

Wet season spelling in the Fitzroy Woodlands

The use of spelling for healthy ecosystems

Why is it important?

Wet season spelling (WSS) has two main purposes –

- maintain or improve land condition
- accumulate biomass

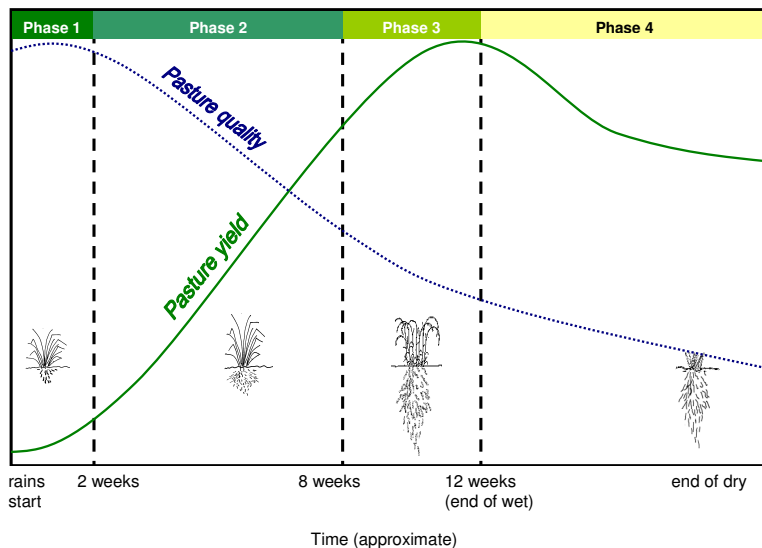
Land in good condition has a high long term carrying capacity (LTCC) and is resilient to disturbances such as fire and drought. Spelling to improve or maintain land condition is best done over the wet season to benefit **3P** (**P**alatable, **P**erennial and **P**roductive) grasses as it increases the health and vigour of the pasture. Improving land condition through WSS can enhance business profitability as LTCC is improved. You need to be conscious of the stocking rate in paddocks not being spelled if animals are retained on property. The increased grazing pressure may have a negative impact on land condition in these paddocks.

How do 3P grasses function?

3P grasses such as desert bluegrass, black speargrass and buffel are the mainstay of animal production; providing ground cover during dry periods and fuel for burning. Most growth, seed set and establishment occurs over the summer period when there is adequate soil moisture, radiation from the sun and daytime temperatures. Four growth phases can be recognised:



Wet season spelling accumulates biomass above and below the ground



Growth phases and pasture quality of grasses

Phase 1

- Short leafy pasture with slow growth rate and high pasture quality
- High sensitivity to grazing pressure

Phase 2

- High growth rate and high pasture quality
- Moderate sensitivity to grazing pressure

Phase 3

- Low growth rate and moderate pasture quality
- Stems and seedheads developing
- Low sensitivity to grazing pressure

Phase 4

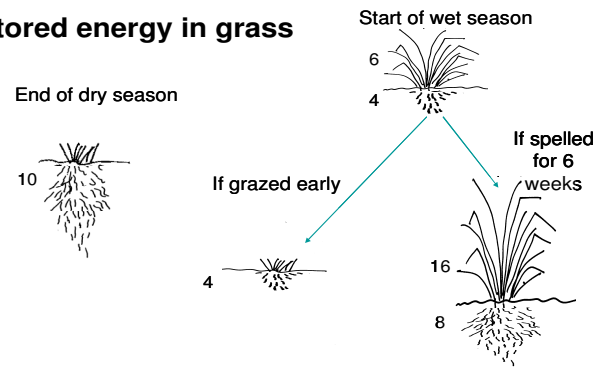
- No growth and low pasture quality
- Low sensitivity to grazing pressure

Importance of stored energy

Perennial grass response to rainfall is fuelled by stored energy contained within their root system. A short, early wet season spell can enhance above ground growth, crown cover and the size of the root system. The net energy balance is increased as the plant produces a large leaf area for strong photosynthesis and growth. Overall plants are more healthy and vigorous which creates resilience in the ecosystem.

If the new growth is heavily grazed early in the wet season, little or no energy is transferred back to the crown and roots as photosynthesis is restricted due to lack of leaf area. The plant then has to draw upon stored energy in the root system for growth, which decreases the size of the root system and the amount of energy which can be stored. The impact may not be evident until the following wet season when the plant's response to rainfall is reduced

Stored energy in grass

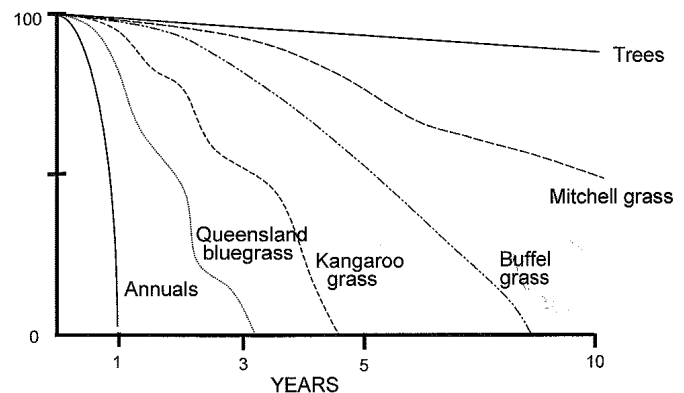


Spelling during phase 1 and 2 promotes root growth (numbers indicate nominal units of energy).

