



Grazing BMP self-assessment Grazing land management

Northern Australian module



CARING
FOR
OUR
COUNTRY



Self-assessment – Grazing land management

Grazing land management is about managing the pastures and the number, type and location of grazing animals on your property to optimise pasture growth and composition, and animal production. It considers the property as a whole and seeks to reduce the threats posed by land degradation, erosion, weeds and pest animals, as well as safeguarding and enhancing biodiversity across the property.

Grazing land management starts with an understanding of your land, its inherent capabilities and its current condition. With this information, decisions can be made about how to manage the various land types and how to improve grazing land condition (subsequently referred to as land condition) in vulnerable areas. Monitoring land condition over time will reveal how the management strategies are contributing to the land's improvement or degradation.

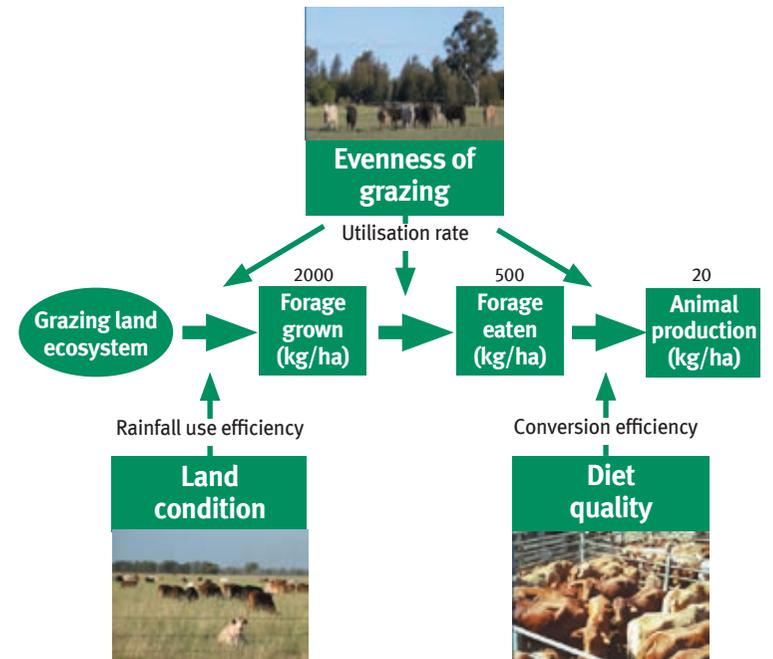
The 'Three Gateways Model' describes the main avenues for influencing animal production through pasture and grazing management:

1. **Land condition gateway** – the extent to which rainfall is converted into pastures, influenced by soil fertility, soil health, pasture species and grazing system.
2. **Level and evenness of grazing gateway** – the utilisation of pastures, influenced by stocking rates, grazing system and animal type.
3. **Diet quality gateway** – the conversion of pasture into animal products, influenced by herbage quality, legume content and pasture species.

The best approach to grazing land management is therefore to focus on improvements that can be made to grazing land condition, level and evenness of use and diet quality.

This module covers the key principles, practices and strategies that can enhance the productivity and sustainability of the grazing enterprise.

The three gateways model





Key area 1 – Maps and property information

- GM 1.1 Property mapping
- GM 1.2 Knowing paddock sizes
- GM 1.3 Identifying land types

Key area 2 – Land capability and condition

- GM 2.1 Understanding land capability
- GM 2.2 Monitoring land condition
- GM 2.3 Improving land condition
- GM 2.4 Current carrying capacity
- GM 2.5 Potential carrying capacity



Key area 3 – Managing the land resource

- GM 3.1 Land type fencing
- GM 3.2 Water points
- GM 3.3 Fence lines, fire breaks and roads
- GM 3.4 Managing gullied areas
- GM 3.5 Managing frontages and wetlands
- GM 3.6 Protecting and improving biodiversity
- GM 3.7 Legislative responsibilities
- GM 3.8 Managing the tree-grass balance
- GM 3.9 Fire prevention and control
- GM 3.10 Using fire
- GM 3.11 Legal obligations for using fire



Key area 4 – Managing grazing pressure

- GM 4.1 Setting stocking rates
- GM 4.2 Adjusting stocking rates
- GM 4.3 Timing livestock management
- GM 4.4 Managing the grazing system
- GM 4.5 Managing for even pasture use

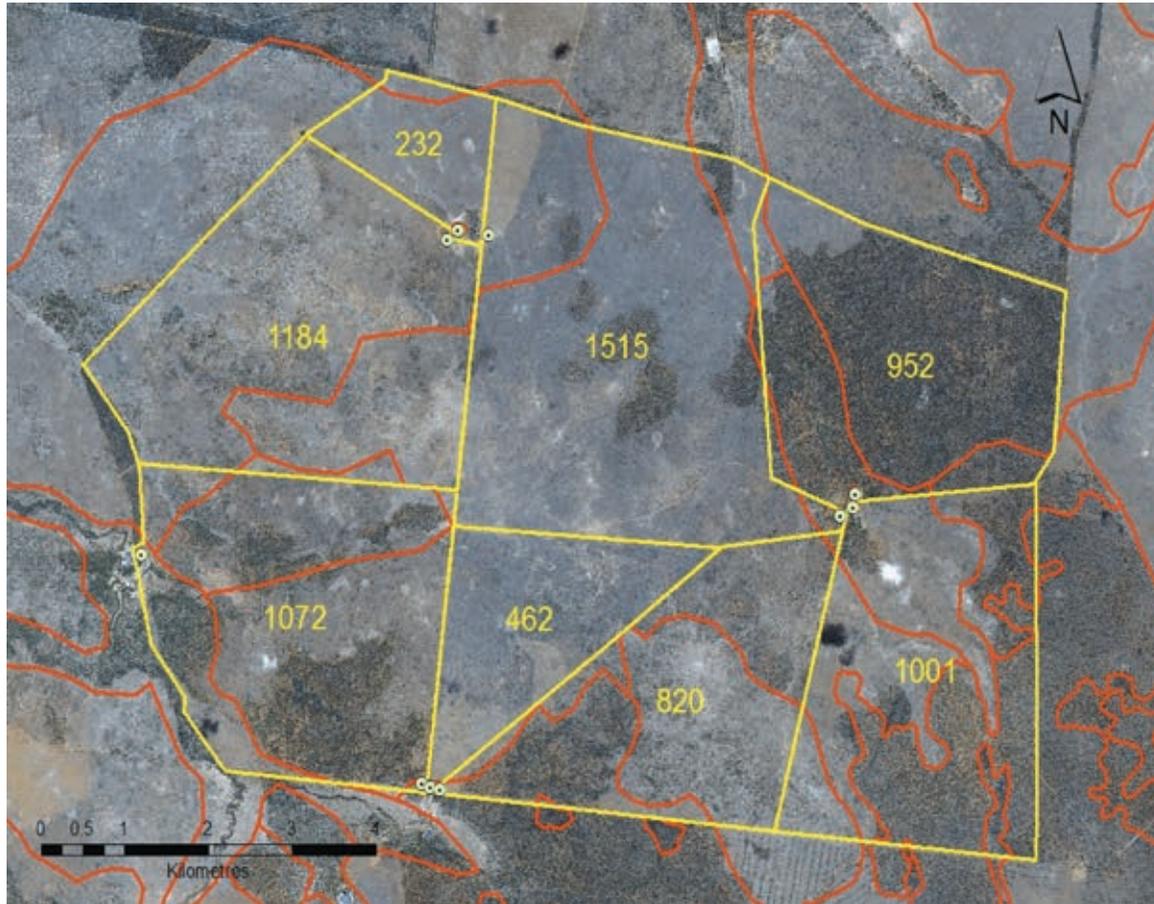
Key area 5 – Improved pastures and forage crops

- GM 5.1 Improved pasture development
- GM 5.2 Managing improved pastures
- GM 5.3 Sown pasture rundown
- GM 5.4 Using forage crops

Key area 6 – Weeds and pest animals

- GM 6.1 Identifying weed incursions
- GM 6.2 Controlling weeds
- GM 6.3 Preventing weeds
- GM 6.4 Pest animals
- GM 6.5 Controlling pest animals

Key area 1 – Maps and property information



Property maps can be used as a useful tool when making decisions on the property

Maps and property information are essential for many activities in a grazing business, whether for setting carrying capacities, planning infrastructure, directing visitors, planning staff duties, planning vegetation management or fire, or managing weeds and pest animals.

