Broader Brigalow Belt South

Fire Management Guidelines

Appropriate fire management practices to help land managers plan hazard reduction burning and undertake planned burns to improve production and conservation outcomes

Australian Government

Catchment Solutions

Introduction

Catchment Solutions Rural and Landscape Fire Management

Catchment Solutions is a Queensland based service provider, offering specialised environmental services. One of the company's three core capabilities is rural and landscape fire management. As part of the wider Reef Catchments Group, Catchment Solutions works seamlessly across private and all levels of the public sectors to deliver results where they matter.

For more information and contact details, visit the website **www.catchmentsolutions.com.au.**

The Catchment Solutions Fire Management program was formed to reduce the threat of inappropriate fire on the unique natural and economic values of the Queensland environment.

Catchment Solutions works in partnership with volunteer rural fire brigades, government and landholders to develop tools that balance and optimise the hazard reduction, primary production and biodiversity aims of fire management. These fire management guidelines are the culmination of extensive discussions with experienced members of the volunteer rural fire brigades and other respected fire managers and fire scientists. These guidelines are intended to be used by volunteer rural fire brigades and landowners who are on the front line in managing fire in rural communities.

Using these guidelines

These fire management guidelines have been developed for 20 landscape types in the Broader Brigalow Belt South region. These landscape types are composed of vegetation types that require similar fire prescriptions.

Four important factors to consider when planning for fire management are:

- **Fire frequency** – how often should an area be burnt
- **Fire intensity** – how hot does the fire need to be
- **Season** – what time of year will usually provide the desired conditions for a planned burn
- **Burning mosaic** – the percentage of ground cover remaining unburnt after a fire

Other important factors to consider are fuel loads, wind speed, humidity, fuel curing, slope and aspect.

These guidelines are not intended to account for all circumstances. Seasonal, yearly and even daily conditions can vary dramatically. Plan ahead, carry out burns when conditions are suitable and always obtain and adhere to conditions of a permit from your fire warden.

Frequency

GREEN – Under most circumstances the number of years between burns should fall within the GREEN range. This range is generally considered appropriate for hazard management, production and conservation outcomes.

ORANGE – Under some circumstance there may be a need for more or less frequent fire, but this should fall within the ORANGE range. Generally, this would occur as a 'one off' e.g. two fires in three years to reduce a lantana infestation.

RED – Generally, it would be considered undesirable for fire frequency to fall within the RED range. For example these long periods of time between fires would result in undesired vegetation thickening and loss of pasture productivity.

NOTE. Defining frequency by 'years' can be misleading e.g. in times of drought or particularly high rainfall. An average year would be defined by having received +/- 20% of the local average annual rainfall by May.

Season

GREEN – Under most circumstances the desired conditions will be available within the GREEN season/s.

ORANGE – Desired fire conditions will sometimes fall within the ORANGE season/s. Specific requirements for a particular burn will vary under different circumstances e.g. storm burning requires relatively high soil moisture.

RED – Under most circumstances, conditions within the RED range of seasons would result in damaging fire and/or fire that is difficult to control.

Mosaic

Patchy fuels produced by mosaic burns can be very effective in reducing the intensity and spread of wildfire, without risking the complete loss of pasture grasses, soils and nutrients. This will also protect the land from weed infestations or environmental damage that sometimes results from complete removal of the ground layer from large areas.

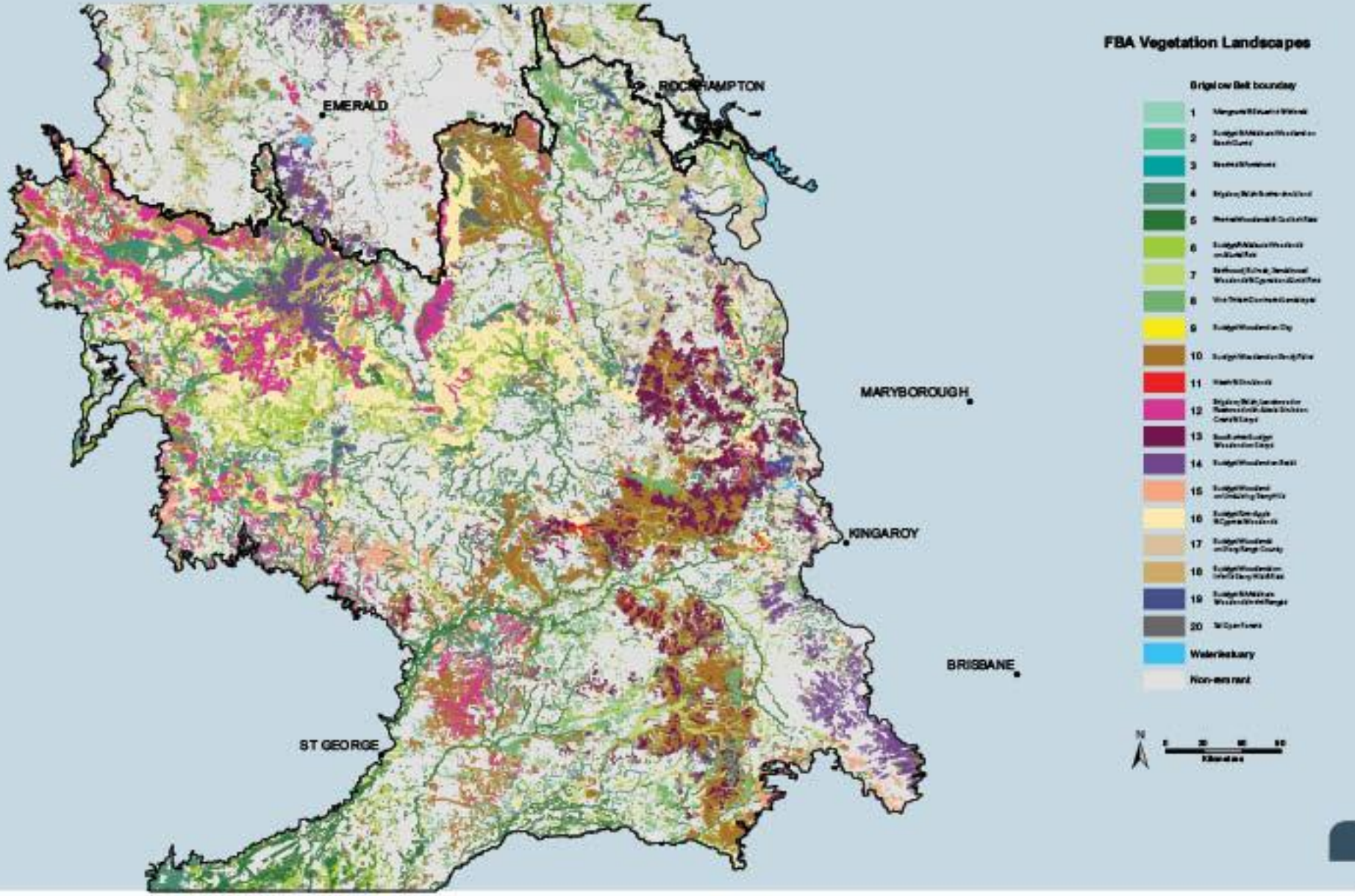
Intensity

LOW intensity fire is < 1m in height.

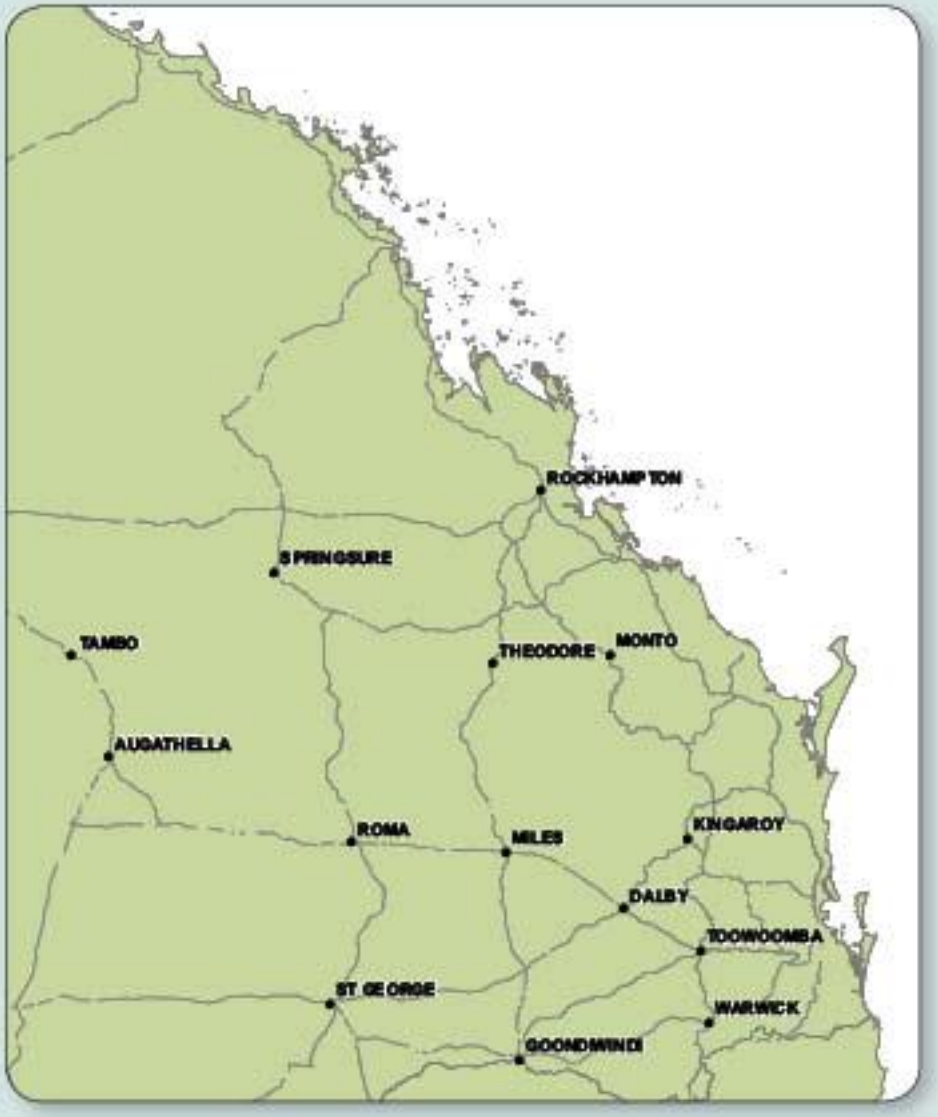
MODERATE intensity fire is < 2m in height.

HIGH intensity fire is > 2m in height.

Vegetation Groups of the Broader Brigalow Belt South Region



Broader Brigalow Belt South Region



The Brigalow Belt is a large area covering 36,400,000 ha. It covers much of the 500-750mm annual rainfall belt from the Queensland – New South Wales border to Townsville. Named after the brigalow tree (*Acacia harpophylla*), the climate, soils, plants and animals of such a vast area are complex. The Bioregion can be split into North and South, the Brigalow Belt South (BBS) northern boundary is just south of Rockhampton to reflect weather changes.

This fire management guide has been developed for the 22 provinces of the Broader Brigalow Belt South Region, which covers 21,590,000 ha.

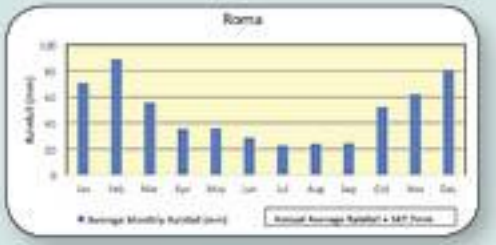
The rainfall in the south decreases from East to West as the charts below demonstrate.

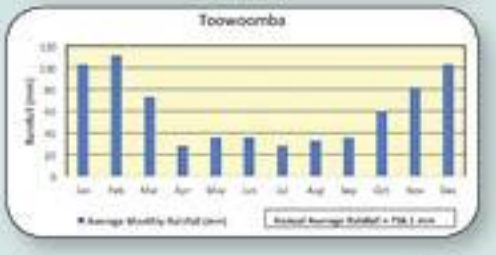
A number of landscapes will have two main pictures due to variation in the type from East to West, or North to South.

