The Clarke Connors Range bushfire consortium

The Clarke Connors Range Bushfire Consortium is a Reef Catchments initiative with funding support from the Australian Government's Caring for Our Country program.

FIRE MANAGEMENT GUIDELINES

REEF CATCHMENTS

Introduction

Reef Catchments and the Bushfire Consortium

Reef Catchments is a community based, not-for-profit organisation that has a proven track record in advancing natural resource management in the Mackay Whitsunday Isaac region. Reef Catchments works seamlessly across private and all levels of the public sectors to deliver the results where they matter.

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

The Bushfire Consortium was formed to reduce the threat of inappropriate fire on the unique natural and economic values of the Queensland environment. In Clarke Connors Range, satellite imaging illustrates that numerous large and intense dry season wildfires have occurred over the last 10 years. The concern is that a drier and hotter climate may further increase the incidence of these fires with consequential economic and environmental impacts. Rural communities recognise the magnitude of these fires, and their effects on life, property, productivity, and the environment. However, the wider community has not had access to good information on appropriate fire management practices until now.

Reef Catchments, in partnership with volunteer rural fire brigades, government and non-government landholders, and the Queensland Fire and Rescue Service, has taken up the challenge of providing the best information available on fire management and planning in the region. These fire management guidelines are the culmination of extensive discussions with experienced members of volunteer rural fire brigades and other respected fire managers and fire scientists.

These guidelines are one of the products of the Bushfire Consortium and are intended to be used by volunteer rural fire brigades and landowners who are on the front line in managing fire in rural communities. They are intended to be used to help land managers plan hazard reduction burning, and in undertaking planned burns for improved production and conservation outcomes.

Using these guidelines

These fire management guidelines have been developed for 12 landscape types in the Clarke Connors Range. These landscape types are composed of vegetation types that require similar fire prescriptions.

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

1. **Fire frequency** – how often should an area be burnt,
2. **Fire intensity** – how hot does the fire need to be,
3. **Season** – what time of year will usually provide the desired conditions for a planned burn; and
4. **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, to 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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Climate of the Central Queensland Coasts Area.

The Clarke Connors Range fire management guidelines cover the majority of the Central Queensland Coast bioregion.

Geographically the guidelines cover an area of approximately 940 000 ha in a narrow coastal strip extending from just south of Bowen to Flaggy Rock Creek south of Carmila.

The region's climate is humid and tropical with hot wet summers and cooler dry winters.

Rainfall varies significantly from the coast of Mackay averaging 1600 mm a year to 3000 mm a year in the elevated sections of the Clark Connors range.

The average summer temperature range is 23° to 31° C in summer to 11° to 22° C in July.

Landscape 1

Mangroves and estuarine wetlands

Mangroves and estuarine wetlands

Burning is generally not recommended in this landscape

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

Regional ecosystems

8.1.1 8.1.2 8.1.3
8.1.4 8.1.5

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Hazard Reduction

Saltmarsh and saltwater couch grasslands are regularly inundated by high tides which maintain high soil moisture and ensure continual green growth throughout the year. Because of this these areas rarely represent a fire hazard risk. Risk is further minimised by the fact that the grasslands rarely accumulate large amounts of fuels and tend to be broken up by patches of saline clay and sparse Saltmarsh.

The native ground cover within fringing melaleuca woodland and forests is also saltwater couch and this does not represent a high fire hazard. However, in many areas Guinea grass and other exotic grasses have invaded and these can accumulate high fuel loads that pose a fire risk in the dry season. Guinea grass and many other exotic grasses tend to quickly increase their biomass afterfire, often reaching a similarfuel load in as little as one season. The most effective long-term fire hazard reduction strategy is to remove these grasses using herbicide such as glyphosate.

Production

Because of high salt levels in the soil, weed infestations are rarely a problem in saltwater couch grasslands and burning for weed control does not need to be undertaken.