Good quality maps are an indispensable tool and property information, including lot and plan numbers and paddock and land type areas, should be readily available to facilitate proficient property planning and management.

Maps should identify but not be limited to:

- natural features – topography, water courses, wet lands, land types, soil types, vegetation types, biodiversity values
- built features – fences, paddock sizes, buildings, water infrastructure (bores, dams, tanks and troughs), roads, monitoring sites e.g. photo monitoring sites
- land use – cropping, cleared areas, sown pastures, farm forestry, etc
- management issues – land condition, weed problems, erosion – hill slope, gully and streambank

Maps can be sourced from numerous locations. Contact your state agricultural or natural resource management department or your local natural resource management group. Regularly updating maps ensures their ongoing usefulness for property and business management and planning.

Self-assessment – Maps and property information

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 1.1 Property mapping				
No property map.	Current map showing land types, infrastructure and paddock areas.	Map developed using GPS recorded points and GIS software. Natural and built features presented in layers for ease of use and updating.	Industry standard <input type="checkbox"/>	1.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Above industry standard <input type="checkbox"/>	2.
				3.
GM 1.2 Knowing paddock sizes				
Paddock sizes are unknown/undetermined.	Approximate paddock sizes are known from property maps and/or historical information.	Paddock sizes have been accurately measured using GPS equipment and are marked on the property map.	Industry standard <input type="checkbox"/>	1.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Above industry standard <input type="checkbox"/>	2.
				3.
GM 1.3 Identifying land types				
Land types and vulnerable areas within paddocks are unknown.	Land types and vulnerable areas within paddocks are known from property maps and/or historical information.	Land types within paddocks are accurately mapped using regional land type mapping and ground truthing as required. Land type areas measured and vulnerable areas highlighted. Information is used in grazing management and property development.	Industry standard <input type="checkbox"/>	1.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Above industry standard <input type="checkbox"/>	2.
				3.



The capacity of grazing land to respond to rain and produce useful forage

Key area 2 – Land capability and condition

Understanding the inherent capacity and limitations of your country is critical to good grazing management and, ultimately, to the productivity and sustainability of your grazing business.

Understanding land capability

‘Land types’ are areas of land characterised by consistent patterns of landform, soils and vegetation. Land types are described in terms of their landform; soil types and characteristics, woody vegetation and pasture composition. Land types have many influences - land use and management requirements; land use limitations; suitability for sown pastures; growth of introduced weeds; conservation features and related management. Regional ecosystems are an example of land types.

Land types inform landholders about an area’s inherent capabilities in terms of its **potential productivity**, limitations and vulnerabilities. Land type mapping enables producers to identify areas of land that differ in their capability to produce forage (quality and quantity) and to determine how these differences will affect productivity and influence management options. Land type areas form management units for the purposes of property mapping and management planning.

Local land type maps and supporting information can be obtained from regional natural resource management groups or state agricultural and land management agencies.

Monitoring land condition

‘Grazing land condition’ is defined as the current capacity of land and pasture to respond to rain and grow pasture. It is a measure of how well the ecosystem is functioning and

expresses how much of the potential productivity is converted to actual productivity. Land that is not managed sustainably will lose condition. By monitoring land condition over time, landholders can determine the impact of their grazing management decisions and identify areas that need special management.

State land and environmental management agencies have developed tools and methodologies for assessing land condition. As these are used in some land management regulatory processes it is important for producers to understand them and how they relate to legislative obligations.

The main indicators used to assess land condition are:

Perennial, productive and palatable (3P) grasses

3P grasses are the key to maintaining effective water use, nutrient cycling and pasture productivity. They keep moisture and nutrients in the paddock and provide forage after annual plants have disappeared. Unlike perennial grasses, annual grasses grow quickly from seed but die off quickly in the dry leaving the soil vulnerable to erosion. If the density and vigour of 3P grasses decline, land condition and productivity is threatened.

Ground cover

Comprises organic material i.e. senescent and green grasses, forbs, low shrubs, cryptogams and litter. Maintaining ground cover minimises run-off and loss of nutrients and soil. Loss of soil to waterways can impact on freshwater and marine environments. Ground cover recommendations indicate the desired level of ground cover at the end of the dry season.



Land in 'A' condition

Soil condition

Good surface condition reflects good soil structure and healthy organic matter content. Bare soil is susceptible to hill slope, gully and streambank erosion. Loss of soil from hill slopes as little as 2% can lead to unproductive scalds (clay pans). Where water concentrates into channels, soil is lost through rill and gully erosion. Good ground cover especially upslope from gullies helps limit erosion.

Presence of weeds

Weeds compete with productive pasture plants for nutrients and water. Weed infestations are often associated with declining land condition as weeds exploit disturbed and bare areas and are favoured by loss of 3P grasses.

Woodland thickening

Woody plants compete with pastures and reduce forage production and carrying capacity. Woody weed thickening and shrub encroachment are major problems on many land types.



Land in 'B' condition

Land condition classes

Grazing land condition is assessed in four classes:

A – Land in excellent condition

A condition land has all the following features:

- good coverage of 3P grasses
- 3P grasses make up more than 80% of yield
- few weeds and no significant infestations
- organic ground cover greater than 50% at end of the dry season (most land types in good condition will have at least 50% and often above 70% ground cover)
- good soil condition
- no erosion
- no sign, or only early signs, of woodland thickening



Land in 'C' condition

B – Land in good condition

B condition land is similar to A condition land except that it has at least one or more of the following features:

- some decline in 3P grasses and an increase in other species (less favoured grasses, weeds)
- 3P grasses make up 60–80% of yield
- organic ground cover of 40–50% at end of the dry season
- some decline in soil condition
- some signs of previous erosion and/or current susceptibility to erosion
- Some thickening in density of woody plants

C – Land in poor condition

C condition land is similar to B condition land, except that it has one or more of the following features:

- general decline in 3P grasses and large amounts of less favoured species



Land in 'D' condition

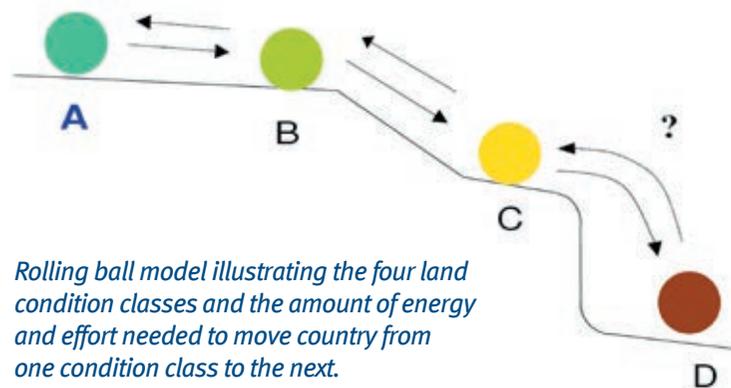
- 3P grasses make up 10–60% of yield
- organic ground cover of 20–40% at end of the dry season
- obvious signs of past erosion and/or high susceptibility to erosion
- general thickening in density of woody plants.

D – Land in very poor condition

D condition land has one or more of the following features:

- general lack of any perennial grasses or forbs
- 3P grasses make up less than 10% of yield
- organic ground cover less than 20% at end of the dry season
- severe erosion or scalding, resulting in a hostile environment for plant growth
- thickets of woody plants cover most of area.

Ongoing monitoring of land condition (for example by using photo monitoring sites or equivalent techniques) enables the impact of grazing management to be assessed and timely



Rolling ball model illustrating the four land condition classes and the amount of energy and effort needed to move country from one condition class to the next.

action taken if required. Where available and appropriate, remote sensing technology can be an additional tool for monitoring long term trends in ground cover.