The area has been extensively cleared for agriculture and improved pastures for grazing. Coal seam gas production is a recent addition to the Broader Brigalow Belt South landscape.

The aim of this document is to provide guidelines that address three primary rationales for fire management: burning for hazard reduction; primary production; and/or conservation.

It is hoped that the guidelines will provide the basis for a conversation amongst neighbours on the timing and use of fire in their landscapes.





The Landscapes of the Broader Brigalow Belt South Region

Landscapes are groupings of various vegetation types within the Broader Brigalow Belt South Region. The above photograph has four main fire guideline landscapes.

1. The dark green 'V' below the cliffs is Landscape 5: Vine thicket dominated landscapes.
2. Landscape 10: Box and other Eucalypt woodlands on scarps is the country above the cliffs.
3. Landscape 14: Eucalypt woodlands on stony range country is the silver leaf iron bark up against the vine thicket.
4. Modified/cleared country is the grass in the foreground. The grass is Black Spear Grass, a native grass in a modified landscape, with the old dead trees showing that fire is regularly used to keep regrowth at bay.

The fire guidelines are intended to be viewed at the landscape scale rather than a single, small property view. Similarly a fire regime is a sequence of fires over time rather than a single event.

Mangroves and Estuarine Wetlands

Including saltwater couch and salt marsh flats

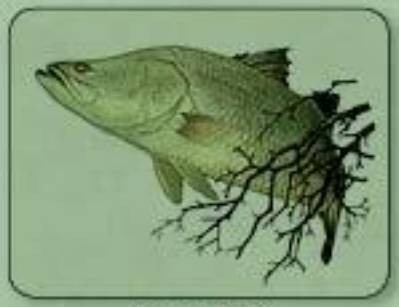
Landscape 1

Burning is generally not recommended in this landscape

Mangroves, saltmarsh, saltwater couch, saltpan vegetation, and fringing melaleuca forests and pandanus.

Mangroves and Estuarine Wetlands

Including saltwater couch and salt marsh flats



Barramundi

Hazard Reduction

Mangroves, adjacent saltwater grassland, and salt marsh are continually flooded by high tides throughout the year. Because of this, they maintain a high soil moisture and green growth throughout the year. Wildfire is rarely a risk.

The fringes of these areas can become infested with exotic species such as Guinea grass that can develop high fuel loads along fringing areas between mangroves and other coastal vegetation. There may be a need to reduce these fuels to prevent fire movement along these margins. However this is best done by means other than fire (such as glyphosate herbicide) as some exotic grasses such as Guinea grass are fire promoted and can build significant amounts of fuel in even a single growing season. Therefore fuel reduction burning would need to be done virtually every year to reduce risk, placing a significant burden on the land manager. As a fire promoted species, burning this grass can make the fire hazard worse and this can severely damage mangroves and adjacent coastal vegetation.

Production

Mangroves are well known habitat and nurseries for fish and crustaceans. More recently, it has become obvious that saltwater grassland and salt marsh are critical feeding areas for many fish and crustacean species during high tide periods. A decrease in pasture biomass through fire or overgrazing will reduce the habitat value and therefore fisheries production. Saltwater couch can be highly productive, high in protein and digestible. However if grazed, care should be taken to manage stock during periods of higher tides as the wet soil will easily become rutted which can result in increased salt retention after high tides and eventual scalding. This can result in increased areas of bare soil, limiting the production value for both fisheries and stock.

Conservation

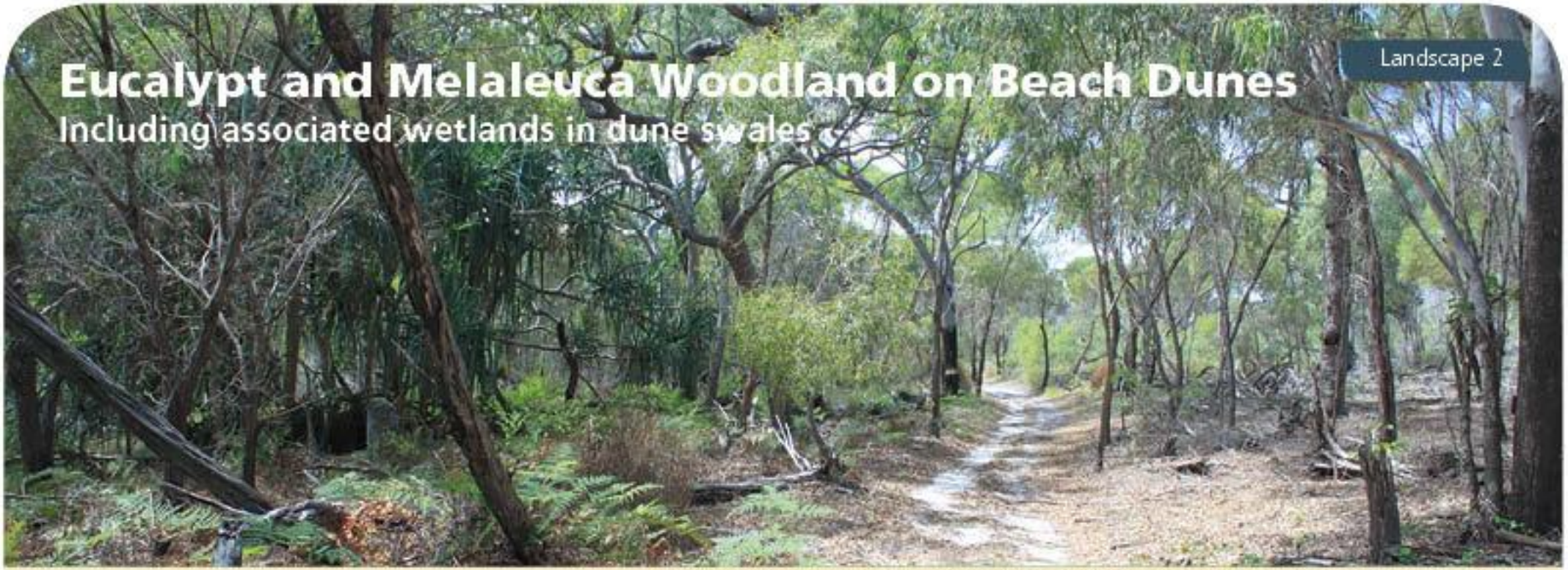
These wetlands are important for the conservation of numerous species including migratory birds and the mangrove mouse. Careful management of the land to maintain production values will also retain conservation values and benefit these species. Maintaining these wetlands in a healthy condition by carefully managing grazing and avoiding fire, will also assist them in filtering excess nutrients and sediment from water runoff preventing these from impacting on coastal fringing reefs and seagrass beds and the wildlife these support.

Regional Ecosystems

11.1.1 11.1.2 11.1.3
11.1.4

Eucalypt and Melaleuca Woodland on Beach Dunes

Including associated wetlands in dune swales



Woodlands of Moreton Bay ash, poplar gum, paper bark, Queensland peppermint with wattles, weeping tea tree and coastal banksias as a shrubby understory and/or sedges and grasslands on coastal dunes.

Eucalypt and Melaleuca Woodland on Beach Dunes

Including associated wetlands in dune swales

Hazard Reduction

Vegetation on the back of beach dunes seldom poses any significant threat. However where there is buildup of exotic grasses such as Guinea grass, some fuel reduction may be required. A low intensity fire with good soil moisture (e.g. shortly after a storm) followed by patch spraying of the recovering grass tussocks should provide good results. Planned burning should not be any more frequent than every 3 years.

Generally native grasses do not accumulate large amounts of fuels compared to exotics; so control of weed grasses will reduce the need for hazard reduction burning and therefore long-term management costs.

Wetlands and swamps can often be used as fire breaks themselves as they will retain green vegetation even when the surrounding areas become flammable. Unless the season is very dry, they do not provide the fuel that would result in a high intensity fire.

Production

Clearing and introduction of exotic pasture species coupled with the impacts of stock can severely impact fragile dune systems and typically results in an increase in weeds such as rubber vine. Generally these areas do not support productive pastures and grazing pressures simply produces a reservoir of exotic weeds that spread into more valuable grazing lands nearby. If weeds such as rubber vine are present in significant densities fire could be used to gain initial control.

Rubber vine seed, seedlings and young plants are fire sensitive and larger plants will be reduced in size allowing more efficient and cost effective follow up chemical control. The longer the stems are heated by fire the better the result will be. Use a moderate intensity backing fire in combination with good soil moisture to produce the best results.

Conservation

Wetlands and swamps within this landscape require fire at a longer interval to retain ground layer diversity and allow young canopy trees to obtain sufficient height to ensure they are not affected by the planned burn. Fires should be of low intensity to create a good mosaic. Fire should not be used more than once every five years. Generally native wetland vegetation will not promote a high intensity fire.

It is recommended that fire is only applied to gain initial control of weeds such as rubber vine, to prevent vegetation thickening and to manage rainforest emergence into woodlands.

Burning as soon as fire will carry after 30–50mm of rainfall will likely achieve the desired results and will be effective in control of many woody weeds.

Disturbance of these habitats is caused by 4WD tracks, stock trampling, and feral pig activity. This allows exotic species to infiltrate the landscape resulting in higher fuel loads and increased fire hazard. Reducing disturbance is a cost effective way to minimise fuel development.

Regional Ecosystems

11.2.1 11.2.5 11.2.4

Beaches and Foreshores

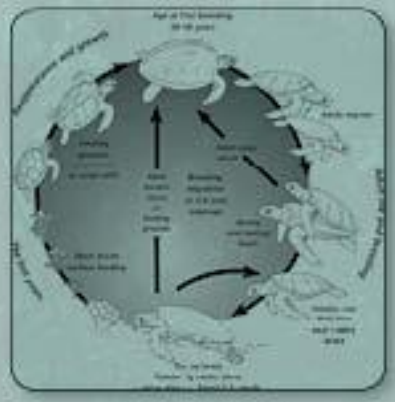
Including "beach scrub"

Burning is generally not recommended in this landscape

Beaches and foreshores induding "beach scrub".

Beaches and Foreshores

Including "beach scrub"



Turtle Life Cycle

Hazard Reduction

Coastal dunes are poor in nutrients, high in salt, exposed to other marine influences and rarely accumulate sufficient fuel to support anything but a low intensity fire. Fuel reduction burns are better conducted within adjacent eucalypt and melaleuca woodland. In some cases, exotic grasses and weeds can increase fuel loads to larger amounts. Control of these invasive species is best done by herbicide application as even very low intensity fire kills fire sensitive canopy trees such as beach she-oaks.

Death of these trees results in reduced canopy shading which allows even more exotic species to establish and accumulate fuels. In addition, the loss of these trees reduces the capacity of beach vegetation to capture wind-borne sand and thus the capacity of the beach to recover from periodic storm driven erosion events.

Production

These areas have no production value and even ad hoc grazing can result in the type of disturbance that leads to infestation of woody weeds such as rubber vine.

Conservation

Beach scrub vegetation is highly valued as a conservation asset due to the diversity of species it supports and as habitat for a large number of iconic and/or threatened species such as northern quolls and the rose-crowned fruit doves and other fruit eating pigeons.

Beach scrub is naturally resilient to infestation by weeds if left undisturbed. However this vegetation is fire sensitive and even low intensity fire will damage its margins and result in weed infestation. All practical efforts should be made to keep fire away from these areas. Open beach foreshore vegetation is of particular value in helping stabilise beach fronts, which themselves are critical nesting habitat for marine turtles. These areas should not be burnt.

Regional Ecosystems

11.2.2 11.2.3

Brigalow, Belah & other shrub land

Including alluvial and stony flats and associated vine thickets

Brigalow, Belah and other shrub land including alluvial and stony flats and associated vine thickets.

Brigalow, Belah & other shrub land

Including alluvial and stony flats and associated vine thickets

Low intensity fire damage to Brigalow stand.

Dead leaves still attached to trees indicates a low intensity fire.

