



# Fire Management Guidelines Barratta Creek Catchment

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



Australian Government

Department of Sustainability, Environment,  
Water, Population and Communities





# Introduction

## Reef Catchments Solutions

Reef Catchments Solutions is a subsidiary and privately owned company of Reef Catchments Limited, a community based not for profit organisation. Reef Catchments Solutions provides environmental consultancy and services across Australia and internationally. Our mission is help you find your solution by providing comprehensive environmental and natural resources management services.

Reef Catchments Solutions has developed a range of fire management tools and planning support services in consultation with rural fire brigades, fire wardens, fire scientists, key land holders and traditional owners. These services are provided to both public and private land managers who are interested in fully exploring the benefits of appropriate sustainable fire management. In 2012 the Wetland Care Australia approached Reef Catchments Solution fire team to develop a set of fire management guidelines and associated fire strategy for the Barratta Creek Catchment.

## Wetland Care Australia

### Barratta Creek Project: Delivering Biodiversity Dividends for the Barratta Creek Catchment

Wetland Care Australia, with support through funding from the Australian Government's Clean Energy Future Biodiversity Fund, will protect, manage and enhance the high ecological functional values of the Barratta Creek Catchment which forms the main artery of the Bowling Green Bay wetlands, the only Ramsar site in north Queensland.

Barratta Creek is one of the most high integrity floodplain creek systems on the developed East coast of Queensland. Since the introduction of intensive irrigated agriculture the creek and wetlands have suffered serious impacts including invasive aquatic and terrestrial weeds, hot frequent fire regimes and excessive tailwater flows.

Wetland Care Australia will unite multiple stakeholders to improve biodiversity outcomes in the Barratta Creek Catchment and internationally listed Ramsar wetlands through integrated catchment based management.

Reef Catchments Solutions in partnership with volunteer rural fire brigades, government and non-government landholders has developed these fire management guidelines for the Barratta Creek Catchment.

The guidelines are the culmination of extensive discussions with experienced members of the volunteer rural fire brigades, other respected fire and land 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 8 landscape types in the Barratta Creek Catchment. These 8 landscape types are part of the 21 landscape types developed for the greater Brigalow Belt (North) 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.

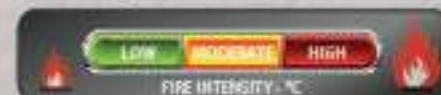
**RED** – Under most circumstances, conditions within the RED range of seasons would result in damaging fire and/or fire that is difficult to control.

## 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.

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# Barratta Creek Catchment

The study area utilised by the Wetland Care Australia project "Delivering biodiversity dividends for the Barratta Creek Catchment", is shown by Map 1.

Essentially it is a sub-catchment containing an estimated 11,500 ha of cane, cattle and remnant riparian vegetation, floodplain woodlands of eucalypt/tea-tree some very small areas of other vegetation types that occur primarily in its southern and northern extremities. Fire is an important tool in the cane and cattle industries, and has significant benefit for biodiversity within

the catchment. In some areas there is a risk country is burnt too frequently, whilst in other areas there is not enough burning to maintain ecosystems and property protection values.

The Barratta Creek Catchment is part of the Northern Brigalow Belt Bioregion of Queensland. A bio-region is characterised by its climate and soils that influence the vegetation, animal habitats and ultimately the industries and communities this environment can support.



Map 1



# 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"

Landscape 3

Burning is generally not recommended in this landscape

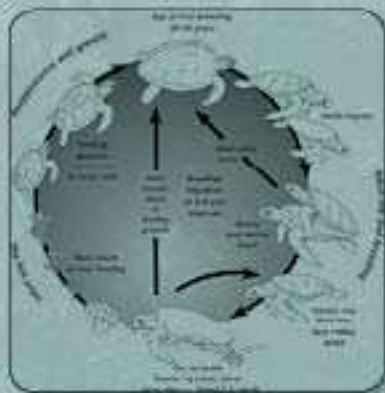
Beaches and foreshores including "beach scrub".





## 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



# Riverine Woodlands

Including freshwater wetlands

Landscape 4



Woodlands of Moreton Bay ash, blue gum and/or tea tree with a shrubby to grassy understorey.





# Riverine Woodlands

## Including freshwater wetlands

### Hazard Reduction

Hazard reduction burning within the broader area is important to protect cane crops and late dry season pastures from wildfire. Hazard reduction burning should begin as soon as the country will carry a fire after the wet season, within consideration of neighbouring cane crops, particularly those areas with trash blanket. Alternatively burning after the first storm can provide a reduction in hazards towards the end of the crushing season. It is important that hazard reduction burning is negotiated between neighbouring land uses.

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.