Paddock records of stock numbers can be used in conjunction with land condition monitoring to help determine suitable stocking rates.

Improving land condition

Land in C condition sits on a threshold (as illustrated by the 'rolling ball' model).

It can either be maintained at that level or improved through targeted grazing land management actions. However, if it drops into D condition, productivity will be extremely low and restoring it to C condition will likely be expensive and very difficult, if not impossible, to achieve. Identifying and managing C condition country is critical for preventing its decline into D condition.

Actions to maintain or improve land condition include:

- setting stocking rates that are guided by the land's carrying capacity and matched to forage availability, taking into account grazing by native and feral animals

- locating waters and fences to ensure even pasture utilisation and minimise overgrazing
- using appropriate grazing systems to enhance the desirable species in the pasture
- spelling pastures
- managing and/or controlling weeds
- matching introduced pasture species to soils and land type
- maintaining healthy native grassland on fragile soils.

Soil organic matter content, and hence soil carbon, is influenced by the balance between pasture growth and pasture consumption. Where pasture utilisation is high relative to plant growth, little plant material is returned to the soil and soil organic matter will decline over time. Where pasture utilisation is low, a greater amount of plant material should enter the soil, potentially increasing soil organic matter. Changes in soil organic matter are very slow and influenced by soil type and seasonal conditions. They are also difficult and expensive to accurately measure.

Determining carrying capacity

Matching the number of animals and their feed requirements with pasture production and quality is critical for land condition, pasture productivity, animal performance and a property's economic viability. When assessing carrying capacity the time frame is a critical consideration. **Long-term carrying capacity (LTCC)** is the average number of animals that a paddock or property can be expected to sustainably support over a planning horizon (5–10 years). This is the timeframe for long term business planning, property purchase and development.

Short-term carrying capacity (STCC) is the number of animals that a paddock or property can support for a week, month,

season or year. It will vary from the LTCC due to variation in rainfall received. It is a function of the pasture available and anticipated growth, forage quality and desired animal performance.

Long-term and short-term carrying capacities are strongly related. Unrealistic expectations of LTCC leads to regular feed shortages, overgrazing and declining land condition. Timely adjustment of stock numbers in response to forage supply is critical to maintaining pasture productivity, land condition and the property's LTCC.

A property or paddock's LTCC is determined by the expected average long-term pasture growth for each land type, a safe level of pasture utilisation for each land type, land condition and the intake requirements of livestock. Pasture growth and LTCC will be highest for land in A condition. Similarly better soil types and higher rainfall areas have higher pasture growth and LTCC. The number of animals that a property can sustainably support can increase or decrease over time in line with changes in land condition, climate, and management decisions.

When calculating carrying capacities, animal requirements should be accounted for by converting the type (e.g. cattle, sheep or goats), size (where mature size differs significantly) and class (e.g. breeding cows, steers) of stock to a standard unit such as adult equivalents (AE), livestock units (LSU) or dry sheep equivalents (DSE).

The property's current LTCC based on current land conditions and resources, might be lower than its potential LTCC. Increasing the property's current carrying capacity to its potential carrying capacity can involve improving land condition to **restore** carrying capacity and or property development (e.g. fencing and water points, sown pastures, timber treatment) to **increase** potential carrying capacity.

The process of calculating the current and potential carrying capacities for a property will help with identifying

opportunities for increasing productivity through property development, improving land condition and using introduced pastures.

Historical stocking rate benchmarks from local land managers whose properties are in good (A/B) condition can be useful when setting or reviewing carrying capacities. Changes in land condition, tree densities and climate patterns must be considered in this process. In many regions tools and calculators have been developed for evaluating carrying capacity. Government land management agencies, natural resource management groups, advisors and consultants are useful sources of information.

Long term grazing capacity i.e. 20–30 years

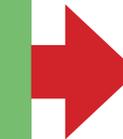
Determined by:

- Average forage growth of land types
- Safe utilisation rate for land types
- Animal intake

Current carrying capacity based on:

- Current land condition
- Current infrastructure

Might be lower than potential carrying capacity



Potential carrying capacity:

- Improved land condition
- Pasture development
- Property development

Factors that need to be considered when determining carrying capacities

Self-assessment – Land capability and condition

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 2.1 Understanding land capability				
<p>Land types and their capabilities are not considered in grazing management and property development planning.</p> <p><input type="checkbox"/></p>	<p>Land types are known and their capabilities are considered in grazing management and property development planning.</p> <p><input type="checkbox"/></p>	<p>Industry standard plus: Land types are accurately mapped at the paddock scale and this information is used in grazing management and property development planning.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>
GM 2.2 Monitoring land condition				
<p>Land condition has not been assessed or considered in grazing management and property development planning.</p> <p><input type="checkbox"/></p>	<p>Regular visual assessment of land condition. Observations and management are used in grazing management and property development planning.</p> <p><input type="checkbox"/></p>	<p>Land condition is assessed annually using photo monitoring sites (or equivalent technique) and documented for all major land types. Monitoring data and management history are used in grazing management and property development planning. Where available and appropriate remote sensing technology is used to monitor long term trends in ground cover.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>
GM 2.3 Improving land condition				
<p>No actions are taken to arrest the decline in land condition or improve C and D condition land i.e. where there is loss of desirable pasture species, bare ground, erosion or weeds.</p> <p><input type="checkbox"/></p>	<p>Opportunities to improve land condition are identified and implemented if viable. Grazing management is adjusted to reduce grazing pressure and enable recovery of affected areas.</p> <p><input type="checkbox"/></p>	<p>Infrastructure and grazing land management strategies to improve land in B, C and D condition are implemented if viable.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 2.4 Current carrying capacity				
<p>A sustainable long-term carrying capacity has not been determined for the property. Stocking rates are based on the number of stock that 'need to be run'.</p> <p><input type="checkbox"/></p>	<p>Estimates of current long-term carrying capacity are based on long-term experience, paddock records, and observed trends in condition of land.</p> <p><input type="checkbox"/></p>	<p>Current long-term carrying capacity has been calculated based on area, land types, land condition, appropriate pasture utilisation rates and current infrastructure.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>
GM 2.5 Potential carrying capacity				
<p>The potential to restore or increase the property's long-term carrying capacity through changes to infrastructure, pastures, grazing or livestock management is unknown/unclear.</p> <p><input type="checkbox"/></p>	<p>Strategies to restore or increase the property's long-term carrying capacity through changes to infrastructure, pastures, grazing or livestock management have been considered and undertaken on some areas.</p> <p><input type="checkbox"/></p>	<p>Strategies to restore or increase the property's long-term carrying capacity have been implemented/are being evaluated and implemented where viable.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>

Key area 3 – Managing the land resource

Strategies for grazing land management can be considered in two broad groups; those relating to the land resource and infrastructure (this Key area) and those that control the grazing pressure applied by livestock (Key area 4).

Land type fencing and water distribution

Fencing and watering points can be used to manipulate grazing distribution, even out grazing pressure and reduce selective grazing. Fencing to land type enables better control of stock access and grazing pressure on fragile or preferred land types. 'Fragile' refers to land that is vulnerable to a decline in land condition and development of problems such as erosion and weeds.

However, fencing to land type is not always practical or cost-effective. In these situations, rotational grazing, spelling, location of watering points and supplement feeding sites, temporary fencing and perhaps fire can be used to even out grazing pressure and improve the condition of deteriorating land.

Fence lines, fire breaks and roads

Erosion by water begins when raindrops fall on bare soil and where runoff starts to concentrate; the erosive power may lead to gully erosion particularly where there are dispersible subsoils. Where gullies exist they can generate a significant amount of sediment and once established they are difficult and costly to repair. In the extreme they can threaten roads and fences and the repair cost may be greater than the initial construction cost.

Erosion can be triggered by inappropriate location or design of property infrastructure. Consequently erosion risk should be considered when planning, building and maintaining infrastructure.