Regional Ecosystems

11.3.1	11.3.5	11.3.16
11.3.17	11.9.1	11.9.4
11.9.5	11.9.6	11.9.8
11.9.10	11.9.11	11.9.14

Hazard Reduction

Brigalow, belah and the associated vine thicket species in this landscape do not present a fire threat because they do not develop a significant fuel load. In a typical season they can form part of a natural fire break system that can be used in property fire management planning. Late dry season wildfires in drier years can damage this vegetation type. Protection of these fire sensitive communities requires fuel reduction burning in the adjacent eucalypt communities.

Reducing the fuel hazard in adjacent vegetation should be done when soil moisture is high. Use natural features or wind direction to burn away from the edge of the brigalow, belah and vine thickets to ensure minimal damage from planned fires. Creating a mosaic fire pattern as the adjacent country dries out will improve the protection from late season wildfires and retain patches of pasture for grazing.

Production

These vegetation communities offer little production value. They generally have a sparse ground cover and provide minimal pasture for grazing. In heavier black soils, this landscape can provide some native pasture growth and may be useful as shade areas.

Brigalow and belah return nitrogen to soil and some regrowth is often retained to help soils recover their nutrient status. Vine thickets offer no production value but have high conservation values. Cattle often 'camp' within these systems which can cause a direct loss of the shrub layer through trampling.

The risk is that exotic grasses such as buffel grass will invade the edge and then fire will follow the grass. A low intensity fire will still cause significant damage and death in adult brigalow, belah and vine scrub species. Watering points should be placed outside this vegetation type.

Conservation

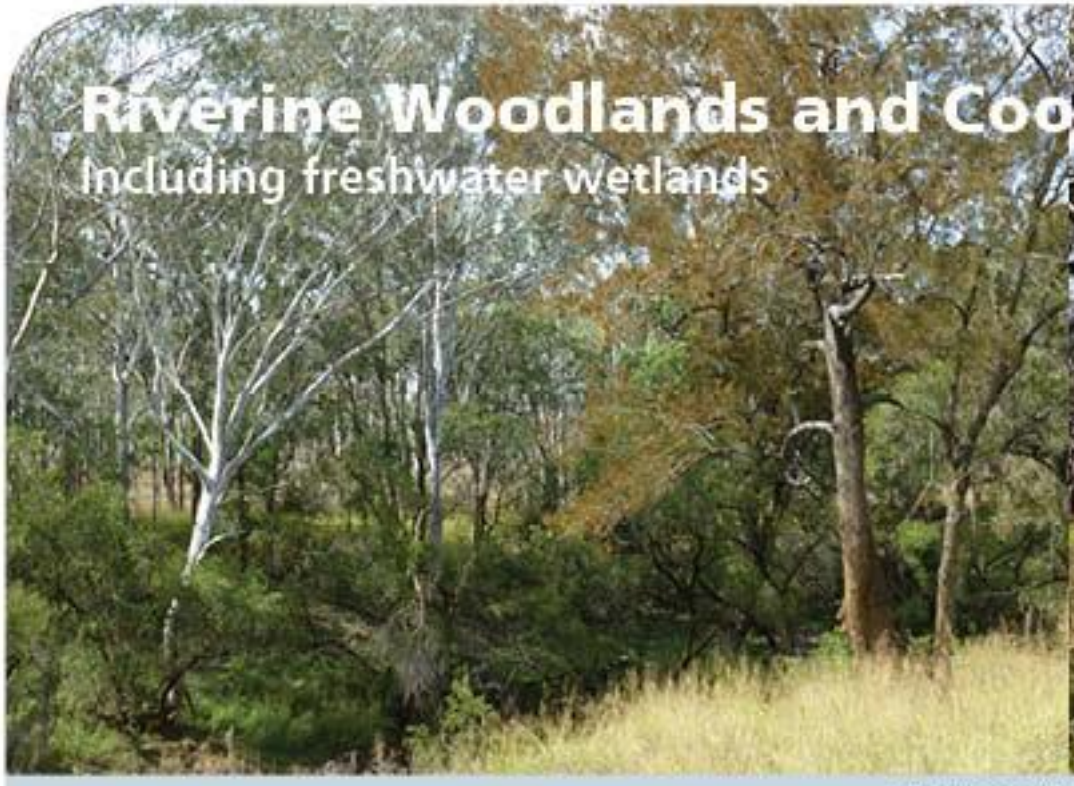
These vegetation communities are fire sensitive so fire should be excluded. Brigalow and associated acacias are soft seeded so do not require fire for germination. Brigalow and associated trees and shrubs have well established roots and will sucker from these after damage from low to moderate fire events. High intensity fire events will kill the entire plant.

Larger species such as gidgee, brigalow, blackwood, and belah, can all be killed by even a low intensity fire. These species are long lived and soft seeded and rely on high rainfall years for their germination. Seeds of very few species such as lancewood can tolerate a low intensity fire, however these trees can take up to 20 years to fully mature. If a fire does go through a lancewood area, ensure the landscape remains fire free for at least 20 years.

Fire protection for these areas should be provided by fuel reduction burns early in the dry season, in the adjoining eucalypt communities This will often require several attempts over several weeks as the country dries out, creating a fine scale mosaic. Use wind direction, topography and time of day to light away from the Brigalow rather than burn up to it.

Riverine Woodlands and Coolibah Flats

Including freshwater wetlands



Woodlands of Coolibah, Forest Red Gum/Blue Gum, River Red Gum with a shrubby to grassy understory.

Riverine Woodlands and Coolibah Flats

Including freshwater wetlands

Old trees have hollows which provide homes for a range of species such as possums, gliders, owls, parrots and lorikeets. It takes many years to replace a tree with hollows.

Flooding can deposit debris increasing the fuel load and potential threat to old habitat trees.

Regional Ecosystems

11.3.3	11.3.15	11.3.25
11.3.27	11.3.28	11.3.37

Hazard Reduction

Hazard reduction burning within the broader landscape is important to protect late dry season pastures from late dry season fires. It also assists in protecting adjacent fire sensitive vegetation. Hazard reduction burning should begin as soon as the country will carry a fire after the wet season or the first storm.

Progressive burning as the grasses cure will provide a good mosaic of burnt and unburnt areas that will provide protection from late season wildfires. Ideally, vegetation within and directly adjacent to riverine channels should not be burnt as this will form a 'green break' which will prevent passage of all but the high intensity wildfire.

Dry soil conditions do not allow pastures to compete effectively against weeds. Where practical use local topography and prevailing winds to put in burnt breaks that can be used later. Storm burning along access tracks will assist pastures to compete effectively against weeds, reducing the likelihood of weeds taking hold.

Production

These woodlands can carry a good pasture, as do freshwater wetlands which provide a range of grasses and forbs. The wetter nature of these areas means they can offer a late dry season grazing opportunity. A low intensity fire after the first storm can be used to remove rank grass and freshen the pasture.

Late dry season grazing will generally keep fuels low, so the frequency of fire should usually be within a range of five to seven years along riverine terraces and alluvial flats and up to ten years around wetland areas. Burning with good soil moisture is important to prevent weed invasion, so late dry season burning should be avoided.

Flooding can carry weed seeds onto these flats. A slower moving, low to moderate intensity fire may be useful in weed control. Plan to burn after spring rain when the grasses will recover quickly out competing the weeds.

Conservation

Planned burning in this landscape should aim to promote patchy fires to ensure a broad range of understory species and habitat conditions (i.e. age after fire) in the landscape. Ideally, vegetation within and directly adjacent to riverine channels should not be burnt.

Avoid burning the balance of this landscape for approximately three years after a major flood as flooding produces a similar disturbance to burning by providing a seed bed and reducing fuel loads. The three year minimum after flooding, provides for recruitment and allows the smaller flood debris to mulch down reducing overall fuel loads.

A good indicator of fire frequency is that the saplings recruited from the previous fire or flood should be of sufficient size to regrow from their tops after a fire of low to moderate intensity. This landscape should always be burnt with good soil moisture to minimise the loss of habitats such as tree hollows and hollow logs. Flood debris can increase fuel loads against habitat trees, so remove accumulated debris from against older trees.

Eucalypt/Melaleuca Woodlands on Alluvial Flats

Including grassy flats

Variable woodlands to grassy woodlands with Poplar Box, Bloodwood, Blue Gum, Black Tea Tree and Gum Top Box. Native grasses are predominately Blue Grass, Black Spear, Mitchell or Pitted Blue Grass.

Eucalypt/Melaleuca Woodlands on Alluvial Flats

Including grassy flats

Regional Ecosystems

11.3.2	11.3.4	11.3.6
11.3.7	11.3.20	11.3.21
11.3.23	11.3.26	11.3.29
11.3.36	11.3.39	11.5.7

Hazard Reduction

This is an important landscape for undertaking planned burns to protect adjacent fire sensitive vegetation such as 'in channel' riverine woodlands. Burning for production and conservation outcomes would be expected to also achieve property protection goals for this landscape by breaking the area up progressively into a mosaic of burnt and unburnt areas when fuels have cured sufficiently after the wet season. Secure boundaries early and then continue a series of smaller fires rather than broad scale burning.

Topography and prevailing winds can be used to conduct smaller burns over several months within the secured boundaries. Aim to burn no more than 20% of a paddock or property in one year; co-ordinate boundary burns with neighbours to prevent frequent low intensity fires and the associated risks of woody thickening and weed infestations.

Production

This landscape is productive country where the fire frequency will be directly related to grazing pressure. A good balance of trees and grass in more heavily grazed areas is achieved by applying a moderate intensity fire every three to six years. Destocking for a period prior to the planned burn will assist in increasing fuel loads in more heavily grazed paddocks in order to achieve the moderate severity required to kill tree suckers. Lighter grazed areas benefit from a low to moderate intensity fire every two to four years to remove old grass. Restrict grazing post-fire, when pastures are in the early stage of growth to enable them to achieve vigour. Soil moisture is a critical factor for planned burning in this landscape and early dry or storm season burns will give the best results. Burning during the dry season will harm the soil by removing the mulch layer and grass seed store. Vegetation thickening or an increase in lantana can occur in heavily grazed areas that are not burned periodically. Control of woody regrowth and dense weed infestations may require a hotter fire (fuel loads of 2000 kg/ha or greater may be needed). Control of tree thickening by fire is difficult to achieve once the regrowth grows above potential flame height.

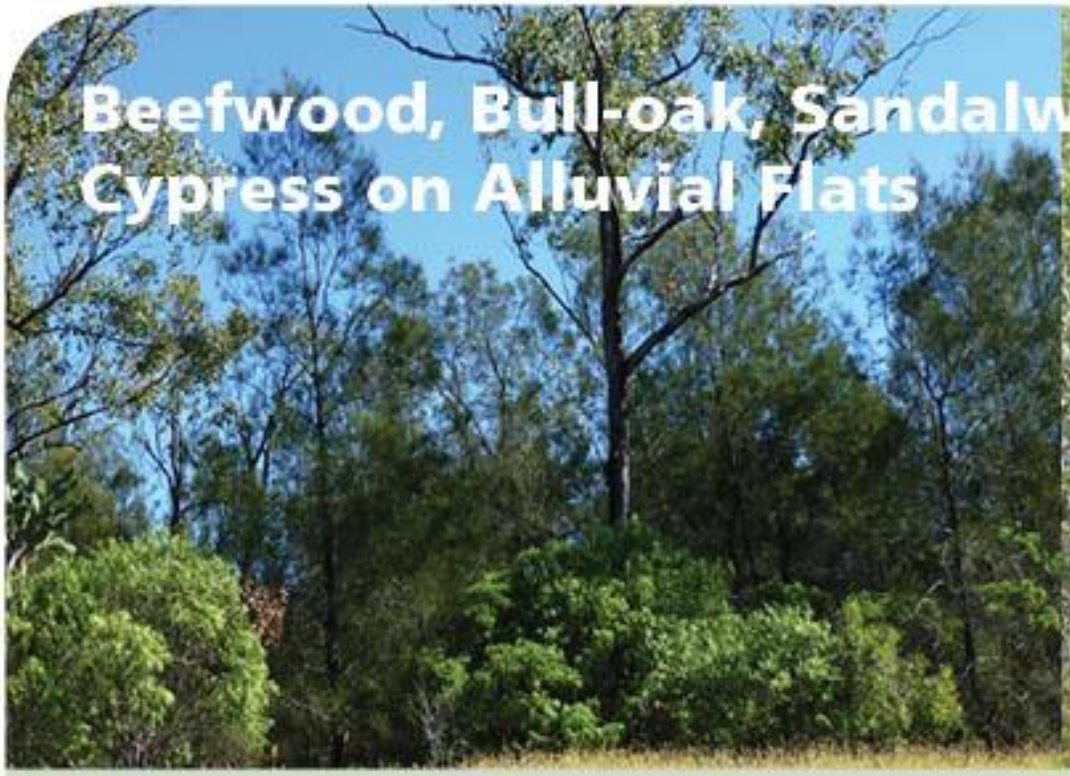
Conservation

Controlling weeds and woody regrowth is a major focus of planned burns in this landscape, and is particularly important to maintain natural grasslands. Small scale, patchy burns as the country dries out gives a good variation in fire intensity and time since last burn. Avoid burning for three years after a major flood as flooding produces a similar disturbance to burning by providing a seed bed and reducing fuel loads.

