Addressing feed supply and demand through total grazing pressure management

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Abstract

Less than half the herbivory in Southern Australian Rangelands is managed by pastoralists. While livestock management which rotationally graze paddocks and allows effective rest and recovery of pastures can maintain higher levels of feedbase and ground cover as well as increasing floristic diversity and perennial grass content, these benefits may be reduced by unmanaged herbivory.

The quantity and quality of forage available in the rangelands for all herbivores is frequently low, and as seasonal conditions deteriorate, there is direct competition between managed and unmanaged species for forage. With an expected long-term increase in the frequency of variable seasonal conditions, negative impacts of unmanaged herbivores will likely be exacerbated in particular environmental impacts. This will subsequently impact on short and long term production and threaten the social licence to operate for livestock industries.

While views on the cost of unmanaged herbivores to the pastoral business are contested, there is a need for R&D to identify production benefits and cost effective management options for total grazing pressure management. Early detection of an impending imbalance between feed supply and demand will mitigate negative environmental impacts. Verification of minimal negative environmental impacts and the ability for the red meat industry to demonstrate continual environmental improvement through the management of total grazing pressure will enable a defensible case for the increasing social licence of the red meat industry.

Executive summary

Total grazing pressure (TGP) influences the demand for forage by all grazing animals (both domestic and non-domestic) relative to forage supply. Successful rangeland management relies on managing grazing pressure from non-domestic herbivores, adjusting livestock numbers in response to available feed and strategically resting pastures. A central tenet in TGP management is achieving the balance between supply and demand for feed, and avoiding an imbalance occurring when feed demand exceeds feed supply. This imbalance can be detrimental to livestock productivity and animal welfare and damage resource condition.

Despite the past R&D in TGP management and the recent uptake of exclusion/TGP fencing across some areas in the Southern Australian Rangelands there is a gap in knowledge for viable TGP management options for maintaining or improving livestock production and resource condition. In addition, there is an inability to identify when an imbalance between feed supply and demand occurs. Industry knowledge and technical expertise is currently fragmented across different jurisdictions preventing the sharing of information. This current operating environment of the Southern Australian Rangelands is precluding the capacity for industry to make informed decisions about cost effective, practical solutions for TGP management. An inadequate understanding of TGP management solutions is preventing sustained productivity growth and threatens the pastoral industries ability to adapt to climate variability through the effective management of all herbivores.

This project used a coordinated approach at the national level to capture common issues in TGP management. It was undertaken as a partnership between four states (Queensland, New South Wales, South Australia and Western Australia). This ensured national and regionally relevant
Information and context was captured on TGP impacts, opportunities and management and to identify key knowledge gaps, providing an opportunity to deliver production gains to more than 1.9 million km² of Australian rangelands.

A key feature of this project was to ensure a synthesis of information drawn from science and practice. Consultation at the regional level was undertaken to capture local knowledge through a formal industry and stakeholder survey (n=266) across the Southern Australian Rangelands. The project design was able to identify existing and new regional producer networks, scientists and extension agencies to identify a community of practice to support future MLA Research, Development and Adoption (RD&A) in TGP management. Our approach aimed to strengthen the ability for MLA to target RD&A investment with the greatest benefits at property and regional scales and outline opportunities for RD&A co-investment.

There were three project objectives:

i. Undertake a review of literature and expert opinion (featuring producer experiences) to quantify the impacts of TGP management on primary production, natural resources and identify relevant knowledge gaps.

ii. Develop a TGP knowledge database of current knowledge and industry relevant information.

iii. Deliver a RD&A Investment Plan and Prospect Statement for investment

This project will support economically defendable production and environmental stewardship practices for the sheep meat and grassfed beef industries. The review of literature and supporting bibliography will serve as foundation information for regional NRM bodies on TGP management. The Investment Plan aligns to the Australian Beef Sustainability Framework which aims for continual improvement in production and environmentally sustainable practices. The implementation of the Investment Plan will have short-term benefits for livestock businesses and long-term benefits such as increased economic earnings for the industry and positive natural resource outcomes.

Key findings and recommendations

There were three investment priorities identified and six specific R&D activities which need to be implemented together in the one “Addressing feed supply and demand through total grazing pressure management” program.