Strategies to reduce erosion include:

- locating roads and fences along the contour where possible
- avoiding areas with dispersible sodic subsoils
- using whoa boys and table drains to disperse road run-off
- cross-slope roads on steep country
- using causeways or culverts where roads cross creeks.

Managing frontages and wetlands

Frontage country along watercourses and wetlands, including the riparian zone and associated floodplain generally extends from the waterway/wetland to the start of the upland area. Frontage land buffers the impact of land-based activities on the aquatic environment. Deep rooted native vegetation stabilises and improves the resilience of streambanks. Vegetation and high ground cover alongside waterways helps reduce nutrient movement into streams and protect banks from erosion during flood events.

Often it is the most productive country on a property so its condition and management is important for enterprise profitability. However it is a very sensitive environment and its attractiveness to cattle means it is easily damaged by over grazing and trampling. Consequently, grazing pressure needs to be carefully managed. Bare patches, compacted soil and tracks in frontage country can concentrate the flow of water increasing the risk of soil loss to waterways and rills and gullies forming. Weeds and pest animals are often significant problems also.

Signs of poor condition frontage country include:

- floodplain area: bare soils and erosion, gullies and weeds
- riparian areas: poor vegetation health or structure, loss of ground cover, damaged and eroding streambanks
- waterways and wetlands: poor vegetation health, highly turbid water, pugging and algal blooms.

Controlling cattle with off stream watering points/ fencing provides a means of controlling grazing pressure to maintain productive frontage pastures and keeping soil on the property.

Managing frontage land with care contributes toward:

- improved land condition and productivity
- increased property sustainability, drought resilience and profitability
- decreased erosion
- improved water quality in freshwater and marine environments
- healthy ecosystems.

Protecting and improving biodiversity

Grazing properties take up a large portion of the Australian land area and contribute significantly to biodiversity across the landscape. A rich and abundant biodiversity contributes to a property's ecosystem function, landscape resilience and water quality, and consequently to the sustainability of the grazing enterprise. Strategies for managing land in good condition are usually consistent with managing for biodiversity.

Producers will bring benefit to their own property as well as to the region by maintaining and enhancing habitat and by monitoring and minimising the impact of their management practices on biodiversity.

Knowing the location of high value biodiversity areas means these areas can be considered, along with land type and land condition, in the overall management of the property. Land unsuited to grazing can often be specifically managed for its biodiversity value with little or no impact on animal production.

Biodiversity management strategies include:

- maintaining native pasture composition at densities that conserve and protect ground layer plant and animal species and soil health
- setting specific management goals for biodiversity conservation e.g. managing grazing to maintain habitat complexity in remnant vegetation
- maintaining important habitat features, such as fallen logs, ground cover and large trees with hollows, throughout the landscape
- planning paddock layouts e.g. fencing to land types so that fragile areas can be excluded from regular grazing
- identifying areas of conservation significance on the property that need special management e.g. decreased grazing pressure
- protecting important habitat features, such as riparian areas and corridors that provide pathways for the movement of native fauna
- introducing special management arrangements such as nature refuges.

Legislative responsibilities

A variety of legislation controls land and vegetation management on rural freehold and leasehold land. Producers need to be aware of their rights and obligations. Appendix 1 lists legislation relating to land and vegetation management.

In Queensland, property owners should ensure they have



Even if fire is not used on the property, plans still must be made

a certified Property Map of Assessable Vegetation (PMAV). This identifies what can be done with the various types of vegetation on the property and protects the owner's options for vegetation management.

Managing the tree–grass balance

Managing the balance between grass and other vegetation is an important consideration on many land types. Trees and shrubs compete with grass for water and nutrients, and reduce pasture growth and carrying capacity. Tree and shrub encroachment and thickening are often major factors in declining land condition. An increasing density of woody vegetation also presents problems for access, mustering, and controlling weeds and feral animals.

It may be desirable to control woody vegetation to restore the balance between trees and grass. Where woody vegetation does need to be managed, actions need to be planned and implemented in compliance with native vegetation legislation regardless of method used. Information on these requirements can be obtained from your state land management agency.

Planning for fire and using fire

Bushfire prevention and control is crucial to protect property infrastructure, forage reserves and pasture condition. Fire break maintenance is particularly important after seasons of above-average pasture growth. Maintaining fire equipment and training family and staff in fire procedures are essential property activities.

Controlled fires can be a valuable tool for managing pasture, woody weeds or regrowth on some land types. If you are considering using fire to reduce thickened timber, you need to be aware of and comply with relevant local, State and Federal legislation.

Fire can be used to help reduce patchiness and promote more even grazing. A strategic burn on a less-used land type, patch

or pasture species can draw cattle to the area, allowing for more heavily utilised areas to be spelled. In some areas, fire, spelling and subsequent grazing can be used to favour more desirable pasture species.

The choice of fire regime for woody weed and regrowth control should depend on the nature, density and size structure of the woody species being targeted. More intense fires are required where; species are more fire tolerant, tree and shrub densities are high, and plants are large. Less intense fires are more appropriate for fire-susceptible species or where the purpose is to control recently established (i.e. small) shrubs. The vulnerability of the land type to intense fires and the biodiversity value need to be considered.

Careful grazing management is needed both before and after planned fires to ensure burning achieves the desired objectives. Fresh growth is very attractive to livestock, native and feral animals so it is important to manage grazing pressure after any fire to allow pasture to recover.