Identifying and retaining habitat trees, such as mature blue gums, will help conserve significant species like gliders and provide seed trees for future regeneration.

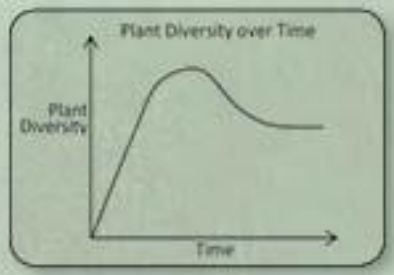
Burn only when there is good soil moisture, and aim to vary the time of burning from early dry to storm season as conditions allow. Indicators of successful fire management include: a diverse grass layer; standing hollow-bearing trees; and an open woodland vegetation structure.

Beefwood, Bull-oak, Sandalwood Woodlands and Cypress on Alluvial Flats



Beefwood, Bull-oak, Sandalwood woodlands often in association with Scribbly Gum and/or smooth Barked Apple and Cypress on alluvial flats.

Beefwood, Bull-oak, Sandalwood Woodlands and Cypress on Alluvial Flats



Hazard Reduction

This vegetation type generally has a very sparse ground layer except where exotic grasses have established. The canopy trees do not shed much leaf litter so there is little buildup of fuel. Exotic grass establishment within this landscape increases the fuel load exponentially and results in an increase in fire intensity that can damage mature trees. Areas of exotic grasses like buffel grass, should be burnt as soon after the wet season as a fire will carry. The aim of hazard reduction in this landscape is to have a variation in the time since last fire to protect the landscape type and adjacent fire sensitive vegetation communities from wildfire. However, fire should not be used more frequently than twice in a ten year period. Fire adapted eucalypt communities adjacent to this landscape type should be included in broad scale protection burns.

Production

This landscape has been extensively cleared for agriculture and grazing. Fire is generally used for removing old grass and therefore is best used when soil moisture is high so grasses can recover quickly. Good spring storms with the likelihood of follow up rain or early dry season after the wet are suitable opportunities. Much of this landscape has significant areas of introduced grasses, particularly buffel grass, so the choice of burning season should reflect the pasture characteristics. A low to moderate intensity fire with good soil moisture should provide a rapid response from pasture grasses, reducing the opportunity for woody weed invasion.

Conservation

Where practical, established exotic grasses should be removed from the vegetation prior to burning as these fuels can generate enough heat to kill mature trees. Patchy mosaic burns of low intensity, early in the dry can provide protection from later wildfires. High fire intensities will kill parent trees in bull oak stands. A low intensity fire several years later maybe required to reduce the stem density.

Bull-oak is an important food source for Glossy black-cockatoos who favour returning to certain trees and stands rather than feeding across available resources.

In areas bounded by Millmerran, Cecil Plains, Goodiwindi and Leyburn there is a rare species of butterfly known as the Bull-oak Jewel Butterfly (*Hypochrysops piceatus*), that inhabits old aged stands of bull-oak in association with an ant. The butterfly's larvae shelter in the daytime in holes formed by the xyloryctid moth larvae and feed at night in the fresh upper branches of the bull-oak tree. The ant provides protection for the Bull-oak Jewel Butterfly larvae from wasps and spiders in return for nutritious secretions produced by glands on the larvae's back. Low intensity fires remove the leaf litter crucial for the ants and can damage the ant's nests. Moderate or high intensity fires will kill the adult trees and remove the butterfly altogether.

Road reserves and any common land with mature bull oak stands should be checked for Bull-oak Jewel habitat prior to any planned burns.

Regional Ecosystems

11.3.13 11.3.32 11.3.33
11.3.18

Vine Thicket Dominated Landscapes

Burning is generally not recommended in this landscape

Vine thicket, Blackwood, Gidgee, Brigalow and Belah Scrubby Woodlands to open forest on clay plains. Vine thickets on Basalt. Vine thickets, Brigalow, Belah, Cyprus Pine and Bull-oak on sandy plains. Vine thickets, Brigalow, Acacia Scrubs, very shrubby Eucalypt woodlands on stony soils usually in range country and hills. Vine thicket, Hoop Pine and Brigalow or other Acacia.

Vine Thicket Dominated Landscapes

Bottle tree with recovering scrubs.

Edge of brigalow scrub showing fire damage with dead trees, from fires entering the stand.

Regional Ecosystems

11.4.1	11.4.3	11.4.7
1.4.8	11.4.9	11.5.4
11.5.15	11.5.16	11.8.3
11.8.6	11.8.9	11.8.13
11.11.1	11.11.2	11.11.5
11.11.13	11.11.13	11.11.14
11.11.16	11.11.18	11.11.19
11.11.21	11.12.4	11.12.21

Hazard Reduction

Vine thickets in the southern Brigalow Belt rarely pose any wildfire threat and indeed are often useful as 'green breaks' that disrupt the passage of fire. Many of the species are fire intolerant, and a naturally sparse ground layer results in little fuel development that would support fire.

Introduced species including grasses can, however, cause an unnaturally high fuel load particularly on vine thicket boundaries. Lantana will also develop along boundary areas where light levels are higher.

The use of fire to reduce grass fuels and lantana will generally kill vine thicket species, resulting in a more open canopy and subsequently expansion of introduced grasses and lantana.

It is recommended that if vine thickets are going to be used as 'green breaks', protect them by lighting against the vine thicket rather than push a fire into the vine thicket.

Production

This landscape generally provides a very sparse pasture and is of little to no use in production.

Conservation

Vine thickets within this landscape type contain areas of significant ecological value. Vine thickets and many of the species associated with them are extremely fire sensitive. These areas may contain trees such as the bottle tree (*Brachychition rupestre*), Ooline (*Cadellia pentastylis*) and other scrub species that are susceptible to even low intensity fire. The vine thickets and scrubs have good nutrient cycles with a well established mulch layer and seed bed.

The Black–Breasted Button Quail (*Turnix melanogaster*), rely on this leaf litter, foraging for invertebrates for their food. Even a low intensity fire trickling into the scrub edge will cause loss of the leaf litter and death to the edge trees. A reduction in the area of vine thickets and scrubs obviously reduces the habitat for the button quail.

In addition, fires impacting these areas, open the canopy and allow grasses such as Buffel Grass to invade, making them more susceptible to future fires. This damaging cycle of exotic grass invasion, followed by fire, followed by further grass invasion requires intervention.

Grazing is the best option when attempting to reduce these invasions. Graze along the edge of vine thickets and adjacent landscapes to control species such as Buffel Grass.

Once grazed, maintain the edges with herbicide and promote natural regeneration for vine thickets where desired. Protection burns should be undertaken in the adjacent fire adapted vegetation, with care to direct fire away from the scrub edge rather than let fire burn up into the scrub.

Male Black-Breasted Button Quail and chick
Luke Hogan (Qld Herbarium)

Black-Breasted Button Quail chicks
Luke Hogan (Qld Herbarium)

Eucalypt Woodland on Clay Plains

Including grassland on clay plains

Grassy woodlands of Blue Gum, Coolibah or River Red Gum. May have isolated patches of Brigalow. Native grasses are mainly Blue Grass or Mitchell Grass.

Eucalypt Woodland on Clay Plains

Including grassland on clay plains

Regional Ecosystems

11.4.2 11.4.4 11.4.10
11.4.12

Hazard Reduction

The main aim for hazard reduction is to provide a patchy mosaic of varying fuel loads which will offer some protection against spread of late season wildfire. Eucalypt woodland and grasslands on clay plains tend to retain soil moisture later into the dry season than the surrounding vegetation on sand or alluvium. This means that these areas are able to contain planned burns later into the dry season than surrounding land types. However, curing of grasses can occur rapidly (particularly if grasses are frosted) and thus fire intensity and risk will develop quickly as the dry season progresses. Hazard reduction burns within this landscape should begin as soon as fire will carry and wherever possible with some soil moisture to allow native grasses and herbs to re-colonise burnt areas quickly. The organic layer is an important component of a soil profile. It is imperative that consideration be given to this 'earth' layer when planning burns. Burning with good soil moisture either after the wet or spring storms will protect the soil and seed bank for grasses, forbs and shrubs.

Production

Heavy day soils retain moisture longer than many other soil types and therefore pastures on these soils, offer good quality grazing later in the dry season. The soils are often self-mulching; as the day dries it shrinks, forming cracks in the soil surface, allowing organic matter to fall in. On re-wetting, the clay expands, and cracks close, and over time the trapped organic matter enriches the soil. Too frequent fires reduce this soil enrichment process and can result in reduced soil fertility.

A fire every three to seven years within woodland areas is suitable for production areas, with the aim of burning no more than 30% of a given paddock at each time. A shorter fire frequency of three to five years in the grasslands is acceptable. Fires should be planned for the earlier part of the dry. An occasional storm burn may be a useful tool in controlling thickening by cypress and belah where it occurs. Fires should be started against fire sensitive vegetation to reduce scorching.

Conservation

Burning when there is good soil moisture will help retain important habitat features such as fallen timber and hollow trees within woodlands. Fire is an important tool in preventing cypress, brigalow or belah communities from encroaching into eucalypt woodlands and grasslands. Storm burns with a moderate intensity will assist in removing this encroachment.

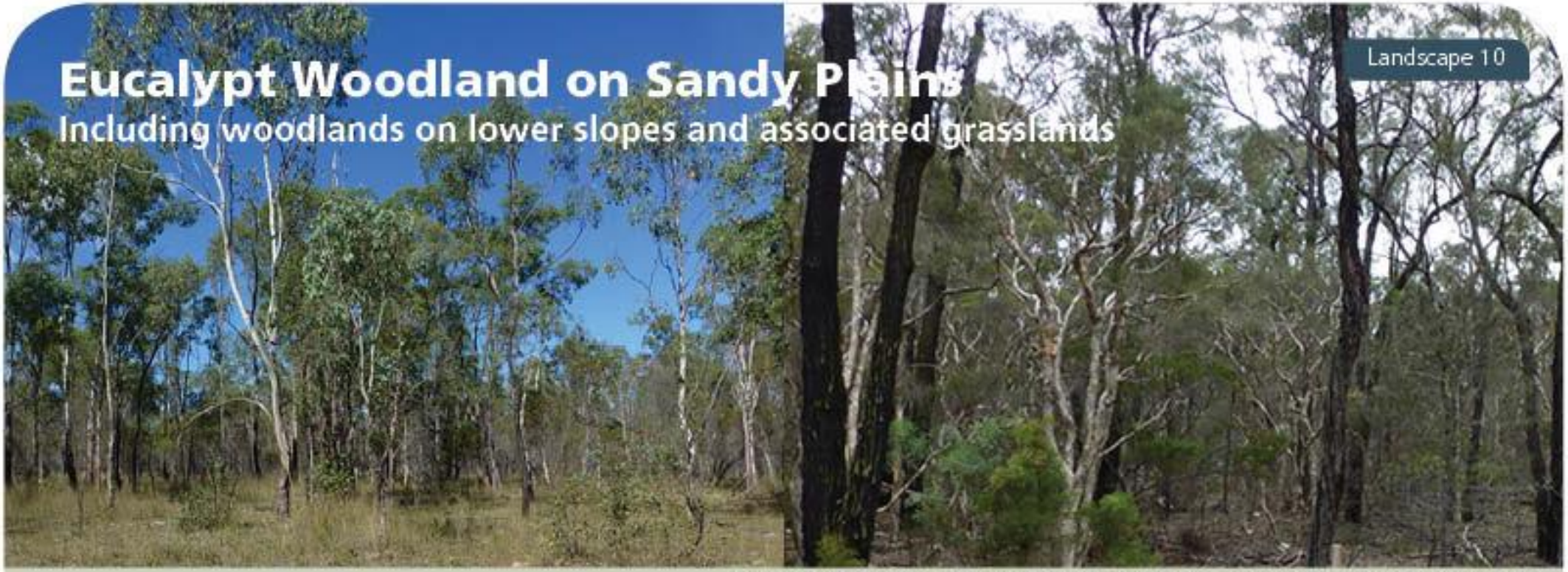
Aim to burn no more than 20% of the area in any one year but retain some portions unburnt (up to about 7 years).