Each of these themes are to be implemented where unmanaged herbivory is highest in areas protected behind the National Dog Fence (QLD, NSW and SA) and where there is an unprecedented opportunity to manage TGP across extensive areas with exclusion and TGP fencing in south west QLD and western NSW.

1. Increasing the technical capacity for industry to manage all herbivores

1.1 Assessing feasible solutions to identify an imbalance between feed supply and herbivore demand.
1.2 Pilot and validate a tool to predict paddock scale hot spots and hot times for herbivore activity

2. **Realising the production and environmental benefits of total grazing pressure management**

2.1 On-farm benchmarking of production and environmental value of TGP management

2.2 Establishing a mechanism for trading and delivery of environmental services for the red meat industry

3. **Ensuring the widespread adoption of evidence-based, effective total grazing pressure management**

3.1 Establishing a network of industry co-learning sites.

3.2 Identification and demonstration of cost effective TGP management options

In addition a fourth investment priority has a policy focus and is required to ensure legislative requirements to control wildlife recognise the need for pastoralists to undertake control of kangaroo populations in a timely, effective and humane manner.

4. **The legal capacity for industry to manage all herbivores**

4.1 National task force to co-ordinate and develop TGP management policy
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1 Background

Globally, the management of grazing intensity has been identified as a major factor in rangeland degradation (Rutherford et al. 2012). Where grazing intensity is high and prolonged, there are negative impacts on sustainable production, biodiversity (Cowie et al. 2011) and soil carbon (Pineiro et al. 2010). However, there are inconsistencies in the literature on the role of grazing management in sustainable production of food and fibre and in the restoration of degraded, unproductive areas. These inconsistencies are due in part due to the grazing system used (Teague et al. 2015) but also by failing to account for the additional grazing pressure from native and feral animal herbivores which can effectively double the grazing pressure from domestic livestock (Bastin 2012).

A recent comprehensive Australian study suggests that livestock grazing is unlikely to produce ecosystem benefits in Australian rangelands and non-domestic herbivores have no effect on ecological functions and biodiversity of these regions (Eldridge et al. 2016). This suggests extensive pastoralism remains the major contributing factor to land degradation in these areas. However, increased perennial ground cover and plant diversity have also been associated with total grazing pressure (TGP) management which combines long periods of pasture rest (Waters et al. 2016) and is supported by further studies in the USA (Teague et al. 2015). Anecdotal evidence from pastoralists suggest benefits to feed supply and increased lamb survival may result from the use of TGP exclusion fencing and predator-proof fencing respectively. These benefits have been recognised in some states through significant recent and planned future incentive funding programs, particularly in western Queensland ($10-15 million) and NSW ($12 million).

TGP management activities vary from culling and harvesting undomesticated animals, water point control and management, exclusion fencing (boundary, internal and cluster) and implementing grazing management to provide strategic periods of rest often as integrated approaches. While there is increasing uptake of these methods, information on costs and benefits to feed supply, the impacts on resource condition and livestock production are largely un-documented. Currently, there is considerable, industry-based requirement for understanding the impacts of TGP management, particularly the costs and production benefits, but also landscape-scale impacts which have been difficult to monitor across large pastoral properties. This is particularly urgent given the increases in investment of large areas of exclusion type fencing in some regions. Industry and NRM bodies require information on the impact of TGP management on ground cover within and outside TGP managed areas, and the implications of the redistribution of grazing intensity for ground cover, plant diversity and animal welfare is of broader concern to the livestock industries and the public to retain the social licence to operate for Southern Australian Rangelands.