Self-assessment – Managing the land resource

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 3.1 Land type fencing				
<p>Paddocks commonly contain a variety of land types and there is limited control over grazing patterns.</p> <p><input type="checkbox"/></p>	<p>Vulnerable land types are being fenced off from other country where practical and cost effective.</p> <p>Fences are located and constructed to protect fragile land types.</p> <p><input type="checkbox"/></p>	<p>Property is fenced where practical and cost effective to land type and to protect areas that are in poor condition or fragile.</p> <p>Fences are located and constructed to protect fragile land types.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>
GM 3.2 Water points				
<p>Limited water infrastructure resulting in uneven grazing, land degradation close to water points and under-utilised areas.</p> <p><input type="checkbox"/></p>	<p>Water infrastructure being developed to match paddock size and carrying capacity, improve grazing evenness and reduce sacrifice zones around water points.</p> <p>Water points are located to protect fragile land types.</p> <p><input type="checkbox"/></p>	<p>Water infrastructure appropriate for paddock size and carrying capacity, minimises uneven grazing and sacrifice zones around water points.</p> <p>Water point location protects fragile land types.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>
GM 3.3 Fence lines, fire breaks and roads				
<p>There is little consideration of erosion risk when planning, building and maintaining fences, fire breaks and roads.</p> <p><input type="checkbox"/></p>	<p>All property built features are constructed and maintained with due attention to erosion risk. Areas of dispersible sub-soil are avoided where possible. Creek crossings are built to bed level to avoid erosion risk. Whoa boys are used sometimes.</p> <p><input type="checkbox"/></p>	<p>All property built features are planned and built to avoid erosion risk. Strategies include: building roads and fences along the contour, avoiding areas of dispersible sub-soil where possible, using whoa boys to distribute run off, cross slope roads on steep slopes and using causeways or culverts when crossing creek lines.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 3.4 Managing gullied areas				
No significant gullied areas on this property.		<input type="checkbox"/>		
Little or no change to the management of gullied areas.	Where possible gullied areas are fenced to exclude stock and encourage revegetation. Grazing, if any, managed to ensure low utilisation rate.	Professional advice informs appropriate mix of strategies in improve areas of gully erosion, which may include stock exclusion, mechanical reshaping of gully heads and sides and the installation of porous check dams.	Industry standard <input type="checkbox"/> Above industry standard	1. 2. 3.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
GM 3.5 Managing frontages and wetlands				
No significant frontages or wetlands on this property.		<input type="checkbox"/>		
Frontage country and wetlands are not managed differently to other land types. Grazing management does not consider vulnerability of frontages and wetlands. There is limited or no infrastructure, such as fencing and/or off-stream watering points.	Frontage country and wetlands are managed as vulnerable land types where practical by strategic fencing and/or the provision of off-stream watering points. These areas are actively managed e.g. grazing pressure, wet season spelling and weed and pest control.	Industry standard plus: Strategies to maintain and/or improve land condition are being implemented in degraded or vulnerable frontage and wetland areas.	Industry standard <input type="checkbox"/> Above industry standard	1. 2. 3.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 3.6 Protecting and improving biodiversity				
<p>Areas on the property with high biodiversity value (species and/or habitat areas) have not been identified.</p> <p><input type="checkbox"/></p>	<p>Areas on the property with high biodiversity value are recognised in property management.</p> <p><input type="checkbox"/></p>	<p>Areas on the property with high biodiversity value are identified and mapped.</p> <p>Protecting and improving biodiversity is an integral component of property development and land management.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>
GM 3.7 Legislative responsibilities				
<p>You have no or limited understanding of the legislative rights and obligations relating to land and vegetation management on the property.</p> <p><input type="checkbox"/></p>	<p>You understand your legislative rights and obligations relating to land and vegetation management. You have taken action where available, to safeguard your vegetation management options. For example, in Queensland a Property Map of Assessable Vegetation (PMAV) has been lodged and certified.</p> <p>Where required vegetation management permits are obtained before undertaking burning, clearing or poisoning.</p> <p><input type="checkbox"/></p>	<p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>
GM 3.8 Managing the tree-grass balance				
<p>Woody vegetation thickening is not managed.</p> <p><input type="checkbox"/></p>	<p>Where required, woody vegetation control is undertaken opportunistically to maintain the tree-grass balance.</p> <p><input type="checkbox"/></p>	<p>Where required, managing woody vegetation is an integral component of planning and implementing grazing land management strategies.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 3.9 Fire prevention and control				
Minimal planning and preparation for fire prevention and control.	Strategies for fire prevention and control developed and implemented. Appropriate equipment is available and in working order. Family and staff understand fire plans and know how to use equipment.		Industry standard <input type="checkbox"/>	1. 2. 3.
<input type="checkbox"/>	<input type="checkbox"/>			
GM 3.10 Using fire				
Burning for pasture and vegetation management is not applicable on this property. <input type="checkbox"/>				
Burning is undertaken without a defined goal and strategies for pre and post-fire land management.	Controlled burning is used to manage woody weeds and pastures, and protect pastures and infrastructure against wild fires. Grazing management strategies are designed to create appropriate pre-fire fuel loads and enable sufficient post-fire spelling to achieve recovery.		Industry standard <input type="checkbox"/>	1. 2. 3.
<input type="checkbox"/>	<input type="checkbox"/>			
GM 3.11 Legal obligations for using fire				
Fires are lit without permits and/or notifying neighbours.	You understand and comply with legal obligations for giving notifications and obtaining permits when controlled burning.		Industry standard <input type="checkbox"/>	1. 2. 3.
<input type="checkbox"/>	<input type="checkbox"/>			

Key area 4 – Managing grazing pressure

Managing grazing pressure is the most important aspect of grazing management. It directly impacts on the pasture resource, animal performance and profitability. Excessive grazing pressure reduces the vigour and density of preferred pasture plants resulting in more bare ground and less desired plants. Animal performance is affected because they have less opportunity to select higher quality plants and parts of plants. Poorer pasture productivity and animal performance flows through to lower reproductive performance and growth rates.

Strategies for managing grazing pressure are

- using stocking rates that are guided by current and potential sustainable carrying capacity calculations for the property
- regularly assessing forage availability and adjusting stocking rates accordingly
- timing activities such as breeding, weaning and sales to match grazing pressure and animal requirements to seasonal variations in pasture availability and quality
- locating infrastructure (fences and waters) to encourage even pasture use and protect vulnerable areas of the landscape
- implementing a grazing/spelling system to control stock access to pastures particularly in vulnerable areas e.g. frontage country and recently burnt areas to allow for pasture recovery
- using seasonal forecasting where appropriate in planning grazing management.

Understanding pasture growth

Grazing pressure affects plants differently during their life cycle, so it is important to understand the phases of pasture growth. Pasture growth is described in four phases.

Phase 1: Early growing season



Phase 1 pasture growth is characterised by:

- short, leafy growth phase
- moderate pasture growth rate
- high forage quality, but low yield
- high sensitivity to grazing pressure.

Phase 2: Mid growing season



Phase 2 pasture growth is characterised by:

- a well-developed leafy tussock phase
- high pasture growth rate
- good forage quality, with a moderate and rapidly increasing yield
- moderate sensitivity to grazing pressure.

Phase 3: Mid to late growing season



Phase 3 pasture growth is characterised by:

- the reproductive phase (although seeding can occur at any phase)
- low pasture growth rate
- moderate-low forage quality, and the maximum yield has been reached
- low to moderate sensitivity to grazing pressure.

Phase 4: Beyond the growing season



Phase 4 is at the end of the growing season and is characterised by:

- a dormant phase
- little or no growth
- low to very low forage quality (plants have withdrawn protein down into their roots)
- low sensitivity to grazing pressure.

Setting stocking rates

To maximise profit in the long term, the focus needs to be on sustainable profit rather than on maximising production per hectare. The least risky (economically and ecologically) approach to managing stocking rates is generally to stock at or close to the (long-term) sustainable carrying capacity in most years. Note that this will be less than the potential carrying capacity where land is in poor condition.

Stocking at a higher rate than the long-term carrying capacity may be profitable in the short term but will be less profitable over the longer term as overgrazing contributes to

a decline in land condition and productivity and an increase in supplementary feed costs. High stocking rates, especially on vulnerable land types in poor seasons, can lead to a rapid deterioration in land condition through loss of 3P grasses, ground cover, erosion and weed invasion. Reduced pasture productivity and loss of ground cover when pastures are over-utilised causes a decline in soil organic matter content.

Adjusting stocking rates

Decisions about stocking rates should be based on regular assessments of forage quantity and quality, pasture composition, residual (standing) feed, and ground cover. Decision support tools include forage budgets, grazing charts, and seasonal forecasts.

In good seasons, stocking rates can be increased above the long-term carrying capacity to take advantage of above-average pasture growth, but prompt action is required to reduce stocking rates as pasture availability declines or seasonal conditions change.

The critical time for assessing the available feed and adjusting stocking rates is the end of the growing season i.e. March–April in northern Australia. A vital consideration in setting stocking rates is ensuring there will be adequate ground cover at the end of the dry season to protect against excessive runoff and soil loss when the season breaks. Regional grazing management recommendations provide guidelines for ground cover levels. Stocking rates may need to be adjusted at other times of the year to e.g. late dry season if pastures are burnt or the start of the wet season is later than expected.

Timing livestock management

The timing of calving/lambing, weaning and sales can have a significant impact on grazing pressure. Lactating animals have significantly higher nutrient requirements than dry stock. Weaning and removing culls can markedly reduce grazing pressure in paddocks without affecting overall productivity.

Seasonal changes in forage quantity and quality need to be considered when targeting markets and planning sales. Pressure on desirable pasture species can be reduced by selling surplus stock before feed shortages are likely to occur.

Managing the grazing system

‘Grazing system’ refers to how stock are allocated to grazing paddocks. Grazing systems can generally be described as continuous or rotational. Under continuous grazing systems, the paddock is grazed continuously. Conservative stocking rates are the key to ensuring land is not degraded under continuous stocking.

Rotational grazing is used to implement strategic pasture spelling. Spelling can be used for regenerating pasture and preserving forage for later use. For pasture regeneration, spelling must occur after effective rainfall has fallen, when the plants are actively growing and restoring their root reserves. This is commonly referred to as wet season spelling and country may be spelled for all or part of the growing season. As a rule of thumb 30–50 mm of rain is required to initiate pasture growth at the beginning of the growing season. If country is difficult to access after rain, then resting should commence before the wet season starts.

Rotational grazing systems range from fairly simple, large paddock rotations to highly intensive time-controlled grazing systems. Time control grazing systems use very high stocking rates for short periods (days/weeks) followed by long spelling periods (weeks/months); for example, grazing paddocks at 5–10 times the average stocking rates then spelling for several weeks or months to allow desirable species to regrow.