These long unburnt areas are important for a range of reptiles and mammals that also rely upon the late dry season capacity of the day plains.

A hot fire may be required for canopy recruitment every third to fourth fire event over a timeline of twenty to twenty five years.

Eucalypt Woodland on Sandy Plains

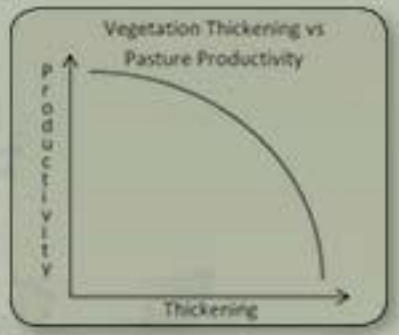
Including woodlands on lower slopes and associated grasslands



Open woodlands with a shrubby or grassy understory containing Ironbark, Bloodwood, Smooth Barked Apple, Black Tea Tree, Poplar Box. Often has Bull-oak and/or Cypress in the understory.

Eucalypt Woodland on Sandy Plains

Including woodlands on lower slopes and associated grasslands



Regional Ecosystems

11.5.1	11.5.2	11.5.3
11.5.5	11.5.6	11.5.8
11.5.9	11.5.12	11.5.13
11.5.14	11.5.17	11.5.20
11.5.21		

Hazard Reduction

This landscape is often braided by numerous creek lines and gullies that often retain some standing water or at least high soil moisture during the early part of the dry season. These can be helpful in implementing early dry season burns that produce a patchy mosaic of burnt and unburnt fuels.

Burns that result in about 30–40% of the total area burnt will provide a break up of continuous fuel levels which will reduce the spread of late season wildfire. Avoid burning too frequently or in the same place such as along a track or road edge, as this can favour weeds.

Production

These woodlands usually have a grassy understory but may develop a shrub layer. The landscape is used extensively for grazing and pasture vigor and therefore productivity is closely linked to periodic fire management. In more lightly grazed areas, fire can be used to remove old grass and freshen the pasture every 4–6 years.

In heavily grazed areas or where fire has not been used for extended periods, there may be encroachment of soft wood scrubs species. In these instances a reduction in grazing to build a suitable fuel load of around 2000kg/ha will be required to carry a fire of sufficient intensity to remove the trees and shrubs causing thickening.

Fire should be used when soil moisture levels are relatively high, such as the early during the wet season or directly after the first rains of the storm season when follow up rain is evident, to ensure pasture grasses recover quickly.

Burning in a dry year will not give a return in grazing value rather thickening or woody weed invasion is probable.

Conservation

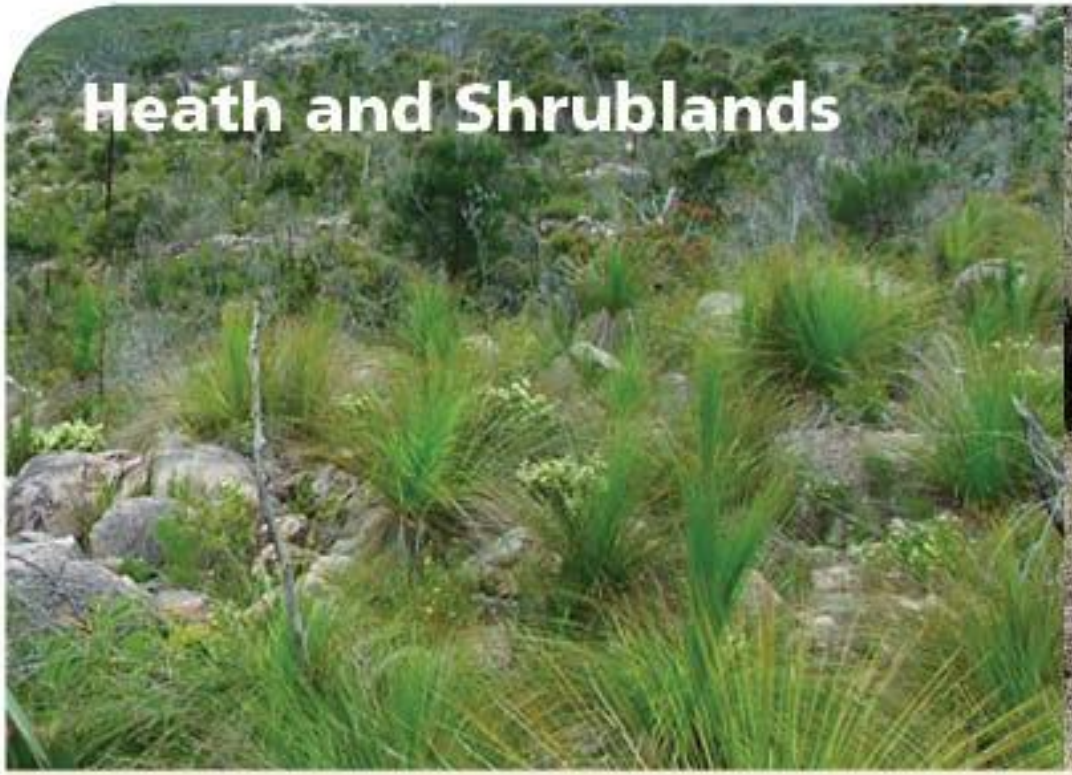
Management of these woodlands for conservation purposes may require establishing cover of both grassy and shrubby habitats. Areas containing a shrubby understory will require a longer time between fires than grassy areas to allow the shrub layer to mature and produce seed (some require 5–6 years to seed). Fire frequency in the shrubby woodlands should be between 7–10 years compared to the shorter interval of 4–6 years for more grassy areas.

This landscape is important habitat for squatter pigeons which prefer a longer undisturbed ground layer for nesting. The pigeon feeds on a range of grass seeds, legumes, herbs, insects, and occasionally fallen acacia seeds.

Within this landscape, a range of fires of varying intensities and sizes resulting in a variety of vegetation ages or time since fire will best benefit the squatter pigeon. In addition maintaining a mix of areas that range from more open and grassy through to densely shrubbed will best benefit the squatter pigeon. The squatter pigeon can be an indicator of good fire management that retains robust pastures over the long term. Their continued persistence in the landscape is a direct result of good pasture and fire management.

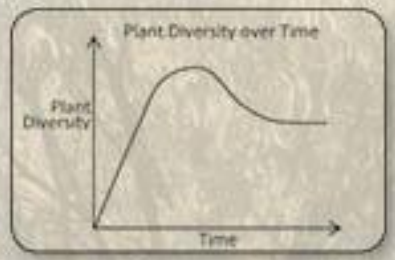
Some soil moisture is crucial for planned burning to allow quick recovery of grasses and to avoid excessive loss of habitat features such as hollow trees and fallen timber.

Heath and Shrublands



Shrubland to heath of mixed Tea Tree, Acacia, Queensland Peppermint and other shrubs may be on scarps, plateaus, ridges or mountain tops.

Heath and Shrublands



Hazard Reduction

Heath is a diverse vegetation type that will usually burn completely or not at all, at any given point in time. Burning heath for hazard reduction should commence in the mid-dry season as these areas often retain moisture for longer and may not be capable of carrying fire until this time. Planned burns should target small sections where possible, using natural features such as rocky outcrops, depressions, drainage lines or less flammable vegetation to break the country up into small burnt areas. Hazard reduction may be achieved in neighbouring landscapes to assist in the longer fire intervals heath and shrublands generally require.

Production

Heath and shrub lands do not offer any opportunity for production in horticulture, apiary or grazing. They generally grow on rocky scarps in the mountains so access is also limited for the commercial harvest of foliage and flowers. Lantana infestations can occur on outcrops, and a slow moving, moderate intensity fire will aid in the control of this invasive species. Ensure there is soil moisture and a suitable fuel load (3000kg/ha) and be prepared to undertake a second, follow up burn to manage lantana. Low intensity fires do little to promote regeneration and are generally unachievable in heath because of its uniform fuel characteristics.

Conservation

The location of the various heaths will dictate the best fire management approach.

In the Brigalow Belt montane heaths tend to be self-protecting with stone, diffs, scree slopes and the top of the mountain providing separation to other vegetation types.

A number of the heaths and shrublands in the central Brigalow area are on scarps or form a low shrub layer surrounded by eucalypts. These heaths are at greater risk from late season wildfires than the montane areas. Plan to use a downhill fire to aid in keeping the fire intensity within the moderate range. A moderate to hot fire is required to release dormant seeds. Heath diversity reduces over time since the last fire as many species are relatively short lived and over long time frames one species tends to dominate. The aim of fire management for heath is to release seeds, promoting regeneration of the diverse range of species, without fire being frequent enough to reduce the opportunity for plant species to mature and develop seed. A range of smaller burns in a mosaic pattern with intervals of around 10–15 years should assist in maintaining heath communities. Topographic and landscape features such as rocky outcrops, and the associated changes in soil moisture can be used to divide the area to achieve a mosaic range of fire intervals.

Montane heath with stone separation

Late dry season wildfire damage of heath and surrounding eucalypts

Regional Ecosystems

11.5.10 11.7.5 11.12.18

Brigalow, Belah, Lancewood or Rosewood with Acacia Scrubs on Crests and Scarps

Landscape 12

Burning is generally not recommended in this landscape

Brigalow, Belah, Lancewood, Rosewood with Acacia scrubs on crests and scarps.

Brigalow, Belah, Lancewood or Rosewood with Acacia Scrubs on Crests and Scarps

These vegetation types normally occur on the edge of geological change and are often self protecting from fire. This picture shows the natural separation.

Regional Ecosystems

11.7.1	11.7.2	11.7.5
11.10.3	11.10.4	11.10.8

Hazard Reduction

The position of this vegetation type in the landscape puts it at risk from wildfires late in the dry season, racing uphill and scorching this fire sensitive vegetation.

This landscape generally fails to accumulate any significant amounts of fuel and thus will rarely support a fire. In many cases this landscape can be useful as a naturally fuel reduced area that will restrict the spread of fire.

This landscape is fire sensitive and as such fuel reduction burning in adjacent areas, should avoid scorching along margins as this weakens the stand and allows invasive exotic grasses such as buffel grass enter the stand. Exotic grasses invading this landscape will increase the fuel load.

Production

This landscape generally has shallow soils which do not develop a grassy understory. As with other brigalow dominated ecosystems, this landscape is of limited production value and there is no need to manage them with fire.

Conservation

This landscape is fire sensitive, should be excluded from planned burning, and its margins protected from fire wherever practical. Moderate and even low intensity fires can kill adult brigalow and belah trees. They are generally self protecting within this landscape. Fire management in adjacent areas should be conducted as early in the dry season as possible and lit from the edge of this land type rather than let fire run up into the edge. When lancewood is present, ensure the landscape is protected from fire for at least 20 year intervals.