Saltwater couch is a perennial grass and pasture condition is strongly dependant on normal tidal cydes. Fire does not improve productivity and indeed, fire can lead to loss of important nutrients. Saltmarsh and saltwater couch grasslands are an important food source, and refuge for juvenile fish. There is strong evidence that juvenile fish feed heavily in these areas on high tides. A decrease in biomass through removal by fire, or overgrazing, may have a significant impact on coastal fisheries production.

Conservation

Apart from their values to coastal fisheries, mangroves, saltmarsh and saltwater couch grasslands provide essential habitat for a range of conservation dependant species.

Minimising fire and other disturbance within these areas provides significant positive benefits for migratory and resident shorebirds, seabirds and the threatened mangrove mouse.

Barramundi

Beach stone-curlew

Landscape 2

Beaches and foreshores

Beaches and foreshores

This landscape is extremely sensitive - no burning

Coastal she-oak & beach scrub (rainforest) in protected areas

Regional ecosystems

8.2.1 8.2.2 8.2.10

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Hazard Reduction

Coastal she-oak and beach scrub (rainforest on sand dunes) habitats are fire sensitive and will be killed or severely degraded by even low intensity fire.

The native ground cover within beach scrubs and coastal foreshores does not accumulate large amounts of fuel, and does not represent a high fire hazard. However, infestations of exotic grasses and weeds can significantly increase hazardous fuels, especially along disturbed edges of this landscape.

Hazard reduction burning is generally not suitable in coastal areas, as Guinea grass and other fire loving grasses quickly increase their biomass after fire, often reaching a similar fuel load in as little as one season.

An effective long-term strategy is the use of registered herbicide to reduce fuel hazards where required. Apply when grasses are actively growing, preferably prior to dry season.

Production

Many remaining areas of beach scrub are islands in a sea of cleared land, and remaining foreshore vegetation is the only buffer between the land and the sea.

Undisturbed foreshores and beach scrubs are fairly resistant to weed invasions, however smaller patches and disturbed areas are more prone to weed invasions and associated fire risk.

Disturbance caused by stock trampling and the presence of feral pigs can encourage spread of lantana and other weeds into otherwise intact areas. Management of stock access and provision of shade and watering points away from beach scrub and foreshores will reduce the impacts of disturbance in the long term.

Reducing weed impacts by means other than fire around buffers and in degraded areas will protect, and facilitate recovery of, these sensitive coastal areas.

Conservation

Fire is a key threat to remaining areas of beach scrub - a critically endangered ecological community under the National Environment Protection and Biodiversity Conservation Act (1999). Beach scrubs and foreshores are key habitats for many rare and threatened plants, animals, and migratory birds. Foreshores are breeding sites for marine turtles and shorebirds such as the bush stone-curlew.

Disturbance of these habitats, commonly due to arson; clearing/ mowing of undergrowth; dumping of garden waste stock; trampling; 4WD and pedestrian tracks, leads to weed invasions and increased fire risk. Weed management, rather than fire management, should be used to protect and rehabilitate remaining areas.

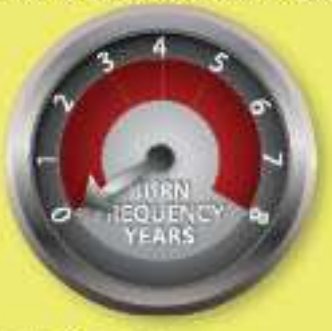
Very careful use of fire in adjacent fire prone landscapes is required. Check that there is little to no scorch into beach scrubs and foreshores as an indicator of successful fire management.

Landscape 3

Hind dunes

Hind dunes

Mixed vegetation on hind dunes (behind main beach and foreshore areas) including; Moreton Bay ash, acacia, coastal banksia, paperbarks, bloodwoods, black she-oak, peppermint and stringybarks & grasslands on sand dunes.



Regional ecosystems

8.2.3 8.2.8 8.2.6
8.2.9 8.2.13

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Hazard Reduction

Burning is not generally recommended in coastal dune systems and adjacent buffer zone unless for rehabilitation or protection purposes in special circumstances.