Avoid repeated burning along roads and access tracks in the early dry in areas where potentially vehicles may carry weeds.

### Production

These woodlands can carry a good pasture as do freshwater wetlands which provide a range of grasses and sedges. 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.

In areas of hymenachne or para grass that are not grazed, the waterways can become choked in a few seasons.

### 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.

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.

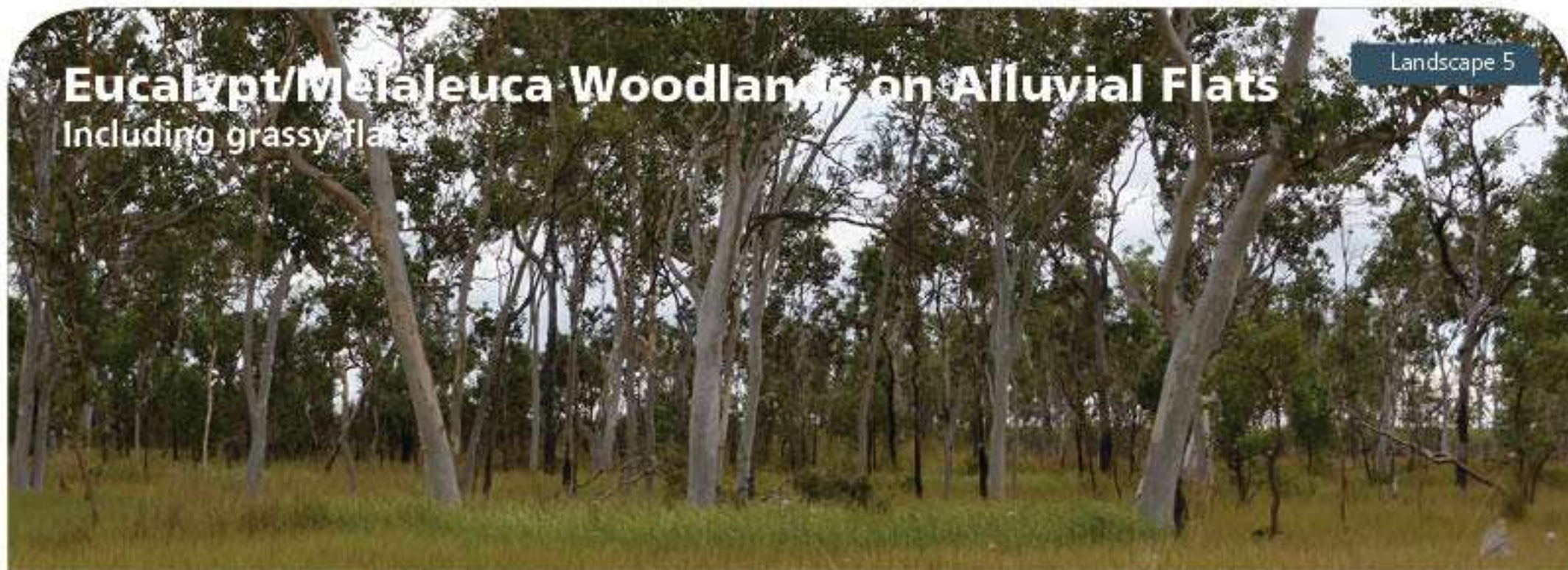
### Regional Ecosystems

11.3.3 11.3.25 11.3.37  
11.3.27

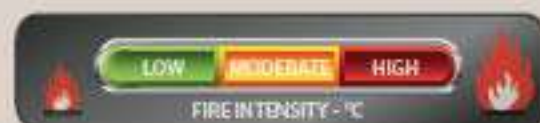


# Eucalypt/Melaleuca Woodlands on Alluvial Flats

Including grassy flats



Variable woodlands to grassy woodlands with poplarbox, bloodwood, blue gum, Moreton Bay ash or tea tree.





# Eucalypt/Melaleuca Woodlands on Alluvial Flats

Including grassy flats



1000 kg/Ha



2000 kg/Ha



3000 kg/Ha



4000 kg/Ha

## Regional Ecosystems

11.3.2	11.3.4	11.3.7
11.3.9	11.3.10	11.3.12
11.3.26	11.3.29	11.3.30
11.3.35	11.3.36	11.3.6
11.3.19	11.3.38	11.3.39
11.3.21	11.3.31	

## Hazard Reduction

This is an important landscape for undertaking planned burns to protect adjacent cane crops, grazing pastures and fire sensitive vegetation such as riverine woodlands. The ability to manage fire at the landscape scale, rather than the block scale is easily achieved in the Barratta, small block size allows a level of patchiness at the landscape scale that is important for mitigating wildfires. Aim to burn no more than 30% of all blocks of this landscape type within the catchment yearly; co-ordinate burns with neighbours to ensure that the needs of different land uses are being met by hazard reduction activities.