More frequent fire events will cause dieback of lancewood and subsequent contraction of this vegetation type.

Glossy black-cockatoos feed extensively on belah seed. Belah does not regenerate after fire, and will typically be killed by even very low fire intensity events.

Shrub lands of acacias developing on natural scalds (that may also include hakea species) can tolerate fires with a 6–10 year interval. However it is not necessary to actively burn as they will generally burn in association with the surrounding landscapes.

Exotic grasses, particularly buffel grass can invade this vegetation type, increasing the fuel load and ignition potential. Treat invasive grasses with herbicide before they enter the vegetation.

The Yakka Skink (*Egernia rugosa*) favour the shrubby drier eucalypt and acacia woodlands where they can shelter in logs, stumps, rock crevices and sink holes. They bask in the morning and afternoon near their burrow. Fire creates disturbance, particularly of the undergrowth and in dry conditions fire would remove branches, logs and stumps that provide habitat.

Yakka Skink © Mark Sanders (EcoSmart Ecology)

Box and other Eucalypt Woodland on Scarps

Including grass and spinifex ground layers

Open woodland with a mix of Box, Ironbark, Bloodwood and Spotted Gum. Spinifex replaces grasses in the more arid areas.

Box and other Eucalypt Woodland on Scarps

Including grass and spinifex ground layers

Hazard Reduction

Hazard reduction in this landscape will necessarily need to take into account steep slopes and planned burning should focus on lighting in more elevated areas, allowing fire to burn downhill.

Burning would ideally be conducted after the first rains with good soil moisture or early in the dry season when the soil still retains some moisture. A series of individual fires is preferred, rather than a single prescription. However, the imperative to manage and protect production and conservation assets should be considered important.

A low intensity downhill fire will reduce the fuel load without damaging the mulch layer. Aim to secure burnt breaks into geographical features such as cliffs and stone screes.

Production

The shallow, poorer soils of this land zone do not provide an opportunity for significant pasture improvement. Thus grazing is based on native grasses that offer bulk but are not high in nutrition. In the more arid areas spinifex is a good soil stabiliser and soil stability must be considered in both stocking rates and fire management.

This landscape in some areas has traditionally been 'calendar' burnt with a high fire intensity every two to three years to keep cypress and wattles suppressed. The higher intensity fires, particularly uphill rather than downhill 'cook' the organic layer in the topsoil killing the helpful soil microbes and grass seed bank.

The woody plants have a deeper root system thus are able to recover in the damaged soil quicker than grasses and forbs resulting in another crop of wattles or cypress.

Aim to secure control lines by burning boundaries early after the wet season. After good spring rains or storms (greater than 50mm) burn downhill with a slow backing fire of low intensity. Plan to burn about 50% of the area, in an average season. Fire should be part of the grazing management with a fire frequency of 5–7 years to freshen the pastures.

Conservation

This landscape is potentially threatened by wildfire every year because being on the scarps fires run up into it, usually in the driest times of the year. Fire is required for recruitment of future canopy species and can assist in promoting a variety of grasses.

A series of small fires commencing at the end of the wet season should be used to secure property and fire sensitive vegetation boundaries. Later, fires can be burnt back onto these earlier fires so that a mosaic of burnt and unburnt vegetation occurs across the landscape. This provides protection against the spread of late dry season wildfires and a good variation in grass seed availability and other habitat features. An occasional storm burn will assist in the promotion of other grasses and legumes.

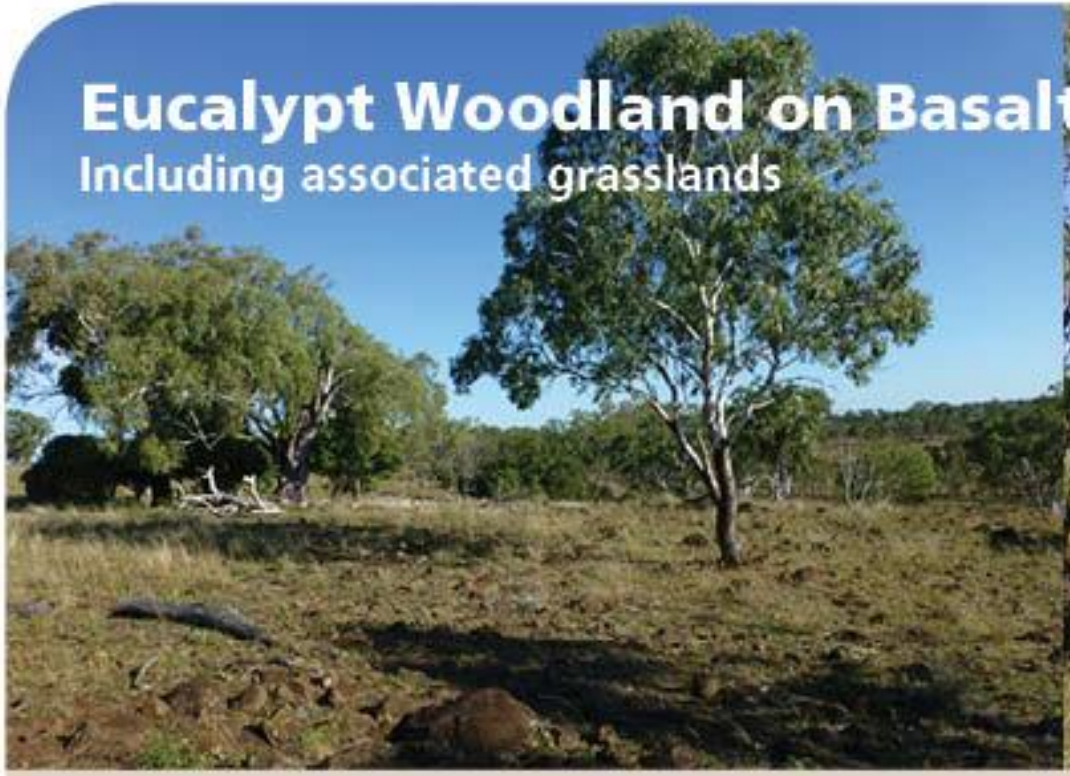
The aim of conservation in this landscape is to maintain diversity in the ground layer, whilst maintaining hollow bearing trees in the canopy and a complete vegetation structure.

Regional Ecosystems

11.7.4 11.7.6 11.7.7

Eucalypt Woodland on Basalt

Including associated grasslands



Grassy open woodlands of Mountain Coolibah, Ironbark, and Poplar Box. Grasslands contain a mix of Queensland Blue Grass, Forest Blue Grass and Black Spear Grass.

Eucalypt Woodland on Basalt

Including associated grasslands

Hazard reduction fires should be low intensity.

Thickening due to uphill fires.

Regional Ecosystems

11.8.2	11.8.4	11.8.5
11.8.8	11.8.11	11.8.15

Hazard Reduction

Hazard reduction is important in this landscape, particularly in the wetter years as the grasses can create heavy fuel loads even with grazing. Soil moisture is important for recovery of the grasses after fire so burn in the early dry or after the first rains of the wet season. An observation of grasses having set seed would be a suitable indicator of appropriate timing for fire in the early dry. Hazard reduction in this landscape should be as low a fire intensity as possible to reduce the fuel. Downhill burning and time of day for ignition are two options for reducing the fire intensity after rain. Frequent uphill hot fires will cause the woodland to thicken, shading out the grass.

Production

Basalt based soils have moderate to high fertility although the soils may be shallow on hilly country. Across the region, silver-leaved ironbark or mountain coolibah country produce some of the better native pastures for grazing. Queensland blue grass, forest blue grass and black spear grass are the primary native pastures. Good soil moisture is a critical component for burning to retain the organic mulch layer which provides for the breakdown of leaf litter and old grass into the soil.

The timing of fire management and the level of grazing pressure placed on this landscape after fire is crucial for retaining these native pastures. The grasses are most susceptible when using the plants' reserves to sprout after a fire, drought or winter dormancy. As such, they should not be grazed until they have re-established vigorous growth.

A low to moderate fire every 3–8 years will keep the country open from re-growth and remove older rank grasses. Aim to burn about one third of the area at a time. Wetter years provide an opportunity to develop a fuel load of 2000–3000kg/ha required for weed control of curry bush and other shrubs.

Conservation

The main conservation objective in this landscape is to maintain the presence of grasslands on basalt, principally Queensland blue grass (*Dichanthium sericeum*) communities that have become rare. Grazing pressure, particularly in the drier years and inappropriate fire regimes that favour less desirable grasses like Indian couch threaten these areas. In addition the spread of improved pasture grasses like buffel grass into the heavy black day soils has significantly reduced the extent and quality of Queensland blue grass, grasslands. Mountain coolibah woodlands now provide refuge for many of the grassland species that previously would have preferred the open grasslands.

Wattle thickening can occur in these areas as a response to fire in drier periods. The woodlands require a low to moderate fire every 5–10 years to maintain the open structure and provide a variety of grasses and forbs. Grasslands benefit from a low to moderate fire event every 3–5 years. Queensland blue grass seed will persist in the soil for at least five years. Burn around 30% of the area to maintain mature grasses as native animal habitat.

Eucalyptus Woodlands on Undulating Stony Hills and Flats

Including shrubby areas and grassland

Variable woodlands of Ironbark, Poplar Box, Spotted Gum or Gum-topped Box. May have a shrubby understory including False Sandalwood and Wattles. Main grass species in the woodlands and grasslands are Blue Grasses and Mitchell Grass.

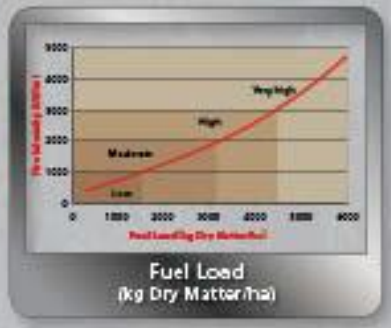
Eucalyptus Woodlands on Undulating Stony Hills and Flats Including shrubby areas and grassland


1000 kg/ha


2000 kg/ha


3000 kg/ha


4000 kg/ha



Regional Ecosystems

11.9.2	11.9.7	11.9.9
11.9.13	11.9.3	11.9.12

Hazard Reduction

This landscape has an undulating topography often with flats and rolling hills. This allows for construction of fire lines and a separation from other vegetation types on steeper slopes or more erodible soil types. Hazard reduction burning should begin as soon as the landscape will carry a fire. Aim for a low to moderate fire intensity with approximately 30% remaining unburnt. A varied approach to hazard reduction burns is better than burning the same boundary lines repetitively.

Production

The woodlands can have a grassy or shrubby layer with the former having better native grass grazing value. Stocking rates and longer term grazing pressures are important in this landscape as there is a risk of overgrazing the palatable grasses, leading to an overall degradation of the pasture. Always burn with good soil moisture using spring rains, storms or during the wet season so that the grasses can respond before the woody regrowth. Fire is important to remove rank grass and stimulate new growth, however the paddock should be spelled after burning to allow grasses to shoot and regain vigour. Fire is also an important tool in the control of woody weeds and regrowth. Use fire before the crown of the regrowth exceeds the flame height to ensure a good thinning is achieved. In a paddock of severe regrowth and suckers the paddock may need to be spelled to build up enough fuel to kill the regrowth. In some cases a high fire intensity may be required to reduce thickening.

To achieve a high intensity fire a fuel load of 2000–3000 kg/ha is required. Fire frequency in grazed lands should be about 5–8 average years, with a longer period of 8–10 years in the western parts of the Brigalow Belt south due to lower rainfall.