It is important to determine the most appropriate grazing/spelling regime for your enterprise and pastures. Grazing systems that are used successfully in one region or with one species may not translate to other regions. For example, a long spell which restores a native pasture may cause a decline in the quality of introduced pastures.

Managing for even pasture use

Grazing animals do not use pasture evenly. They actively select certain plant parts over others (e.g. leaf over stem) and prefer certain pasture species to others. Patch grazing also occurs and animals will continue to favour these areas with their shorter leafier growth. Animals also preferentially graze some land types, such as frontage country. Grazing behaviour is also influenced by landscape features and prevailing weather conditions.

Allowing livestock to selectively graze pastures increases per head production. This is because the stock can select a high quality diet than if they are forced to consume lower quality herbage. However, if selective grazing is allowed over a long period, the desirable pasture species will be overgrazed and decline.

Strategies for evening out the grazing in paddocks include location of infrastructure (fences and watering points), regular or targeted spelling, choice of grazing system, fire, and selection of supplement feed-out sites.

Self-assessment – Managing grazing pressure

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 4.1 Setting stocking rates				
<p>Stock numbers per paddock are not recorded regularly or records are not kept.</p> <p>Stocking rates are not balanced against sustainable carrying capacity calculated for the property.</p> <p><input type="checkbox"/></p>	<p>Records of stock numbers in paddocks and visual observations of land condition are used to ensure that stock numbers match sustainable carrying capacity over time.</p> <p><input type="checkbox"/></p>	<p>Industry standard plus:</p> <p>Paddock and overall property stocking rates are calculated using standard stock units. Stocking rate trends for paddocks and the property are monitored over time and used to inform management decisions.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>
GM 4.2 Adjusting stocking rates				
<p>Stocking rate commonly exceeds available feed, and/or land condition is poor or declining (bare ground, loss of desirable pasture species, erosion or weeds).</p> <p><input type="checkbox"/></p>	<p>Stocking rates are adjusted to meet current feed supply, animal requirements, pasture residue and ground cover targets.</p> <p><input type="checkbox"/></p>	<p>Stocking rates and feed supply are assessed seasonally or more frequently. Forage budgets or grazing charts are used to set stocking rates and predict the need to reduce stock numbers or implement other strategies to maintain livestock and land condition.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>
GM 4.3 Timing livestock management				
<p>The timing of joining, weaning and stock sales is based on historical precedents or is ad hoc.</p> <p><input type="checkbox"/></p>	<p>The timing of joining, weaning and stock sales is planned on the basis of seasonal pasture production for the property/region. Weaning and selling strategies are adjusted in response to seasonal conditions to help manage grazing pressure.</p> <p><input type="checkbox"/></p>		<p>Industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 4.4 Managing the grazing system				
Ground cover and density of desirable pasture species are not considered in grazing management decisions. No actions are taken to arrest a decline in land condition or improve land in declining condition.	The grazing system enables ground cover and density of desirable pasture species to be maintained or improved. Where appropriate wet season spelling and/or spelling when pastures are in early phases of growth is implemented.	Industry standard plus: Pasture monitoring is undertaken and the data used with grazing records to manage the grazing system.	Industry standard <input type="checkbox"/> Above industry standard <input type="checkbox"/>	1. 2. 3.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
GM 4.5 Managing for even pasture use				
Evenness of grazing is not considered and/or tools to manage grazing patterns are not applied.	Grazing patterns and evenness of pasture use are monitored. Stocking rate, infrastructure and/or pasture spelling are used to even out pasture use across paddocks.		Industry standard <input type="checkbox"/>	1. 2. 3.
<input type="checkbox"/>	<input type="checkbox"/>			

Key area 5 – Improved pastures and forage crops

Improved pastures and forage crops can significantly contribute to some grazing systems by:

- increasing carrying capacity by providing extra feed
- improving diet quality and thus growth rates, so that cattle can be turned off at younger ages or alternative markets targeted
- filling feed gaps so production can be optimised throughout the year
- providing alternative forage which allows pastures to be spelled
- providing forage for special purposes e.g. to grow out weaners, finish stock
- restoring land condition especially where little or no native pasture exists.

The most appropriate introduced pasture species and forage crops for a property will be determined by the feed requirements, land type, soil characteristics and climate

Improved pasture development

There are significant costs involved in establishing introduced pasture species and the cost/benefits and payback time must be carefully considered. Pre-planting preparation, establishment technique and post-planting management will determine the success of introduced pastures.

Higher fertility soils will give better long-term productivity from improved pastures. Whenever possible, legumes should be included in the introduced pasture mix to improve diet quality

for stock and build soil nitrogen. Information about selecting appropriate species is available from state agricultural agency staff, private agronomists and consultants.

Managing improved pastures

As with native pastures, improved pastures need good grazing management to be productive, persistent and environmentally sustainable. Matching stocking rates to the available feed is the most critical factor. Periodic spelling can significantly contribute to long term pasture condition. Pasture spelling can be very important for allowing legumes to reach the seed phase. Some improved pastures require special management to prevent the ingress of weeds which can reduce stand life and pasture quality.

In some situations some aspects of management may need to be adjusted to effectively utilise the improved quantity and quality of pasture on offer. Examples include changing from breeding to finishing, targeting alternative markets, and adjusting selling times and time frames for calving/lambing.

Sown pasture rundown

Nitrogen is often the most limiting soil nutrient. Most of the nitrogen in the soil is not available to plants until it is mineralised by microbes, that is, broken down from the soil organic material and released in the form of nitrates which plants use. In older sown grass pastures (e.g. buffel grass), pasture rundown due to declining nitrogen availability is an increasing problem.

Incorporating legumes into pastures can assist by improving diet quality for grazing animals and fixing nitrogen from

the atmosphere for use by pasture plants. Other potential strategies to address pasture rundown include incorporating renovating pastures by cultivation, applying phosphorus fertiliser where required to increase legume growth and strategic nitrogen fertiliser use.

Using forage crops

Forage crops and short-term pastures are costly to establish. It is best to plan carefully and consider the likelihood of crop success and economic or other benefits.

Self-assessment – Improved pastures and forage crops

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 5.1 Improved pasture development				
Introduced pastures are not applicable on this property.		<input type="checkbox"/>		
Introduced pasture species (grasses and legumes) are rarely considered, or are planted without careful prior planning.	Use of introduced pasture species has been considered. Pastures are established using techniques recommended for the region.	Use of introduced pasture species is planned and matched to soils and landscape. Cost/benefit analysis undertaken to determine the value of using these species. Pastures are established using techniques recommended for the region. Establishment is assessed after each sowing and techniques adjusted as required.	Industry standard Above industry standard	1. 2. 3.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 5.2 Managing improved pastures				
Introduced pastures are not applicable on this property.		<input type="checkbox"/>		
No particular attention is given to the management of paddocks containing introduced pasture species.	Paddocks with introduced pasture species are managed to ensure productivity and sustainability.	Industry standard plus: Introduced pastures are integrated into the overall grazing system. Impact of introduced pastures on carrying capacity and stock performance is known.	Industry standard <input type="checkbox"/> Above industry standard <input type="checkbox"/>	1. 2. 3.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
GM 5.3 Sown pasture rundown				
Sown grass pastures are not applicable on this property.		<input type="checkbox"/>		
Soil nitrogen levels and their effect on sown pastures and animal performance are not considered in pasture or grazing management.	Potential impacts of a decline in soil nitrogen fertility as sown grass pastures age are understood. Grazing and animal management is adjusted as necessary to deal with lower pasture productivity and diet quality.	Industry standard plus: If economic, practices to improve animal diet quality or pasture production by increasing nitrogen supply and or cycling are implemented.	Industry standard <input type="checkbox"/> Above industry standard <input type="checkbox"/>	1. 2. 3.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 5.4 Using forage crops				
Short term forage crops and pastures are not applicable on this property. <input type="checkbox"/>				
Short-term forage crops and pastures are not considered, or are planted without careful prior planning. <input type="checkbox"/>	Short-term forage crops and pastures are considered and used to fill in feed gaps. <input type="checkbox"/>	Industry standard plus: Feed budgeting, assessment of forage options and market analysis are conducted seasonally to determine forage crop needs. Economic assessment is conducted after each crop. <input type="checkbox"/>	Industry standard <input type="checkbox"/> Above industry standard <input type="checkbox"/>	1. 2. 3.



