

Burning management in the Fitzroy Woodlands

The use of fire for healthy ecosystems

Why use fire on your property?

Generally fire is used to manage native and exotic woody plants, for cattle production and natural habitats for biodiversity conservation. Fire can be a useful tool to maintain and improve ecosystem health.

Specifically for cattle production, fire is able to remove rank grass, however, green pick does not always produce a reliable increase in animal production. Fire can alter pasture composition by encouraging desirable pasture species and suppressing unpalatable species, and spread grazing pressure across a paddock and minimise the effects of patch grazing.

As fire has strongly influenced the evolution of most grazing lands, an appropriate fire regime needs to be considered. Your fire regime also needs to be consistent with your land condition and business goals.

Achieving your desired results from fire is closely linked to how your grazing land is managed. Grass is the key to a successful grazing operation and for a successful burn. To achieve both these outcomes requires careful consideration, particularly pre and post fire management.



A good headfire leaves stubble on the grass crowns, causing minimal damage to growing points. Good flame height gives a good brownout of the woody plants.

Fire regime

As fire is a dynamic process that affects the components of the ecosystem in a variety of different ways, there is no fixed recipe for fire management. One off or irregular fires can have many and varied results on grazing land and animal production. For these reasons having an appropriate fire management regime, where fires are timed for a specific purpose, can help achieve your goals.



Good preparation, equipment and people are critical elements for a successful fire regime.

When thinking about a fire regime there are a number of questions which can help determine the effectiveness of fire to achieve ecosystem health and business goals. How can fire be used to improve ...

- land condition?
- evenness of use?
- diet quality?
- tree/shrub density?

Paddocks should be prioritised for burning with grazing and spelling strategies planned to make best use of the years that are suitable for burning.

The frequency, intensity and time of fires must also be considered when looking at a fire regime. Areas of low productivity or land condition need special consideration as pasture recovery can be slow and may require additional spelling. Areas of high productivity and/or land condition are able to withstand more frequent fires provided subsequent

wet seasons are adequate and pastures have had an opportunity to recover.

If the SOI based forecast is for below average summer rainfall, burning should not be considered. Burning in drier years should be avoided on the less productive areas such as the narrow-leaved ironbark land types.

Improving land condition with fire

Pasture composition and vigour

Desirable pasture species are primarily encouraged via grazing management. The implementation of a fire management regime can improve pasture condition by encouraging desirable pasture plants (like black speargrass) and suppressing less desirable pasture species (like wire grasses) and some weeds. Black speargrass obtains a competitive advantage as the seeds are stimulated to germinate, while wiregrass seeds are consumed or destroyed by fire.

Woody plant and pasture balance

The relationship between woody plants and pasture is a critical one. Woody plants compete with more palatable or more nutritious forage and so reduce the carrying capacity of the area. Generally, higher the woody biomass, lower the pasture biomass. Dense woody vegetation can also harbour pest animals and can interfere with the way cattle utilise and are managed within an area.

Reason for burning	Susceptibility to fire	Intensity and frequency of fire required	Additional comments
Woody species Brigalow	Low	Hot fires every 5–7 years	Fire will help to suppress regrowth and increase the time until mechanical control is needed
Poplar box	Seedlings—High Plants taller than 1.5 m—Low	Cool fires every 3–5 years will maintain open woodlands	Small plants are often several years old, have a well developed lignotuber and resistant to fire
Silver-leaved ironbark	Seedlings—High Plants taller than 1.5 m—Low	Cool fires every 3–5 years will maintain open woodlands	Small plants are often several years old, have a well developed lignotuber and resistant to fire
Currant bush	Low	Cool fires every 3–5 years will maintain open woodlands	Currant bush spreads by layering, which can be encouraged by burning
Wattles	Low	Cool fires every 3–5 years will maintain open woodlands	Wattles regrow rapidly by seed, root suckers or both.
False sandalwood	Low	Medium intensity every 4–7 years	Fire kills very few sandalwoods but will suppress regrowth
Pasture management Decrease undesirable species eg. Wire grasses	Moderate	Cool fires every 5–10 years	Ideally followed by spelling to favour desirable grasses
Reduce patch grazing impact	Not Applicable	Cool fires every 3–5 years	Animals may continue to graze on the unburnt patches
Establish and manage sown pastures	Not Applicable	Cool fire for seca establishment. Burn every 5-10 years to prevent seca dominance	Seca dominant pastures can be unsustainable with poor ground cover and diminished native pastures. Burn and spell to ensure the grasses remain dominant.