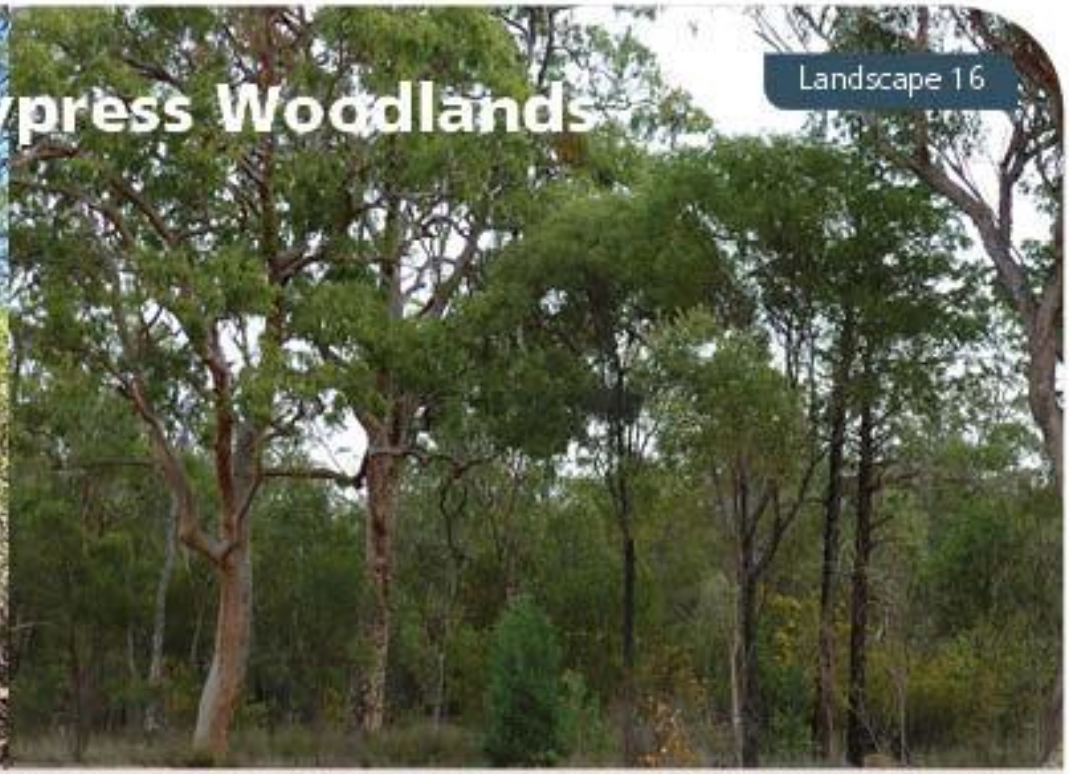
Conservation

Grasslands benefit from a low to moderate fire every 3–5 average seasons and for grassy woodlands about 5–8 average seasons. The grassy woodland and grasslands need fire to prevent thickening with the aim of a moderate fire after spring rains or storms keeping the country open. The boundary between shrubby and grassy understory in parts of this landscape will often reflect the seasons. In wetter years the grasslands will grow a lot of fuel and in the drier years the shrubby layers will expand into the grasslands. Fire regimes rather than a single fire event will ensure that both types are resilient. The shrubby understory and associated leaf litter, fallen limbs and hollow logs are important habitat for reptiles like the Brigalow Scaly–Foot (*Paradelma orientalis*).

The bark litter, fallen branches and trees are particularly important habitat for lizards and skinks. Use a series of fires to create a fine scale mosaic rather than a single fire event to retain the litter layer as habitat for reptiles.


Brigalow Scaly–Foot
© Alexander Dudley

Eucalypt, River Apple and Cypress Woodlands



An open woodland that can have a grassy or shrubby understory. Main species include Spotted Gum, River Apple, Ironbark and Cypress. Grass Trees, Cypress, False Sandalwood and Wattles may be present.

Eucalypt, River Apple and Cypress Woodlands

Canopy fire damage to Eucalypts.

Fuel load increased by Cypress thickening.

Regional Ecosystems

11.10.1 11.10.6 11.10.7
11.10.9 11.10.11 11.10.12
11.10.13

Hazard Reduction

Topography, terrain and slow fuel build up can naturally protect some of these areas from most wildfires. Property planning should focus hazard reduction burning on less erodible soil types that are easier to access. A low intensity fire every 5–8 years will reduce fuel loads to a manageable level for wildfire control. Plan burns when fuel loads are moderate, less than 2000kg/ha, to achieve a mosaic of 30% burnt. Plan burns to occur with good soil moisture such as during the wet season or at the end of summer. High moisture content will protect the soil mulch layer. Fire management in adjacent land zones in the intervening years should provide long term protection from late-season wildfires burning uphill into this vegetation type.

Production

This landscape takes in some of the less fertile scarps, plateaus, and tablelands. The understory can be shrubby or open and grassy. It traditionally would be used as cattle breeding country. In a wetter year it can produce a reasonable amount of grass but it is not that productive or palatable. The soils tend to be phosphorous deficient and prone to erosion. Fire is primarily used to control thickening of the understory, otherwise the land zone would not be targeted for burning. A low to moderate fire event within a 5–6 year cycle would be sufficient to maintain open woodland with grass.

The topography and terrain should be used to burn in patches to achieve 30% burnt. Burn with good soil moisture either at the end of the wet, or after the first storm, if confident of follow up spring rains. Grazing pressure should be reduced after burning to allow grass recovery.

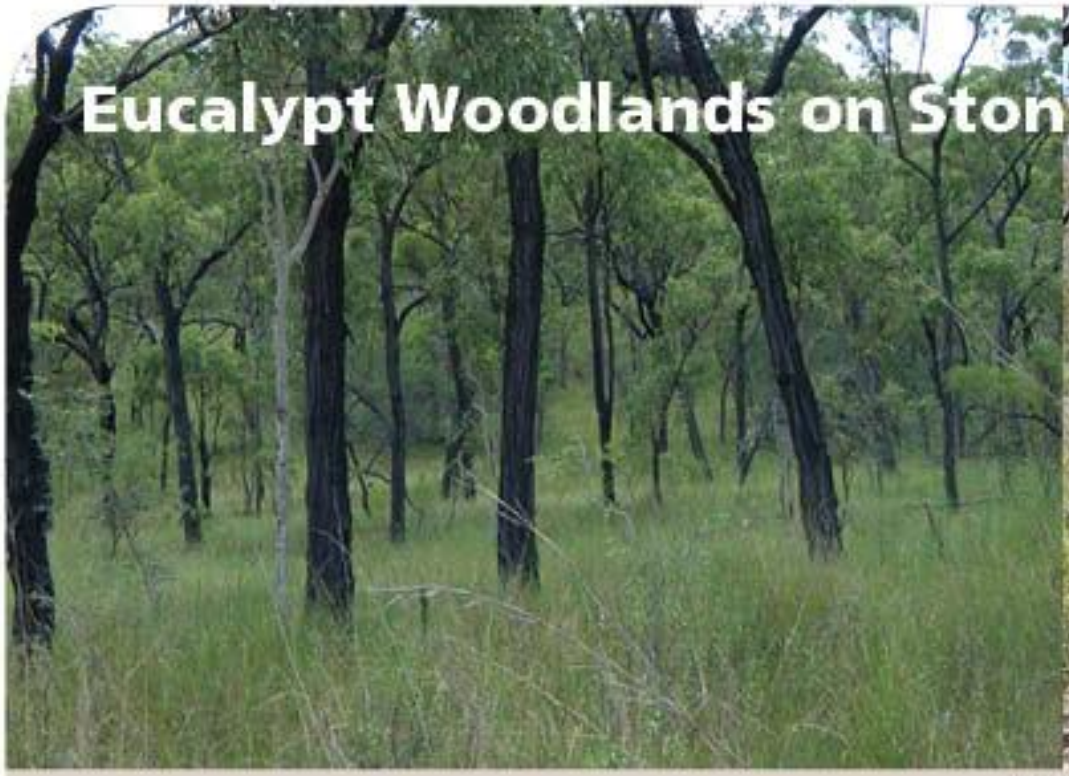
Conservation

This landscape is prime glider habitat. The key habitat features that will help protect gliders are mature, hollow bearing trees and open woodlands not impacted by thickening. It can take up to 60 years to produce a tree hollow that may form a suitable glider nest, so it is a crucial consideration in planned burning and wildfire protection that these older trees with hollows are protected.

Fire management should occur late in the wet – early in the dry season, as soon as the country will carry a fire. Aim for a fine scale mosaic of patchy burns by burning in conditions that will provide a low to moderate intensity fire. The key factors in achieving a low to moderate intensity fire are: a moderate fuel load that is sufficiently cured to carry a fire, lit in the mid–afternoon.

Some plants in the shrub layer will be obligate seeders and require 7–10 years to reach seed producing maturity. Areas with a cypress dominated canopy would have a similar fire frequency from 6–10 years to allow for trees to mature for seed bearing. Conversely if cypress is invading areas, a shorter fire frequency of 4–6 years will reduce the invasion. Cypress thickening in the understory will increase the fuel load and subsequent fire behavior in dry years, resulting in canopy fires with heat that can kill mature Eucalypts.

Eucalypt Woodlands on Stony Range Country



Woodlands on shallow soils often with a canopy dominated by Ironbark, Spotted Gum, Yellow Stringybark or White Mahogany. There may be grass trees and/or cycads in the understory.

Eucalypt Woodlands on Stony Range Country

Areas long unburnt will lose key species. This grass tree area is being overcome by vines and shrubs. Fuel load would create a high intensity fire.

Healthy grass tree ridge with good grass cover.

Regional Ecosystems

11.11.3 11.11.4 11.11.7
11.11.15 11.12.1 11.12.3

Hazard Reduction

As the dry season progresses and soil moisture decreases, fire intensities and therefore the difficulty of wildfire control, invariably increase. This vegetation type generally occurs on slopes, hills, and ranges, and can be at high risk from wildfires, due to its elevated position in the landscape. Fire running uphill will be of a higher intensity and move faster than fire burning down slope. Hazard reduction burning conducted early in the dry season, will assist in breaking up the country and provide a buffer from wildfires.

Landscape scale hazard reduction planning is the best approach to managing fire in this landscape. Fire control lines to target specific areas with a history of wildfire may need to extend across several boundaries. If bordering improved pastures, this landscape will be burnt first for pasture protection. Aim to burn 50% of a property or patch per year when soil moisture is good. Storm burning is also useful in this landscape type to manage vegetation thickening. A moderate intensity fire after the first storms is ideal.

Production

The stony range country has shallow, poor soils that do not produce an abundance of grass. Quality of grazing is good, with kangaroo grass, forest Mitchell, mountain oats and black spear grass common. Cattle can utilize the range country as spelling during the wet season or late winter feed. The season of grazing will dictate the burning season. Cattle graze preferred grasses leaving less palatable grasses to seed.

Over time this will change the composition of grasses in the pasture. A controlled burn removes all the old grasses evenly. Grazing pressures and seasonal variation will dictate the requirement for fire, however a low to moderate intensity fire when there is good soil moisture, every 3–7 years is common. Burn with the feature, from the top down, allowing the fire to creep or wander around the ridge system following fuel loads.

Thickening can be an issue, particularly wattles after a wildfire event. Reduce stocking to build a fuel load and storm burn before the wattle grow above flame height.

Conservation

Planned burning in this landscape should aim to promote patchy fires to ensure a mosaic of different vegetation types and time since fire across the landscape. Rangelands are prone to widespread intense wildfires in the mid to late dry season and this is a key threat to biodiversity. Too frequent fire leads to a loss of vegetation cover and directly threatens gliders, owls, and the mature hollow bearing eucalypts they depend on.

A lack of fire in this landscape can also lead to thickening, shading, loss of tussock grasses and grass trees. The steep nature of some of the ridge lines can make it difficult to burn regularly if neighbours have improved pastures bordering the reserves. Aim to burn every 4–6 years, downhill with good soil moisture to maintain this type. In areas with a wildfire history burn as soon after the wet season as a fire will carry. In areas where it is difficult to introduce fire, aim to burn during the storm season.

Eucalypt Woodlands on Infertile Stony Hills and Flats

Woodlands on infertile stony undulating hills and flats. Main tree species are Poplar Box, Ironbark, Bloodwood and Mountain Coolibah. The woodland can have a grassy or shrub layer.

Eucalypt Woodlands on Infertile Stony Hills and Flats

Golden–Tailed Gecko
© Mark Sanders (EcoSmart Ecology)

Hazard Reduction

The undulating topography of this land zone assists in hazard reduction planning. There are some volcanic intrusions but generally strategic fire breaks can be constructed and maintained easily.