Exotic grass infestations, such as Guinea grass, are common along the edges of coastal dune vegetation. Many introduced grasses are favoured by disturbance and rapidly re-grow after fire, often accumulating similar fuel loads in as little as one season.

Landowners in some built up areas may desire protection burning to reduce hazards. Fire should only be used to gain initial control of weedy areas as part of a long term weed management strategy. Burn with low intensity fire; ensure good soil moisture is present (e.g. after 50mm of rain), and no more than once every 3-5 years. Avoid regular or repeated burning, and do not burn in dry conditions when risk is high.

Management of exotic grasses and other weeds is best achieved by using a registered herbicide when the plant is actively growing. Guinea grass is easily killed after fire with minimal herbicide use.

Production

Clearing, and introduction of exotic pasture species, coupled with impacts of stock can severely impact on fragile dune systems. Exotic species can out-compete natives in disturbed areas and alter natural fire regimes

Open dune grasslands supporting native grasses such as black spear grass would tolerate a low intensity fire every 3-7 years. Planned burns should only be conducted when rapid regeneration of the grassy layer is expected. Burn with good soil moisture and when there is a good chance of follow up rain. Avoid regular or repeated burning as loss of groundcover and soil nutrients will encourage weeds and less favourable grasses.

Disturbance of ground layer leads to weed invasions and loss of native grasses. Minimise disturbance from stock trampling, and manage weeds using other methods than fire.

Conservation

Lack of knowledge of this ecosystem and its need for fire is a major obstacle to effective fire management. In general, fire should only be applied for regeneration of native grasses and canopy trees, and responses carefully monitored.

Fire management could be trialled in areas supporting a native grass ground layer. A low intensity fire no more than once every 3-7 years with good soil moisture is advised. Indicators of successful fire management include: germination of canopy tree species; maintaining native grass density; fauna abundance; and reducing exotic grass dominance.

Many areas supporting beach scrub pioneer species in the understorey will naturally revert to beach scrub; actively exclude fire from these areas.

Coastal landscapes support a diverse range of plants and animals and their habitats are vulnerable to disturbance. Reducing disturbance and managing weeds rather than fire will protect coastal habitats and wildlife, such as the orange footed scrub fowl (pictured above).

Wetlands associated with sand dune systems

Wetlands associated with sand dune systems

Melaleuca (paperbark) swamps and sedge lands in low lying coastal areas.

Regional ecosystems

8.2.4 8.2.7 8.2.12
8.2.11

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Hazard Reduction

Melaleuca swamps in their natural state are relatively fire tolerant, due to high moisture levels in the soils and low rates of litter accumulation. They can also act as a natural fire break in the landscape.

Disturbed or degraded Melaleuca swamps may contain exotic grasses and weeds around the fringes and where water flow has been altered. Ponded pasture grasses can dominate wetter areas. Guinea grass, olive hymenachne and para grass can fuel intense damaging fires.

Burning for weed control and property protection needs to be carefully managed. Protection zones should not be burnt more than once every 4-6 years. Fire can reduce para grass and hymenachne weed infestations temporarily, but it is essential to burn whilst moist to reduce intensity and risk of canopy tree death. Planned burns are generally best prior to the dry season when soil moisture is high but standing water is reduced.

Weed control using approved herbicide is effective both post-fire or instead of fire. Follow up management and ongoing observation is required for successful control. Indicators of success include native wetland plant abundance, canopy tree health, and reduction in extent and dominance of exotic grasses.

Production

Many areas of coastal Melaleuca swamps are grazed, although pasture development is limited as they may be inundated for 3-6 months of the year.

Some areas of coastal Melaleuca swamps have been modified to establish ponded pastures. These commonly include para grass or olive Hymenache, one of the top 20 Weeds of National Significance, and can completely choke out wetlands. Heavy dry season grazing can reduce weeds extent and density when fire risk is the greatest. Burning to reduce infestations can be effective, and is best done in conjunction with grazing to reduce fuels and damage to wetlands.