2 Project objectives

The major objective of this project was to deliver a RD&A Investment Plan and Prospect Statement to support ongoing TGP management in southern Australian Rangelands. This investment plan was underpinned by a review of literature. Specifically, the project was to:
i. Undertake a review of literature and expert opinion (featuring producer experiences) to quantify the impacts of TGP management on primary production, natural resources and identify relevant knowledge gaps for southern Australian rangelands.

ii. Develop a TGP knowledge database of current knowledge and industry relevant information.

iii. A Prospect Statement and RD&A Investment Plan

3 Methodology

A systematic review was undertaken capturing published and unpublished information with an emphasis placed on reliable information with relevance to practical strategic decision making by pastoralists and other stakeholders. Specifically, the review addressed:

- Regional situation statements which compiled data from state-based monitoring programs and research to identify temporal and seasonal patterns of TGP (livestock, kangaroos and goats)
- The main issues associated with the management and non-management of TGP (production, economic, and resource)
- Implications for production (including grazing system; biomass, pasture utilisation, strategic rest and feed quality)
- Differences in grazing behaviour and diet selection of different herbivores
- The condition of natural resources (ground cover, perennial grass cover and establishment and species diversity)
- Range of practices used for managing TGP
- Compilation and evaluation of existing and emerging technology product (GIS and digital-based technologies) that may inform TGP management decisions.
- Regional-specific needs for information and adoption of TGP management options.

There was an emphasis in the review to marry the science with stakeholder views and needs identified through a survey of land managers (n=219) and service providers (n=47) across the Southern Australian Rangelands. The information from the review was then synthesised into a report that identifies specific key issues and knowledge gaps which supported the development of the Investment Plan and Prospect Statement.
4 Results

4.1 Review of literature and information database

This review (Attachment 1) aimed to understand the Research, Development and Adoption (RD&A) requirement in the Southern Australian Rangelands for total grazing pressure (TGP) management.

The major findings were:

**Most TGP is unmanaged in southern Australian rangelands**

- On average, less than half the herbivory in the Southern Australian Rangelands is managed by pastoralists. Recent estimates suggest that a total of 28.93 million DSE are currently grazing these areas, of which 15.57 million DSE are unmanaged Macropods and goats and 13.36 million DSE or about 45 percent is livestock.
- Unmanaged herbivory is highest in areas protected behind the National Dog Fence, areas where most of the sheep in the Southern Australian Rangelands are now grazing. In some areas beyond the National Dog Fence, there is still an issue in managing significant numbers of unmanaged Macropods which are competing with cattle for forage.
- The quantity and quality of forage available for all herbivores within the Southern Rangelands is frequently low and as seasonal conditions deteriorate, it is more likely that direct competition will occur between managed and unmanaged species for forage. With an expected increase in climate variability, periods of competition between herbivores may become more common, leading to a further decline in the natural resource base. This will subsequently impact short and long term production and threaten the social licence to operate for livestock industries. This will be most apparent when high densities of herbivores coincide with periods of low rainfall.
- Livestock management involving rotational grazing of paddocks allows effective rest and recovery of pastures. This can increase ground cover, floristic diversity, perennial grass content and long-term soil organic carbon levels. While various forms of rotational grazing and pasture spelling are being practiced by land managers, grazing by Macropods in particular can reduce the benefits pastoralists may gain from early destocking and resting pastures.
- Land managers obtain little or no benefit from grazing Macropods, and there are contested views on the cost they impose upon the pastoral business through both impacts on resource condition and feedbase quantity and quality.

**Recent and current investment in TGP management**

- In NSW from 2004 to September 2012, the Western CMA invested approximately $9.4 million in some 284 projects involving TGP management (largely feral goat management). Western Local Lands Services has continued to invest in direct on-ground grants to landholders with the objective of improving natural resource outcomes. The 2014 TGP Project committed $2.8 million to 58 landholders to erect 1005 km of TGP fencing, 42 trap yards and undertake grazing management plans.
The project objective is to ‘... increase productivity, native vegetation and soil health by reducing total grazing pressure, particularly of unmanaged goats’. Conservative estimates suggest at least 1 million hectares in western NSW are currently being managed within TGP fencing either through incentive funding or within carbon farming areas.

- Seven Collaborative Area Management or ‘cluster’ groups have been formed as part of a South West NRM, QLD state government funded initiatives. These groups of land managers came together and formed associations, allowing them to purchase fencing materials at a reduced cost. These groups then built exclusion fences surrounding their properties, helping each other and sharing fencing equipment. Once these fences are completed, the groups will work to mitigate shared issues within the clusters. Some of these issues include unmanaged herbivores which apply an unsustainable grazing pressure and wild dogs that predate on livestock.