Lantana bushes taking over a hill and valley

Source – Alan Fletcher Research Station, Department of Natural Resources, Qld

Key area 6 – Weeds and pest animals

Weeds

The key principles for managing weeds are:

1. Being aware of weeds that can be/are a problem in your area.
2. Detecting weeds on a property.
3. Preventing weeds from entering a property.
4. Identifying control strategies and implementing an integrated approach.
5. Intervening early to control new weeds on a property before they spread or get established.
6. Monitoring and following-up

Identifying weed incursions

Weeds on grazing lands can be broadly classified into two categories:

Environmental weeds disrupt native ecosystems and habitats by displacing native species, changing the vegetation structure, reducing biodiversity and ecosystem resilience, changing the fire regime, or causing animal health problems.

Production weeds reduce pasture and animal productivity and/or degrade land condition.

Australia's most serious weed species have been named as Weeds of National Significance (WONS), and these include prickly acacia, parthenium, bellyache bush and lantana. The full list is provided at www.weeds.org.au/wons/.

Each state has a list of 'declared' weeds. State legislation specifies landholder's obligations to manage declared weeds. See <http://www.weeds.org.au/docs/weednet6.pdf> for a full list.

Some weeds with no legislative requirements also cause environmental or economic losses, and it can still be in the interests of the property owner to manage them.

Regional and local NRM groups, local and state government officers and rural suppliers can provide advice on identifying and managing weeds.

Controlling weeds

Weed control should be done in a planned manner using an integrated approach and with dedicated follow-up. An understanding of the weed's ecology, and dispersal technique as well as the effectiveness of various control methods is critical. The best results are achieved when weed control is planned and implemented with a whole-of-region or catchment approach. Local NRM groups can help with facilitating and coordinating weed management, and providing networks and knowledge and sometimes access to equipment and funding.

Weeds vary in their impact on grazing systems and in some situations, it is not cost-effective to use chemical control or to try and eliminate production weeds from a property. By modifying how the pasture/land is managed, the growth of weeds can be disadvantaged and desirable species encouraged. For example, maintaining vigorous pastures and high ground cover is critical for managing parthenium.

Herbicides need to be applied correctly for effective results and to minimise off-site movement. Herbicides (attached to soil particles and in solution) lost in run-off, enter waterways and can impact on the health of fresh water and marine environments.

Preventing weeds

Weeds can be introduced to a property in brought-in fodder, seed, grain, soil and or gravel. Monitoring for the appearance of new weeds will be easier if these materials are used in limited areas, such as specific places used regularly for feeding out fodder.

Weed seeds can also be spread by vehicles and machinery. Where practical, cleaning vehicles and machinery before they enter your property can reduce the risk of weed introduction. Weeds can also be spread during road and track construction and maintenance, either in the base materials or by the machinery.

Bringing animals onto a property can also introduce weeds both as seeds in the digestive tract and attached to the coat or feet.

Property owners also need to be aware of the weeds on neighbouring private and public land and the ways these might spread (wind, water, livestock, and machinery) and implement strategies to reduce the risk or extent of spread onto their properties. In some situations, landholders can ask for a weed hygiene declaration to reduce the risks associated with fodder, grain, machinery and vehicles.

Pest animals

The key principles for managing pest animals are:

1. Identifying pest animal impacts on a property and livestock.
2. Identifying control strategies and implementing an integrated approach.
3. Monitoring and following-up.

Pest and feral animals such as rabbits and goats can have a significant impact on grazing lands by competing for pasture and degrading land condition, water quality and soil stability.

Wild dogs, pigs and foxes affect the survival rates of young stock. Some species also have a critical impact on native fauna and flora. Feral cats reduce biodiversity by killing native birds and small animals.

In all states, there are 'declared' animal pests that must be controlled. These can include locusts, feral cats, wild dogs, foxes, rabbits, feral pigs, feral goats and some deer. Full details of declared pests can be obtained from state agricultural agencies or local NRM groups.

Controlling pest animals

Pest animal control is best done by taking a planned, integrated approach in collaboration with neighbours. Pest animals can range widely and will quickly move into areas where a gap has been created by control. There are critical times when pest animal control is most effective at reducing the overall population as well as the effect of predators such as foxes and dingoes on lambs and calves.

Legislative 'duty of care' requirements apply to feral and pest animal management so producers need to be aware of their obligations when implementing control programs.

Self-assessment – Weeds and pest animals

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 6.1 Identifying weed incursions				
<p>Current and potential weed problems are not identified.</p> <p>No awareness of relevant weed management legislation that applies to the property.</p> <p><input type="checkbox"/></p>	<p>Current and potential weed problems are identified.</p> <p>Weed management legislation requirements including identification and reporting of new and existing weeds are known and implemented.</p> <p><input type="checkbox"/></p>	<p>A process for identifying and managing weed incursions is documented and understood by all staff in the enterprise.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>
GM 6.2 Controlling weeds				
<p>Current weed problems are not treated.</p> <p><input type="checkbox"/></p>	<p>Tactical weed control treatments are being implemented.</p> <p>Grazing and pasture management is integrated with weed management to encourage desirable species and reduce weed species.</p> <p>Herbicides are used according to label requirements to achieve effective results and minimise off-site movement.</p> <p><input type="checkbox"/></p>	<p>Industry standard plus:</p> <p>Where possible, the property participates in coordinated local or regional weed management actions.</p> <p><input type="checkbox"/></p>	<p>Industry standard</p> <p><input type="checkbox"/></p> <p>Above industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>
GM 6.3 Preventing weeds				
<p>No weed prevention plans are in place.</p> <p><input type="checkbox"/></p>	<p>Strategies to prevent weeds coming onto the property or spreading are implemented.</p> <p><input type="checkbox"/></p>		<p>Industry standard</p> <p><input type="checkbox"/></p>	<p>1.</p> <p>2.</p> <p>3.</p>

Below industry standard	Industry standard	Above industry standard	Desired standard	Steps required to improve
GM 6.4 Pest animals				
You are not aware of the pest animal control legislation that applies to your property.	Pest animal management legislation requirements are known and implemented.		Industry standard	1.
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	2.
				3.
GM 6.5 Controlling pest animals				
No pest animal control strategies are being used.	Tactical pest animal control measures are being implemented.	Industry standard plus: Where possible the property participates in coordinated local or regional pest animal control plans and actions.	Industry standard	1.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2.
			Above industry standard	3.
			<input type="checkbox"/>	

Appendix 1. Queensland land and vegetation legislation

An overview of Queensland Government legislation relevant to land and vegetation management is provided below. Please note that this list is not exhaustive and does not include Commonwealth or local government requirements.