WSS during phase 1 and 2 growth is ideal for pastures with a good composition of 3P grasses. Full WSS will need to be considered where the aim is to improve the composition of 3P grasses by encouraging seed set.

Importance of seed set

Annual pasture species are highly dependant on seedling regeneration. Queensland bluegrass and kangaroo grass are perennial, but not as long lived as buffel grass. It is important to allow these species to set seed regularly to maintain their presence in pastures.



Proportion of population surviving if seedling regeneration is prevented

Profitability

Improving land condition through WSS can enhance business profitability as LTCC is improved. This was examined via a modelling exercise for a hypothetical property at Duaringa for the years 1986 to 2010. Four breeder paddocks with poplar box land types were in poor condition and rotationally grazed with each paddock receiving a six month spell every four years. The herd from the spelled paddock were agisted 100 km away for the six months. The main benefits were an improvement in land condition on the box land type which allowed a 50% gain in LTCC after eight years. The same improvements occurred after 16 years on the less productive poplar box with shrubby understorey land type.

Gross Margin/ha comparison of spelled and continuous grazed paddocks on a hypothetical property at Duaringa.

GM/ha	No spelling	Spelling ¹
Average	\$22.32	\$28.26
Minimum	\$11.51	\$13.88
Maximum	\$31.72	\$42.33
Years – negative	0	0
NPV @ 4%	\$370.37	\$442.62

¹ Includes agistment and freight costs

On ground results

The below sites are located on a miners' common that had been heavily overgrazed. The paddock was then subject to one full wet season spell (2003/04 summer) and stocked continuously to long-term carrying capacity which has resulted in an improvement in land condition over time.

September 2003



September 2010



The box flat (above) has had an improvement in the crown cover and composition of desert bluegrass (3P). The silver-leaved ironbark landtype (below) has had an improvement in crown cover and composition of buffel grass (3P). Interestingly the ironbark site was accidentally burnt in spring 2009

The 4th paddock problem

The 4th paddock problem involves a four paddock rotation where paddocks are similar in size, land types and LTCC. Each paddock gets spelled every 4th year with the other paddocks having an increased stocking rate of 33%. Therefore the 4th paddock is the last paddock to be spelled, and can end up in poor condition. During dry years the 3rd paddock can also end up in poor condition.

While this problem is not easily addressed, there are potential solutions. The first priority is to allocate spelling based on the land condition. The poorer land condition paddocks get spelled first, while paddocks with good land condition are spelled last. Paddocks with good land condition are more stable and resilient to withstand higher stocking rates. Another suggestion is for the stock from the spelled paddock to be agisted for the first four years of the rotation. This allows an improvement in land condition prior to the rotation operating as originally suggested.

The impact of stocking rate

On fertile land types in good condition, spelling is generally not needed at low to moderate stocking rates. For the less fertile land types in poor condition, a full WSS every two to four years may be necessary to improve land condition, especially at higher stocking rates. The duration and frequency of spelling needed for recovery will be less when taking advantage of good seasons. The benefits of spelling may not be as noticeable if the rotation is to begin during a run of poor seasons.

Grazing systems

A recent study examining the grazing systems on nine properties throughout Queensland found no consistent differences in pastures or stocking rates with different levels of management intensity. Therefore it is not necessary to have a high intensity cell system to achieve the benefits from rotational grazing and spelling.

Comparison of pasture yield, land condition and stock days/hectare averaged over trial period (2006-2009)

Grazing System	Pasture Yield (kg/ha)	Land Condition 1=A, 4=D	Stock Days/Ha
Cell	2745	2.0	113
Rotation	2620	2.1	92 ¹
Continuous ²	2766	2.1	115

¹ Rotation data is underestimated due to incomplete records at site

² Continuously grazed paddocks in this study had some degree of spelling associated with their management.

Summary

- Use WSS to improve or maintain land condition.
- Improving land condition can lift LTCC and profits.
- The improvements gained through WSS depends on duration of spell, time of year, the land type, time of year in relation to rainfall and stocking rates.
- If cattle from spelled paddocks are redistributed across the property, care must be taken to avoid overstocking and damaging other pastures.

WSS guidelines

To maintain land condition

- Spell pastures during the growing season in phase 1 and 2 growth to maintain land condition, about once every four years

To improve land condition

- Spell for the whole wet season
- Target land in “C” condition, and ideally, spell annually until land condition improves

The less productive land types and/or poor land condition means that longer and more frequent spelling is needed to improve or maintain land condition.

Spelling may not be possible or effective during a run of below average rainfall years.

Places to go for more information

StockTake: Balancing supply and demand workshop, developed to provide grazing land managers with a practical, systematic way to assess land condition, long-term carrying capacity and calculate short-term forage budgets. Contact Jane Hamilton (via DEEDI Business Information Centre) 13 25 23 or jane.hamilton@deedi.qld.gov.au

MLA EDGENetwork:

Grazing Land Management: Provides land managers with a practical and planned approach to improve land productivity and sustainability Contact Jane Hamilton (via DEEDI Business Information Centre) 13 25 23 or jane.hamilton@deedi.qld.gov.au