- The Collaborative Area Management project aims to increase livestock diversity on properties, allowing land managers to continue with or return to sheep enterprises. The sheep and wool industry can then benefit local towns through increased production. Our best estimates suggest that approximately 7 million hectares in SW Queensland are now managed within cluster fencing.

- Anecdotal evidence suggests both TGP and cluster style fencing continues to be erected independent of incentive programs in NSW, Queensland and WA. Motivation for exclusion fencing is primarily occurring to protect livestock from wild dogs but also excluding goats and Macropods.

Future needs

- Despite the requirement for land managers to manage the natural resource on pastoral leases or freehold land to at least maintain resource condition, an inability to control the unmanaged herbivore populations precludes effective rest and recovery of pastures. Land managers are prepared to tolerate some forage demand from unmanaged herbivores but in some areas, view the current populations of unmanaged herbivores is placing unprecedented demand for forage which is negatively impacting pastoral businesses and the resource base. In addition, there is a view that this TGP exaggerates the effects of drought and accelerates the negative impacts on resource condition.

- The uptake of fencing provides an unprecedented opportunity to manage TGP across extensive areas of south west QLD and western NSW but as yet there is limited direct evidence of benefits to resource condition and primary production beyond financial benefits from reduced dog predation.

- In recent years, practical non-lethal, non-fencing methods to influence livestock grazing distribution have been developed in Western Australia, referred to as Rangelands Self-herding and are currently being evaluated but is virtually unknown in Southern Australian Rangelands.

- Despite a range of other TGP management options (including re-introduction of the dingo and guardian animals) no comprehensive economic analysis of the cost-
effectiveness of various TGP management options or the impacts on resource condition has been undertaken.

- Government surveys on changes in Macropod and goat populations employ different methods as well as information being fragmented across jurisdictions making a defendable, reliable assessment of TGP for the Australian red meat industry difficult. These surveys are also undertaken at temporal and spatial scales that preclude land managers making timely decisions to respond to TGP.
- Southern rangeland land managers are vulnerable to the consequences of unmanaged TGP with an inability to identify temporal and spatial changes in herbivore distribution at a paddock scale and to assess the consequences to feedbase and resource condition. There is an absence of technology products for land managers to provide this information which can underpin management decisions. The ability to quantify the proportion of TGP which is domestic livestock and unmanaged herbivores and the impact of unmanaged herbivores on resource condition, forage availability and financial returns is required to allow land managers to determine how much to invest in control of unmanaged herbivores.
- To improve TGP management early warning of when an imbalance between forage supply and forage demand is imminent is required.
- Changing consumer preferences are dictating that the red meat industry is able to demonstrate production system practices that use natural resources wisely as well as care for animals. The red meat industry also needs to respond to global expectations for sustainable development and mitigation of climate change. The management of total grazing pressure provides an opportunity for southern rangeland pastoral industries to increase livestock productivity, meet changing consumer preferences for sustainably produced meat and fibre and maintain its social licence.

### 4.2 RD&A Investment Plan

The RD & Investment (Attachment 2) for total grazing pressure management in the Australian Rangelands aims to deliver sustained productivity growth and enable the pastoral industry to respond to changing market preferences and community expectations for the wise use of natural resources. This plan will allow the industry to be better equipped to adapt to drought and climate variability through the effective management of all herbivores.

The Investment Plan also aims to allow red meat production in the Southern Australian Rangelands to verify minimal negative environmental impacts and demonstrate continual environmental improvement. Over time, this will enable a defensible case for the increasing social licence of the red meat industry.

The Investment Plan targets SE Australia for two reasons; the unmanaged herbivory is highest in these areas and there has been large scale uptake of fencing to exclude or manage TGP offering the greatest opportunities for potential production and environmental gains to be made through this early adoption. Stakeholder survey results revealed that kangaroo management and fencing may offer the greatest impact on TGP management over the short term. As such, a network of sites to demonstrate and validate the impacts (economic and resource condition) of alternative TGP
management options through multiple paddock contrasts (inside/outside fenced areas) to evaluate traditional (water point management, culling) as well as emerging management (self-herding, fencing) to be compared. Because the network of sites will be established in a co-learning environment, local pastoral groups will have autonomy over determining locally relevant TGP management options to evaluate as well as implementing adaptive livestock management.