Management options utilising fire

Bio-economic modelling conducted on a hypothetical property based at Duaringa found that if tree growth is left unchecked, pasture productivity, carrying capacity and profitability are all reduced. In addition the success of burns for effective tree growth control is dependent of land type productivity, stocking rate and climate. Specifically, conservative stocking rates enhance the likelihood of fuel loads to achieve a burn on a designated year, and for hotter, more effective burns. The modelling concluded that it is important to take opportunities to burn and control tree growth before trees have thickened to a point where pasture growth and standing dry matter decline to a level where fires cannot be carried.

Achieving desired results with fire

Pre fire management

Fuel loads of around 2000 kg/ha are necessary for sufficient fire intensity when managing woody plants. Forage budgeting at the property scale, maybe helpful here if pre-fire pasture spelling is required to ensure adequate fuel loads are accumulated and persist until the time of the fire.



2050 kg/ha pasture material on forest country.



2650 kg/ha pasture material on scrub country with brigalow regrowth.

Post fire management

Spelling after the fire event ensures that heavy grazing does not damage the regrowing grasses particularly if the post fire wet season is a poor one. Reducing stocking rates in paddocks that are patch burnt may need to be considered as animals will favour the burnt country. Ideally, **3P** (**P**erennial, **P**alatable and **P**roductive) grasses are allowed to set seed or achieve phase 3 growth in the post-fire period. This may require destocking or, at least very low stocking rates.

Fire can promote germination of some woody species, notably wattle species. It is important to monitor the area in the post fire period in order to be able to respond appropriately to large-scale germination events. If large recruitment events are triggered by a fire, a second fire may be useful. Conducting a second prescribed fire before recruits set seed could reduce the build-up of seed-banks particularly some wattle species.

PHASE 3 (SEEDING) is characterised by:

- seedhead development
- low pasture growth rate
- moderate forage quality and maximum yield
- low to moderate sensitivity to grazing pressure

For buffel grass Phase 3 is:

- when spelled paddocks can start to be grazed, once seeding has started
- when high grazing pressure starts to do less damage to mature tussocks and seedlings



Buffel grass phase 3 (seeding)

Producer case study – their experience with burning

The Williams family properties are 15 kilometres north west of Rubyvale with the main land types being silver-leaved ironbark, box flats and softwood scrub. About half of the aggregation is cleared with good stands of buffel and native grasses. The treed areas are well grassed with healthy stands of desert bluegrass, black speargrass and kangaroo grass. Land condition is very good and infrastructure has been well developed over the last 40 years. Cattle are run as a self replacing herd with most of the turnoff steers and heifers going to the JapOx and local trade markets.

Glynn believes that *“to burn at any time during the year is beneficial.”* In the early days the burns were frequent and uncontrolled due to a lack of infrastructure and resources. More recently the burns are well controlled. Together with a light stocking rate regime, benefits received from the burns include:

- Enhanced animal production
- Maintaining tree and shrub density
- Regrowth management
- Maintaining good land condition

Glynn believes the burning management has been consistent over the last 100 years, averaging about once every three years. Cool fires and patch burning is used on the forest country, while hotter fires are used for regrowth control.



Kim Williams, Back paddock, April 2011.

Back paddock for example was patch burned in February 2011. Good land condition, light stocking and good summer rain has resulted in good regrowth of desert bluegrass and black speargrass

Even as the properties became more developed, paddocks continued to be burnt about every three years. The benefit of property development is burning can be delayed until there is adequate soil moisture for grasses to regrow straight after the fire. Usually about one quarter of a paddock is burnt to ensure there is a safety margin of feed retained. Cattle remain in the paddock to obtain the benefit from the fresh growth. In subsequent years a separate section of the paddock is burnt. Cattle patch graze the newly burnt section and the previously burnt area effectively receives a rest from grazing.

“Never burn more than ¼ of a paddock to keep a safe feed reserve!”

The cleared country has a different fire regime due to a different desired outcome. The aim here is for a hotter fire to remove logs and suppress the growth of the currant bush, silver-leaved ironbark and wilga regrowth. Therefore, more grass for a bigger fuel load is required together with hot weather conditions. Four or five years may be required between burns to generate the higher fuel load. Adequate soil moisture to generate healthy grass regrowth is essential when managing hot burns.

In summary, 100 years of burning management on forest and scrub country has demonstrated benefits for animal production, maintaining land condition and managing tree, shrub and regrowth density. Infrastructure development over the last 40 years have allowed a greater degree of control and targeted burning. Cool fires, patch burnt on forest country about every three years, or hotter fires for regrowth control have been a successful management combination for the Williams family.



Pulled paddock, April 2011. Cleared in 2000, burnt October 2008 and regrowth chained June 2009.

Places to go for more information

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 25