Legislation	Scope	Department
<i>Environmental Protection Act 1994 and Regulation</i>	<ul style="list-style-type: none"> Requirement not to carry out activities that may cause environmental harm unless all practical measures are taken to minimise impacts Prohibits dumping of waste chemicals and containers 	EHP
<i>Chemical Usage (Agricultural and Veterinary) Control Act 1988 and Regulation</i>	<ul style="list-style-type: none"> Limits pesticide use to registered products only Defines situations where unregistered products can and cannot be used Prohibits use of certain products for public interest reasons Defines requirements for users of restricted products 	DAFFQ
<i>The Land Act 1994</i>	Outlines the duty of care requirements for lessees and responsibility to: <ul style="list-style-type: none"> Avoid causing land salinity; conserve soil and water resources; protect riparian vegetation Maintain healthy pastures and native grassland Manage declared pests; and conserve biodiversity. 	DNRM
<i>The Vegetation Management Act 1999 Queensland.</i>	<ul style="list-style-type: none"> Outlines the requirements for clearing native woody vegetation in Queensland Need to check the regrowth vegetation map and regional ecosystem map for your property to determine if the clearing activity is exempt, self-assessable or requires a permit. 	DNRM
<i>The Land Protection (Pest and Stock Route Management) Act 2002</i>	<ul style="list-style-type: none"> Regulates the control of declared pest plants and animals in Queensland 	QPWS
<i>The Nature Conservation Act 1992</i>	<ul style="list-style-type: none"> Regulates the protection of native plants, animals and habitat Control of native animals 	QPWS
<i>The Animal Care and Protection Act 2001</i>	<ul style="list-style-type: none"> Regulates the protection of animals in Queensland Outlines the duty of care towards domestic, farm and pest animals 	QDAFF

<i>The Water Act 2000</i>	<ul style="list-style-type: none"> • Regulates the sustainable planning and management of Queensland’s water resources • Licensing of water use from watercourses • Protection of bed and banks of watercourses 	DEWS
<i>Fire and Rescue Service Act 1990</i>	<ul style="list-style-type: none"> • Principal legislation that deals with lighting fires in the open in Queensland • Provides a systematic approach to the authorised use and control of fire in the open and for fire prevention • Makes it illegal to light a fire without a ‘Permit to Light Fire’ issued by a fire warden • Local government may also have in place a local law restricting or prohibiting the light of a fire in part or all of the local government area 	Rural Fire Service
<i>The Aboriginal Cultural Heritage Act 2003</i>	<ul style="list-style-type: none"> • Protection of significant Aboriginal objects, areas or sites • Duty of care to ensure activities do not harm the object, area or site. 	DEHP

References and further reading

General reference

Chilcott CR, Sandral CJ, Aisthorpe JL, Paton CJ and McCallum BS (2005) *EDGE network Grazing Land Management – Fitzroy Basin Version*. Meat and Livestock Australia, Sydney.

Coughlin, T., O'Reagain, P., Nelson, B., Butler, B. and Burrows, D. (2008) *Managing for water quality within grazing lands of the Burdekin Catchment – Guidelines for Land Managers*. (Burdekin Solutions Ltd, Townsville)

EDGE network Grazing Land Management workshop materials: www.mla.com.au/Livestock-production/Grazing-and-pasture-management/Native-pasture/Pasture-growth).

Mclvor, J. (2012) *Sustainable management of the Burdekin grazing lands – A technical guide of options for stocking rate management, pasture spelling, infrastructure development and prescribed burning to optimise animal production, profitability, land condition and water quality outcomes*. State of Queensland.

Paton, C., Hamilton, J. and Emery, T. (2011) *Best-bet practices for managing the grazing lands of the Maranoa Balonne A technical guide of options for optimising animal production, profitability and land condition*. (Department of Employment, Economic Development and Innovation)

Quirk M & Mclvor J (2003) *Grazing Land Management: Technical Manual*. Meat and Livestock Australia, Sydney.

Futurebeef website, <http://futurebeef.com.au/>

Key area 1 – Maps and property information

Department of Primary Industries and Fisheries (2008) *Land types of Queensland*. Version 1.2. Prepared by the Grazing Land Management Workshop Team, Department of Primary Industries and Fisheries, Brisbane. <http://futurebeef.com.au/topics/grazing-land-management/land-types-of-queensland/>

DERM article on vegetation communities www.derm.qld.gov.au/vegetation/bioregions.html

Key area 2 – Land capability and condition

Coughlin T, O'Reagain P, Nelson B, Butler B and Burrows D (2008) *Managing for water quality within grazing lands of the Burdekin Catchment – Guidelines for Land Managers*. Burdekin Solutions Ltd. Townsville.

Queensland Department of Natural Resources and Mines *Guidelines for Determining Lease Land Condition* (2011). Queensland Government, Department of Natural Resources and Mines, Brisbane.

Queensland Department of Environment and Heritage Protection *BioCondition* (2012). Queensland Government, Department of Environment and Heritage Protection.

Beutel, T & Silcock, J (2008), *Not just watching the grass grow: Graziers who monitor their land*, State of Queensland (Department of Primary Industries and Fisheries).

Karfs, R, Holloway, C, Pritchard, K & Riesling, J 2009b, *Land condition photo-standards for the Burdekin Dry Tropics Rangelands: a guide for practitioners*, Burdekin Solutions Ltd & State of Queensland (Department of Primary Industries and Fisheries), Townsville.

Long paddock website www.longpaddock.qld.gov.au/ for FORAGE reports -- 'FORAGE is a web-based system which generates and distributes information relating to climate and pasture condition at user-specified locations', including ground cover reports for your lot on plan.

Pisani, O (2012), *Guide to pasture photo monitoring*, Multimedia, Future Beef Australia & State of Queensland (Department of Agriculture, Fisheries and Forestry & Department of Environment and Resource Management), www.futurebeef.com.au/resources/multimedia/.

Key area 3 – Managing the land resource

AgForce Projects http://www.agforceprojects.org.au/index.php?tgtPage=media&page_id=39

Land Act 1994 www.legislation.qld.gov.au/LEGISLTN/CURRENT/L/LandA94.pdf

Vegetation Management Act 1999 www.legislation.qld.gov.au/LEGISLTN/CURRENT/V/VegetManA99.pdf

Department of Environment and Resource Management (DERM) Guide to the regrowth vegetation code www.derm.qld.gov.au/vegetation/pdf/regrowth_guide_code

Fire and Rescue Service Act 1990 www.legislation.qld.gov.au/legisltn/current/f/feaescseago.pdf

McIvor J, Bray S, Grice A and Hunt L (2011) Final report to Meat and Livestock Australia for B.NBP.0579. *Enhancing adoption of improved grazing and fire management practices in northern Australia: Synthesis of research and identification of best bet management guidelines.*

Meat and Livestock Australia, (2005) TIPS & TOOLS – *Natural Resource Management; Native Vegetation 1: Assessing the condition of remnant vegetation.* Sydney.

Meat and Livestock Australia, (2005) TIPS & TOOLS – *Natural Resource Management; Native Vegetation 2: Improving the value of remnant vegetation.* Sydney.

Meat and Livestock Australia, (2007), Queensland government, CSIRO (2007) – *Managing recovery: tools for sustainable grazing in the Burdekin catchment*, an information pack for graziers.

RIDC report on the bioeconomic potential for agroforestry in northern cattle grazing systems <https://rirdc.infoservices.com.au/items/09-140>

CSIRO journal article on effect of vegetation management options on property greenhouse gas budget www.publish.csiro.au/?act=view_fie&fie_id=RJo8o55.pdf

Grazing for Healthy Coastal Wetlands: Guidelines for managing coastal wetlands in grazing systems. Queensland Department of Agriculture, Fisheries and Forestry, Brisbane. http://era.deedi.qld.gov.au/3108/1/Grazing_Healthy_Coastal_Wetlands-5527-sec.pdf

Grazing – inland water report, Department of Agriculture, Fisheries and Forestry 2012, Guidelines and template for preparing a wetland management plan. For primary producers (grazing, dryland cropping) in Queensland's inland catchments, Queensland Government, Brisbane.

Key area 4 – Managing grazing pressure

Queensland Department of Primary Industries and Fisheries (2004) *Stocktake: Balancing supply and demand.* Queensland Government, Department of Primary Industries and Fisheries, Brisbane.

FutureBeef website – *Photo-standards for forage budgeting* <http://futurebeef.com.au/page/2/?s=photo+standards>

Key area 5 – Improved pastures and forage crops

Pastures Australia Pasture Picker website, www.pasturepicker.com.au

Key area 6 – Weeds and pest animals

Land Protection (Pest and Stock Route Management) Act 2002 www.legislation.qld.gov.au/LEGISLTN/CURRENT/L/LandPrPSRMAoz.pdf

Western NSW Catchment Authority (2010) Actively control feral animals factsheet www.western.cma.nsw.gov.au/Publications/2010_GBMP1_Actively_control_feral.pdf