By 2024 the investment plan aims to:

• provide the means to quantify current total grazing pressure impacts by developing a predictive tool that identifies density/damage functions to inform proactive management decisions;

• Raise awareness of 1,500 land managers (~25 percent of the pastoral industry of Southern Australian Rangelands) of cost-effective total grazing pressure management;

• Directly engage 2000 landholders in co-learning and information exchange activities;

• Have 100 landholders contributing meta-data to the R&D program; and

• Establish a network of RD&A co-learning and monitoring sites within six nodes across three states (QLD, NSW, and SA).

4.3 Prospect Statement

The Prospect Statement (Attachment 3) outlines a vision for the industry to deliver sustained productivity growth which has responded to changing market preferences and community expectations.

5 Discussion

5.1 Project steering committee comments

The project steering committee raised some important additional considerations for the Investment Plan. Firstly that ‘tool’ or technology product proposed to be developed to assess an impending imbalance between feed supply and demand will not solve the TGP problem but provide a mechanism by which a livestock management decisions or e.g. kangaroo management decisions can be made. As such, the application or the use of the information provided by the ‘tool’ within the livestock management context is of central importance. Secondly, the tool needs to be simple to use and co-developed with industry to ensure its relevance which can be achieved through iterative user group development. The Investment Plan outlines user group validation of the ‘tool’ that would allow for such iterative development of the ‘tool’.

5.2 Social acceptability of pest animal management in meeting TGP targets (B.TGP.1701)

Project B.TGP.701 was undertaken at the same time as the current project (B.TGP.702). Two major recommendations from project B.TGP.701 were to ensure an industry code of practice for non-
commercial kangaroo was developed and promoted and that the consequences of exclusion fencing as well as the humaneness and effectiveness of other TGP control practices be examined. The network of TGP management sites suggested as part of our investment recommendations will provide a mechanism to develop an industry acceptable code of practice as well as an assessment of animal welfare issues associated with various TGP management options. We see that it is essential to understand how animal welfare standards can be maintained within the context of alternative TGP management options.

5.3 NSW Kangaroo Management Task Force and NSW Interagency Kangaroo Working Group

In NSW a Kangaroo Management Task Force has been recently set up. This is a multi-stakeholder advocacy platform which aims to influence politicians and the general public on alternative perspectives for kangaroo management. In addition a high level, intergovernmental Working Group (chaired by Western Local Land Service) was formed in mid-2018. Between both groups they have been influential in recent changes to streamline the non-commercial kangaroo cull. These changes include reducing administrative red tape to allow faster approvals for culling as well as increasing the number of kangaroos that can be culled. This will ultimately enable land managers to be more responsive in managing local kangaroo populations than has been previously been possible. Some of these efficiency measures include removing the need for physical tags; increasing the number of non-commercial shooter licences and connecting landholders to experienced commercial kangaroo harvesters (addressing animal welfare concerns). Our understanding is that these changes are to be implemented in August/September 2018 as part of the NSW Government 2018 Drought Support measures. This model of government agencies to working together to respond to issues associated with kangaroo grazing pressure may be applied in other states under Sub-program 4 of the Investment Plan with a National Kangaroo Management Task Force.

However, there remains a lack of understanding of the impact of kangaroo populations on natural resource condition. While a Kangaroo R&D project team has also been established as a result of the NSW Task Force which may ultimately address this issue, there is a requirement to address both public perception as well as R&D to support TGP management. That is, public recognition of the requirement to manage kangaroo populations at a farm scale needs to be based on animal welfare, resource condition as well as impacts on farm enterprise profitability. Each of these issues are required to be addressed simultaneously rather than as discrete bodies of R&D and as such the four sub-programs described in the Investment Plan each need to be implemented as a program of R&D. For example, building an early warning ‘tool’ which indicates an impending imbalance between feed supply and demand will be of little utility value if policy related issues are unresolved for a land manager to respond by managing all herbivores.

6 Bibliography


7 Appendices

Appendix 1.

Appendix 2.

Appendix 3.