## Production

This landscape is productive country where the fire frequency will be directly related to grazing pressure. Heavier grazed areas will require a moderate fire every five to seven years to maintain a good balance of trees and grass (i.e. to reduce woody thickening). If insufficient grass is left to achieve this, a period of de-stocking will be required. Lighter grazed areas will 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 early 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 tend to favour weeds because native grasses are unable to compete in this season. Control of woody regrowth and dense weed infestations may require hotter fire (fuel loads of 2000 kg/ha or greater may be needed) but control of tree thickening over two meters by fire may be difficult.

## 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 of fire intensity and time since last burnt.

This landscape is prime glider habitat. The key features that will help protect gliders are mature, hollow bearing trees and open woodlands not impacted by thickening.

Fire management should occur 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. Storm burning can be effective to reduce woody thickening, before recruits are above potential flame height.

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



# Beefwood, Bull-oak, Sandalwood Woodlands and Melaleuca on Alluvial Flats

Landscape 6

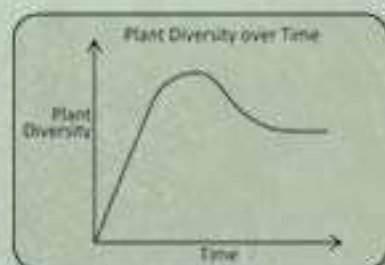


Variable woodlands with a mix of beefwood, bull-oak, sandalwood and melaleuca species on alluvial flats.





# Beefwood, Bull-oak, Sandalwood Woodlands and Melaleuca 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 build up of fuel loads. 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 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 vegetation and adjacent cattle and cane production areas. Specific weed infestations like rubber vine may require fire on a more frequent interval. 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. A storm burn or early dry season fire after the wet are suitable opportunities.

Good spring storms would also offer soil moisture however the risk of potentially hotter, drier weather leading into the late dry makes this risky. Much of this landscape has significant areas of introduced grasses, 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. Rubber vine infestation is a serious weed threat in this landscape.

Fire can be used in the initial control of rubber vine as it reduces the size and vigour of plants and kills seedlings. Care must be taken not to scorch surrounding mature trees. This initial control is made more effective by follow up programs of chemical control. High fire intensities will kill parent trees, but can also lead to mass regeneration 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. Planned burning should consider local use of the bull-oak for this species.

## Regional Ecosystems

11.3.13 11.3.32 11.3.33  
11.3.18



# Eucalypt Woodlands on Stony Range Country

Landscape 7



Woodlands on shallow soils often with dominant ironbark, bloodwoods, yellow stringybark or white mahogany canopy. May have grass trees and/or cycads in the understorey.





# Eucalypt Woodlands on Stony Range Country

## 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 occurs on slopes, hills, and ranges in the upper Barratta catchment and can be at high risk from wildfires, as uphill fire behaviour creates higher intensity fires. Hazard reduction is required early in the season to break up the country and provide a buffer from wildfires.

Landscape scale hazard reduction planning is the best approach to coordinate the use of fire with neighbours. Fire control lines to target specific areas of wildfire history may need to extend across several boundaries. Aim to burn 20–40% of a property or patch per year when soil moisture is good. The best periods to achieve good hazard reduction burning are either after the wet season or after the first storms.

## 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 and black spear grass common. Cattle also tend to congregate on the higher, drier country during the wet season. Fire is used to remove old grass and even a pasture out from grazing (cattle graze preferred grasses leaving less palatable grasses to seed. A controlled burn removes all the old grasses evenly). Grazing pressures and seasonal variations will dictate the requirement for fire, however generally a low to moderate fire every 3–7 years is common.

An indication of good grazing pressure is that there is enough fuel remaining by the storm season to carry a fire. Storm burning will favour black spear grass, whereas winter or spring rain will trigger kangaroo grass because it germinates in cooler conditions.

## 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. Planned burning should aim to create low to moderate intensity fires which will retain mature trees and promote grass recovery.

Burn with good soil moisture, either after a storm or after the wet season as the country dries out. Longer fire intervals before planned burning following a wildfire, also help the recovery of habitats for a range of species.

