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‘Rangeland Self Herding’ - positively influencing grazing distribution to benefit livestock, landscapes and people

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Abstract

Positively influencing the grazing distribution of livestock will have benefits to productivity and landscape function. A behaviour-based approach, termed Rangelands Self Herding (RSH), is being tested and explored across locations in the Western Australian rangelands. RSH draws on a wealth of scientific research with seven guiding principles. Practical tools and tactics are being implemented that are locally adapted to suit the environmental conditions and management goals of each situation. RSH is improving the way livestock use the landscape and interact with humans.

Introduction

Landscape function in the rangelands is affected by the behaviours of livestock and other animals, and flow-on plant-soil interactions. Livestock are the key variable that managers can manipulate to enhance these interactions. To obtain adequate rest and recovery, grazing distribution needs to be guided (Williams, 1954; Hunt *et al.*, 2014), using behavioural approaches. Grazing patterns, although complex, are not random neither are they fixed. Foraging patterns are formed by associations between cues and consequences, individual and social learning, animal responses to familiarity and novelty, and spatial memory (Launchbaugh and Howery 2005).

How Rangelands Self Herding is different

Conventional methods to manage grazing distribution include the location of water and positioning of fences. RSH provides a third approach that deviates from convention by guiding animals via choice rather than exclusion or restriction. RSH is developed for pastoralists and livestock managers and integrates behavioural science, animal nutrition and ecology. The immediate payoffs for pastoral enterprises include gaining the benefits of more controlled and intensive grazing without increasing management intensity or infrastructure, improved monitoring and flexibility, and livestock that initiate more exploratory grazing behaviours. RSH provides practical, low-cost options for pastoralists that are suited to individual needs and local conditions. This is leading to less over- and under-utilisation of areas because animals are influenced to occupy and graze in areas that the manager chooses to impact. RSH also offers ways to implement year-round musters so that managers can vary their stocking rates as feed availability changes in the highly variable environments of the rangelands. This enables flexible responses to changes in weather, ecosystems, markets, animal welfare and business factors that are not normally possible in pastoral areas.

Principles of Rangeland Self Herding

The seven principles of Rangelands Self Herding are:

1. *Human-animal interactions shape outcomes.* In adaptive systems, the relationship between humans and livestock is critical in achieving favourable results in a timely fashion.
2. *Internal feedback sets behaviours.* Animals start an eating behaviour if they expect a reward; sight, sound and smell cues, both natural and contrived, can be used to influence that behaviour. They continue the behaviour if they receive the reward because it provides positive feedback that reinforces the initial behaviour (Ginane *et al.*, 2015).
3. *Experience reinforces behaviour.* Past experience is a major factor in determining current behaviours, including dietary choices and habitat selection. However, unwanted behaviours can be replaced by encouraging new behaviours that establish a new set of experiences.
4. *Animals seek diet diversity.* Different plants bring different nutrients from different soil depths at different times. Livestock perform better when there is diversity, but they must learn how to use it (Masters *et al.*, 2010; Fynn, 2012).
5. *Adaptability is required to face change.* A wide range of experiences prepares animals for a range of future circumstances. Exposure to different feeds and forages *in utero* and pre-weaning can have important long-lasting consequences (e.g. Chadwick *et al.*, 2009; Digby *et al.*, 2010). Continued learning from experienced peer animals (e.g. Thomas *et al.*, 2009), with low levels of stress (Villalba *et al.*, 2009), can help animals manage further changes.
6. *Individuals and groups influence each other.* Individuals need to experiment with, and learn about, all the resources where they live. Individuals shape the behaviour of a group, but so too does group behaviour influence individual responses; it's a dynamic relationship that acts continuously in both directions (Smith *et al.*, 2010; Tanner and Jackson, 2012).
7. *Consequences are broad as everything is connected.* Livestock behaviours affect other parts of the system: soil, plant communities, predator behaviour, and other animals in the landscape (Provenza *et al.*, 2003). Being aware and observant to this can create opportunities for multiple benefits.

Application of Rangelands Self Herding

Livestock managers using RSH are influencing grazing distribution using the capacity of grazing herbivores to learn and modify foraging behaviours. Pastoralists in the Gascoyne, Pilbara and Kimberley regions of Western Australia are participating in a range of practices that draw on the above principles and made relevant to suit their local environment and management. Local adaptation is essential, as it allows for the unique conditions of each enterprise and location, including livestock characteristics, vegetation patterns and management goals (Provenza, 2008).

Pastoralists are using RSH for wide range of reasons, including:

(i) Encouraging animals to voluntarily choose to stay on a small area of unburnt country after a large wildfire;
(ii) Retaining cattle on a water point that had been underutilised, and thereby reduce grazing pressure near a river;
(iii) Triggering the movement of cattle from one land system to another within a large paddock;
(iv) Aiding the movement of livestock from one water point to another with minimal risks;
(v) Increasing mustering efficiency by changing livestock behaviour and responses to interactions with humans;
(vi) Creating opportunities for more frequent harvesting of livestock between musters, which can greatly assist in matching feed supply and demand and in marketing cattle during the year;
(vii) Aiding paddock rehabilitation by controlled impact with short-duration, high-intensity grazing, and;

(viii) Increasing the adaptability of livestock relocated from the rangelands to agricultural properties or to feedlots.

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