based niche construction. [Ref-5]

The disappearance of key niche constructors may lead to abrupt changes in the resources and selection created by them, greatly affecting other species. Populations that have become dependent on engineered habitat and resources may be unable to cope with the loss, leading to further declines in biodiversity and ecosystem functioning. [Ref-5]

Picking the battles - The world needs to rethink its approach to conservation if it is to save nature from a looming wave of extinctions. Government organisations often have only one goal for restoring threatened species: to reduce the main threat. However the focus on threats can be wasteful, inadequate and may even push threatened species closer to the brink. [Ref-6]

Traditional threat-focused approaches have a number of drawbacks, such as; [Ref-6]

- They limit conservationists to solving only one part of the problem;
- can be expensive compared with alternative management choices; and
- may have undesirable outcomes if the threat being targeted is only one of a suite of problems affecting the wildlife in an area, for example; removing the threat of foxes may open up Australian mammals to new threats, such as cats. Credit: DPIW Tasmania.

It is important to consider all the threats, what else lives in the area, whether the threat is stoppable, the costs of alternative conservation actions and how likely they are to succeed. The issue is that reducing threats isn't a biodiversity outcome on its own. Prioritising threats rather than solutions leads us to cling to a single goal — and miss the big picture. [Ref-6]

Benefit sharing, livestock production can play an instrumental role, for example, in supporting sustainable rangeland management, preserving wildlife and other forms of biodiversity, enhancing soil fertility and nutrient cycling, and in directly promoting the amenity value of particular landscapes to other users. A wealth of evidence exists to support the view that light or moderate grazing by livestock increases rangeland productivity in many grazing systems. For example, removal of coarse, dead stems permits succulent new shoots in species such as *Themeda triandra* in African savannahs. [Ref-7]

Conservation Grazing

Conservation Grazing has emerged over the past 10 years and is now used in many countries, for example; England, France, Spain, Russia, Poland and America. Here are some examples;

- There is wide acceptance that grazing wetland sites can be a valuable tool in creating the right conditions for certain species to thrive. [Wicken Fen NNR/Carol Laidlaw][Ref-8]
- Livestock grazing is essential for the management of many of England's important wildlife habitats. Grassland, heathland, wood pasture, floodplain and coastal marshes all require some grazing to maintain the structure and composition upon which a variety of plants and animals depend for their survival. Livestock grazing plays a key role in maintaining species-rich habitats by controlling more aggressive species which would otherwise dominate these areas and by preventing scrub encroachment. [Ref-9]
- Ponies preferentially graze grasses and generally avoid eating flowering plants, allowing them to thrive and multiply. <http://www.wildlifetrusts.org/conservationgrazing>
- In the absence of grazing, open spaces will lose their rich diversity of plants and animals. Small fragile flowers and grasses will disappear as aggressive and competitive woody plants out-compete them for water and sunlight. [Ref-10]
- Ponies are ideal for conservation grazing on heath and moorland. On wet grassland and wetlands, pony grazing is critical to maintain open, tussocky vegetation on which many rare species depend. Ponies instinctively avoid deep boggy areas and negotiate difficult terrain with ease. To find out more email admin@dpht.co.uk

Brumbies would have done this slashing job for Parks Victoria, at no charge...



Parks Victoria sign referring to their 'slashing' program
(Photo taken early 2014)

This is one of many examples where the Brumbies could have saved tax paid dollars.

So many times we see national park staff, who are already thin on the ground, having to both pay and organise tasks that were automatically carried out before the land became a park.

When will Australia start to seriously review and trial new learning on Conservation Grazing?

References

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<http://www.wildhorsepreservation.org/media/horses-majestic-animals-helping-our-environment>

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4 - <http://www.agr.gc.ca/eng/science-and-innovation/agricultural-practices/soil-and-land/riparian-areas/grazing-a-natural-component-of-grassland-ecozone-riparian-systems/?id=1220563603657>

5 - **Niche construction, co-evolution and biodiversity.** Laland, K.N., Boogert, N.J., Niche construction, co-evolution and biodiversity, Ecol Econ (2008), doi:10.1016/j.ecolecon.2008.11.014

6 - **Why picking our battles helps save our species** Viv & Ayesha Tulloch, ABC Environment 30 Apr 2015 <http://www.abc.net.au/environment/articles/2015/04/30/4226211.htm>

7 - **When Livestock are good for the environment: Benefit-sharing of environmental goods and services** - Robin Mearns

8 - Carol Laidlaw is the **conservation grazing warden** working at Wicken Fen for the National Trust. Contact: National Trust, Wicken Fen NNR, Lode Lane, Wicken, by Ely, Cambs CB7 5XP; e-mail: carol.laidlaw@nationaltrust.org.uk; website: www.wicken.org.uk.

9 - **English Nature** is the Government agency that champions the conservation of wildlife & geology throughout England. This is one of a range of publications published by: External Relations Team English Nature Northminster House Peterborough PE1 1UA www.english-nature.org.uk
Additional information Craig Downer http://www.naturalhorse.com/archive/volume7/Issue3/article_5.php

10 - **Conservation Grazing** contact: Cathy Wainwright, The Wildlife Trust, Lings House, Billing Lings, Northampton, NN3 8BE Telephone: 01604 405285 Email: cathy.wainwright@wildlifebcnp.org

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