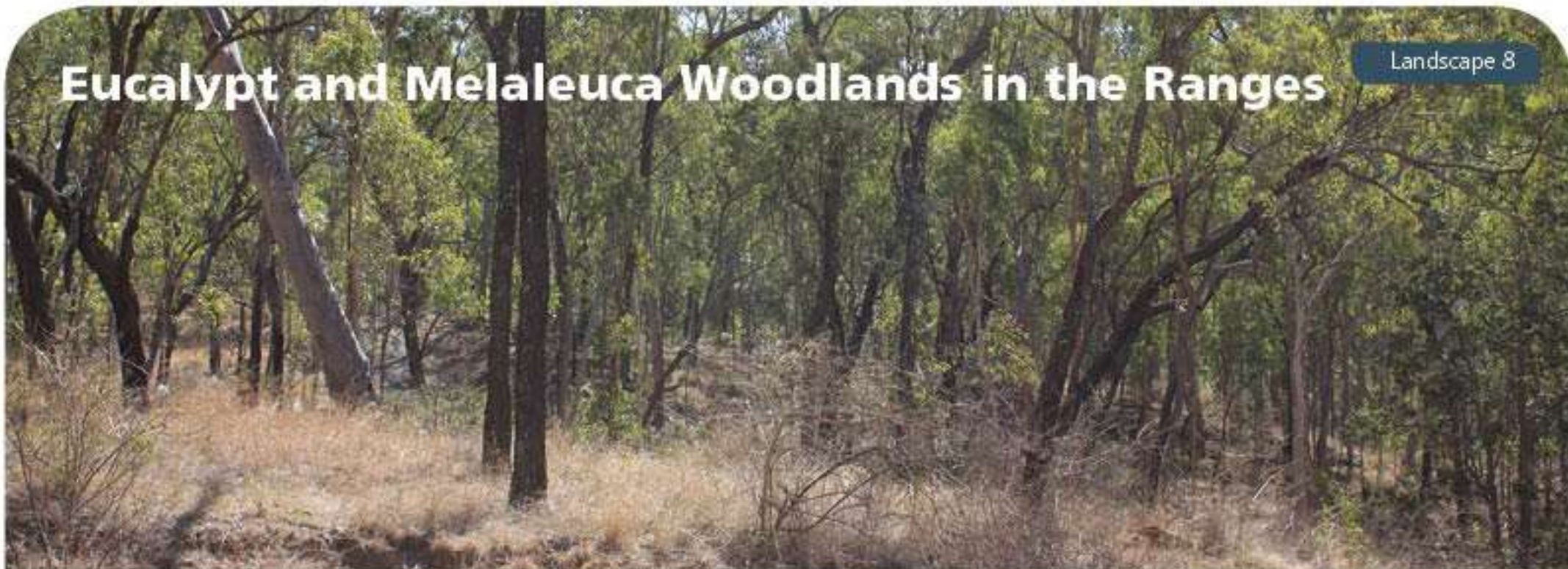
## Regional Ecosystems

9.11.1	9.12.22	11.11.3
11.11.4	11.11.6	11.11.7
11.11.8	11.11.12	11.11.15
11.12.1	11.12.3	

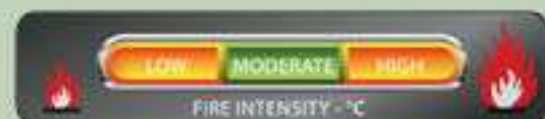


# Eucalypt and Melaleuca Woodlands in the Ranges

Landscape 8



Grassy woodlands and open forests of the coastal ranges of ironbark, Moreton Bay ash, poplar gum, lemon-scented gum, bloodwood or broad leaved tea tree either as a single species canopy or with a mixture of canopy trees. There may be a shrubby understory of acacia, tea tree and she oaks.





# Eucalypt and Melaleuca Woodlands in the Ranges



Northern Quoll

## Hazard Reduction

This landscape occurs in the upper Barratta catchment in the Woodhouse Station area. 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 wattles (*Acacia fimbriosa*) or broad-leaved tea tree (*Melaleuca viridiflora*). 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. 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. There is high diversity in the composition of the trees, grasses, and herbs in this landscape type. A low to moderate intensity fire early in the dry season or following a storm 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 broad-leaved tea tree and lantana. A storm burn of moderate to high intensity will be required to control the thickening. Destocking may be required to grow a fuel load to achieve the high intensity fire required. A backing or downhill fire will kill the regrowth more effectively than an uphill fire.

## Conservation

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. Exposed, rocky outcrops in these eucalypt forests are core habitat for the endangered northern quoll.

Quolls breed around August and September and juvenile quolls are most vulnerable to fires occurring in late spring. Small scale patch burns are recommended around rocky outcrops to reduce the threat to young quolls from hot, late dry season fires. Burn early after the wet season, or after a storm event when good soil moisture is present.

## Regional Ecosystems

9.12.34 11.11.1 11.12.8  
11.12.9 11.12.10 11.12.13  
11.12.19 11.12.6 11.12.17





Australian Government

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