The soils are relatively infertile, however in a good wet season a reasonable fuel load can still accumulate. In drier years the fuel load will be sparse. Hazard reduction burning should reflect the growing seasons, with a fire frequency range of 3–6 years in the east and 8–10 years in western areas.

Use early burns as soon as possible after the wet season to provide a break to protect fire sensitive vegetation such as softwood scrubs or fringing forests along drainage lines. Later, moderate intensity fires can then be lit from the edges of earlier burnt country to achieve a broader fuel reduced area. Areas requiring regular hazard reduction burning will benefit from fires that vary in the time of year, direction of lighting, and intensity used.

Production

3–6 years between burns is suitable for production areas, providing a mix of fire intensities are applied. Avoid 'calendar' burning where fire is used at the same time every year. Varying the season, intensity and area burnt will create a mosaic of habitats; whereas too frequent fire (annual or every second year) has serious impacts on soil health and long term sustainability. Burning with soil moisture will protect the important mulch layer of the soil, which in turn will provide a quicker response for grasses and forbs.

Heavy grazing or a lack of fire over time will change the composition of the pasture grasses, with the less palatable and less productive grasses becoming dominant because they are able to seed. Vary burning times from the early dry season to storm burning to maintain grass composition.

Conservation

This landscape requires fire to maintain and promote the diverse range of native grasses and herbs it contains. A series of fires over a period of weeks rather than a single fire event is the best way to maintain the grass and herb diversity. Burning should start as soon as the country will carry a fire, and continue as the country dries out.

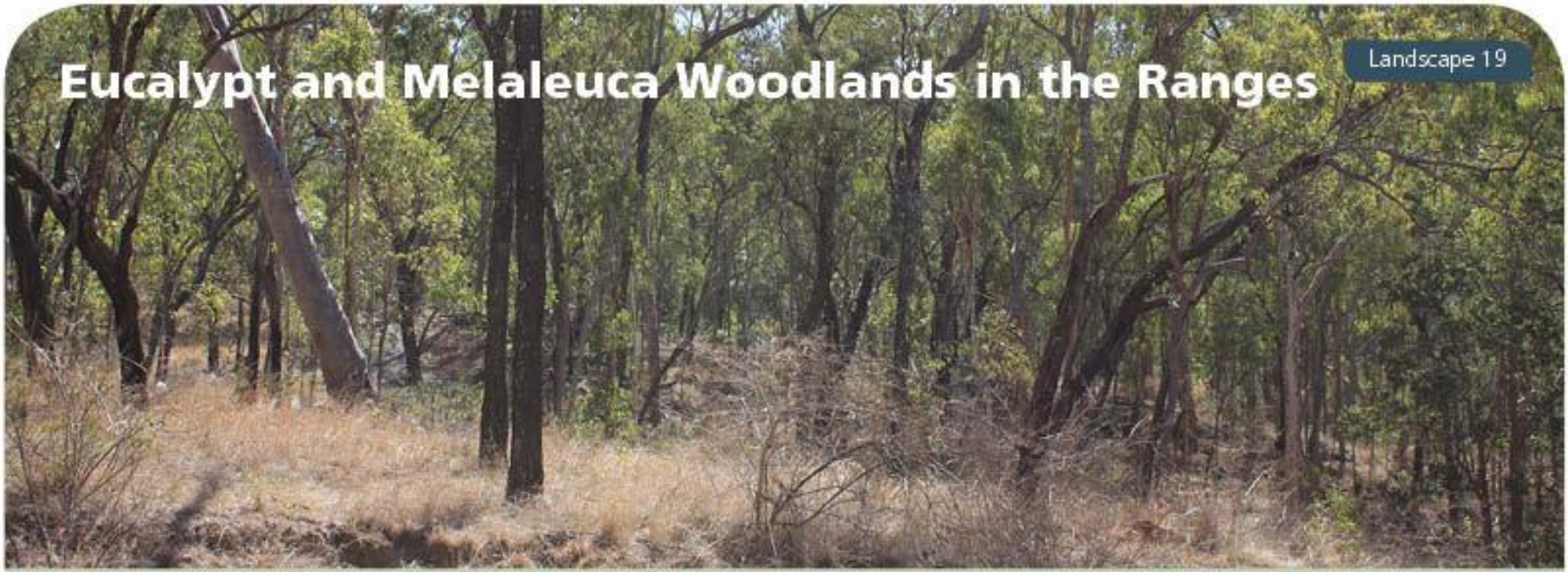
Recently burnt grass dumps will produce more seed than unburnt grass. This is important for small mammals and seed eating birds. A range of fires over the early dry will also provide a greater range of seed, as the early burnt grass will mature and seed earlier than grass burnt later on. Fires should be low intensity, providing patchiness with a good overall mosaic.

The Golden–Tailed Gecko (*Strophurus taenicauda*) lives above the ground in hollow limbs and behind dead or loose bark. The Golden–Tailed Gecko lives in mainly ironbark, cypress and brigalow woodlands, coming out at night to feed on insects. Avoid burning in dry conditions that could cause a high intensity fire. A high intensity fire will damage the habitat of this gecko by removing or reducing hollows and dead bark.

Regional Ecosystems

11.11.9 11.11.10 11.11.11
11.12.2

Eucalypt and Melaleuca Woodlands in the Ranges



Grassy woodlands to open forests of the coastal ranges of Ironbark, Moreton Bay Ash, Spotted Gum, Bloodwood and Tea Tree either as a single species canopy or with a mix of canopy trees. There may be a shrubby understory of Acacia, Tea Tree and She Oaks.

Eucalypt and Melaleuca Woodlands in the Ranges

Hazard Reduction

Hazard reduction in this land zone should focus on burning early breaks to stop or reduce wildfires late in the dry season. This can be achieved through a series of early dry season patch burns over a number of weeks. The topography dictates that most wildfires will be uphill causing an increase in fire intensity. Strategic burning from ridgelines can provide a good breakup of the fuel load at the landscape level to reduce wildfire spread later in the season.

Areas that have been affected by late, dry season wildfires can have a mass seeding of wattle. This understory shrub layer can reach 3–5 meters in a 7 year period. Under adverse wildfire conditions it can create a sub-canopy fire with very high intensity. This in turn can lead to very dangerous crown fire conditions. Vary fire regimes to leave some areas unburnt for 7 years, whilst burning enough area to give protection from late dry season wild fires.

Production

The grassy understory of the woodlands and the grass lands associated with this land zone provide good native pasture grazing. A low to moderate intensity fire after the wet season or following spring storms can remove old grass and even out the pasture composition. A series of patchy fires is better than a single, large fire event as it provides for a staggered recovery of grasses. Fires should be lit from the tops of ridges and allowed to burn down hill to achieve a low fire intensity. Fires lit uphill will be of high intensity and the grasses will take longer to recover, and the risk of erosion will be higher.

Fire exclusion or mid to late dry season burning will create vegetation thickening, particularly of wattle and lantana. A late summer burn of moderate to high intensity will be required to control the thickening and keep the lantana suppressed.

This landscape can also provide good pole and saw log timbers. Forest production areas are generally burnt prior to logging for access and to allow top disposal fires of the tree heads to encourage regeneration. Post logging, depending on the regeneration levels, fire may be used for thinning the regeneration or not used until regeneration is above flame height.

A backing or downhill fire will kill the regrowth more effectively than an uphill fire.

Conservation

There is high diversity in the composition of the trees, grasses, and herbs in this landscape type. The woodlands and forests of this land zone have either a grassy or shrubby understory. The grassy understory requires fire to keep it open with fire intervals of 3–5 years. The shrubby understory requires a longer fire interval to allow the understory species to mature and seed so fire intervals can extend to 7 years for some areas. Be aware that the boundaries of shrub lands and grasslands will naturally fluctuate to some degree. The important thing to remember is that they are both important for conservation and should be retained in the landscape.

Regional Ecosystems

11.11.17 11.12.5 11.12.6
11.12.17 11.12.20

Tall Open Forests

Tall open forests of Spotted Gum, Sydney Blue Gum, White Mahogany, Grey Gum, Silver-Topped Stringybark with a grassy or shrubby understory.

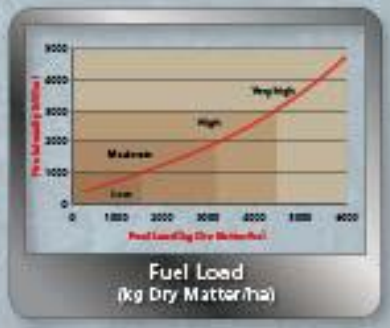
Tall Open Forests


1000 kg/ha


2000 kg/ha


3000 kg/ha


4000 kg/ha



Fuel Load
(kg Dry Matter/ha)

Regional Ecosystems

11.10.2 11.10.5 11.8.1
11.5.7

Hazard Reduction

Tall open eucalypt forests can naturally accumulate very large fuel loads and support widespread high intensity fires.

Protection areas are best managed by regularly burning small areas with good soil moisture, and managing weed impacts post-fire. Aim to burn a patch no more than once every 3–4 years with fuel loads as an indication of frequency, or the repeated disturbance will promote weed invasions.

Burning should only be undertaken when conditions are suitable – vary the season of burning to account for fuel and soil moisture levels, and avoid burning when conditions are very dry, as the fire risk is extreme. Later season fires are acceptable in this landscape as vegetation can take longer to dry out than surrounding woodlands. Traditional burning coincides with late winter to early spring at the first storms when follow up rain is likely, allowing groundcover to quickly recover.

Areas long unburnt, dense lantana, and rank grasses can carry intense fires due to the heavy fuel load. Burning lantana after a frost, which may defoliate plants, can result in a better kill rate. Reducing weedy fuel hazards on the edges, with approved herbicide is often a good option either before or after fire.

Production

The tall open forests on the fertile soils are productive timber forests. Fire management would include a fuel reduction burn pre logging across the intended logging area. The logging debris are burnt post-harvest when the canopy trees are carrying mature seed. The timing of these fires is planned to rainfall events with the focus on ensuring good regeneration of the logged area.

The fire can be intense in patches and is designed to stimulate seed fall into the prepared ash bed. Fire would then generally be excluded until the regeneration is above flame height.

For grazing areas, burn every 3–5 years when conditions are suitable to maintain pasture condition. Country responds rapidly when there is sufficient soil moisture. Burning a few days after rain, towards the onset of the wet season is recommended; avoid burning when soil is dry to maintain productive groundcover.

Spelling country from grazing and/or increasing time between fires will allow sufficient fuels to accumulate to carry moderate intensity fires. Burning to maintain woody vegetation structure generally requires fuel loads of 2000–3000 kg/ha; whilst reducing dense woody regrowth may require between 2500–4000 kg/ha.

Conservation

Where areas of grassy understorey remain, a moderate intensity, patchy burn every 3–5 years is recommended to keep the grasses in good condition. Vary fire regimes to maintain a mosaic of understorey types to mimic natural conditions. Where practical, plan for an occasional hot fire – storm burning is recommended to reduce risk of escape into the surrounding landscape.

Aim to protect mature hollow bearing trees as yellow-bellied gliders, powerful owls, and glossy black cockatoos are largely dependent on these habitats. A dense scrubby understorey may develop over a 15–17 year period, to the point that the forest will not burn unless in extreme conditions. Intense dry season fires are the key threats to these habitats.

Protect adjacent semi–evergreen vine thickets edges from the impacts of hot fire. Carefully planned mosaic patch burning in adjacent woodlands may reduce severity and extent of wildfire by breaking up the fuel load, reducing the potential fire front.

References

- "Landscape Description" photograph page 5, Wayne Ford; (QFES)
- 2 Black–Breasted Button Quail photos page 21, Luke Hogan; (Qld Herbarium, DSITIA, Qld Govt)
- 2 Heath photos page 26, Rod Buchanan; (Burnett Mary Regional Group)
- Yakka Skink photo page 29, © Mark Sanders; (Eco Smart Ecology). For use in the "Brigalow Belt South: Fire Management Guidelines". No other use is authorised
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