Heavy grazing pressure in Melaleuca swamps can disturb native ground layer species and lead to woody weed infestations, including Devils fig and Brazilian pepper tree. Fire is generally not recommended to manage woody weeds in Melaleuca swamps. Approved herbicides or other methods are preferred.

Burning undertaken in land adjacent to Melaleuca swamps should ensure hot fires do not scorch edges or intrude into the wetlands.

Conservation

Melaleuca swamps are dynamic ecosystems and the timing of fire, and wet and dry seasons play a key role in these dynamics.

Too frequent fire from adjacent cane land, grazing paddocks, or weedy urban fringes will reduce ground layer diversity and kill juvenile Melaleucas. However, Melaleuca germination is enhanced by fire and occasional fires will maintain recruitment of trees into the canopy.

To maintain the integrity of Melaleuca wetlands, a fire every 10 years or more is recommended. Burning can be undertaken more often, every 5-10 years, providing fire intensity is low to moderate, and a patchy burn is achieved. Native wetland vegetation will not promote intense fires, however great care needs to be taken when burning exotic grasses to ensure fire does not damage or kill canopy and habitat (hollow bearing) trees. Fire retardants (foams and powders) should not be used as they damage the ecology of these sensitive areas.

Varying the season, intensity, and frequency of planned burning promotes diversity and a range of different vegetation ages.

Landscape 5

Riverine and wetlands

Riverine and wetlands

Burning is generally not recommended in this landscape

Melaleuca (Paperbark), River Oak and lowland rainforest fringing forests along creek-lines; freshwater wetlands and sedgelands.

Regional ecosystems

8.3.1 8.3.3 8.3.4
8.3.15

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Hazard Reduction

Burning is not generally recommended in vegetation fringing the watercourses, unless for specific management outcomes.

Riparian vegetation can act as a fire break in a wildfire, and will be more effective if weeds and grasses do not dominate. Disturbance by fire and other means (eg machinery or stock trampling) encourages weed infestations and increased risk of fire. Common exotic grasses include Guinea grass and Elephant grass, and these can rapidly regrow, accumulating very hazardous fuel loads after fire.

Riparian and wetland vegetation is fire sensitive, and damage can result from even low intensity fires. Burning is sometimes used to gain initial control over weed infestations. If used, fire should not be allowed to burn into vegetation, rather ignite along the edges, as a backing fire will reduce the risk of harming fringing vegetation. Burn with good soil moisture to retain groundcover, and do not burn more than once every 3-5 years.

Riparian and wetland vegetation may require active protection from wildfire in the dry season, by slashing or grazing along edges. Approved herbicide can effectively reduce grassy fuel loads when applied soon after the wet season, and kills effectively post-fire.

Production

Fencing off creek lines and wetlands, and providing off-stream watering points protects creek banks and reduces erosion. However seasonal pulse grazing can be useful to reduce grassy fuel hazards and gain access for weed control.

Ponded pasture grasses represent the greatest threat to freshwater habitats, as they can completely choke out waterways, even when being grazed. Hymenachne, one of the top 20 Weeds of National Significance, and para grass can build up very large fuel loads and severely damage riparian vegetation if burnt in the dry season.

Heavy late dry season grazing of ponded pastures reduces the risk of intense fire, and is useful prior to wet season flooding when grazed patches can drown. Fire has been used to gain some control of these grasses, however care needs to be taken to reduce intensity of fires to protect fringing vegetation. Burn only when fuels are moist and check scorching of fringing canopy trees as an indicator of success.

Herbicide approved for use in and around waterways, such as glyphosate without wetting agents, is effective at killing weeds, including ponded pasture grasses, Guinea grass, and lantana.

As with all weed control programs, follow-up is essential, and ongoing monitoring is needed to ensure infestations remain under control.

Conservation

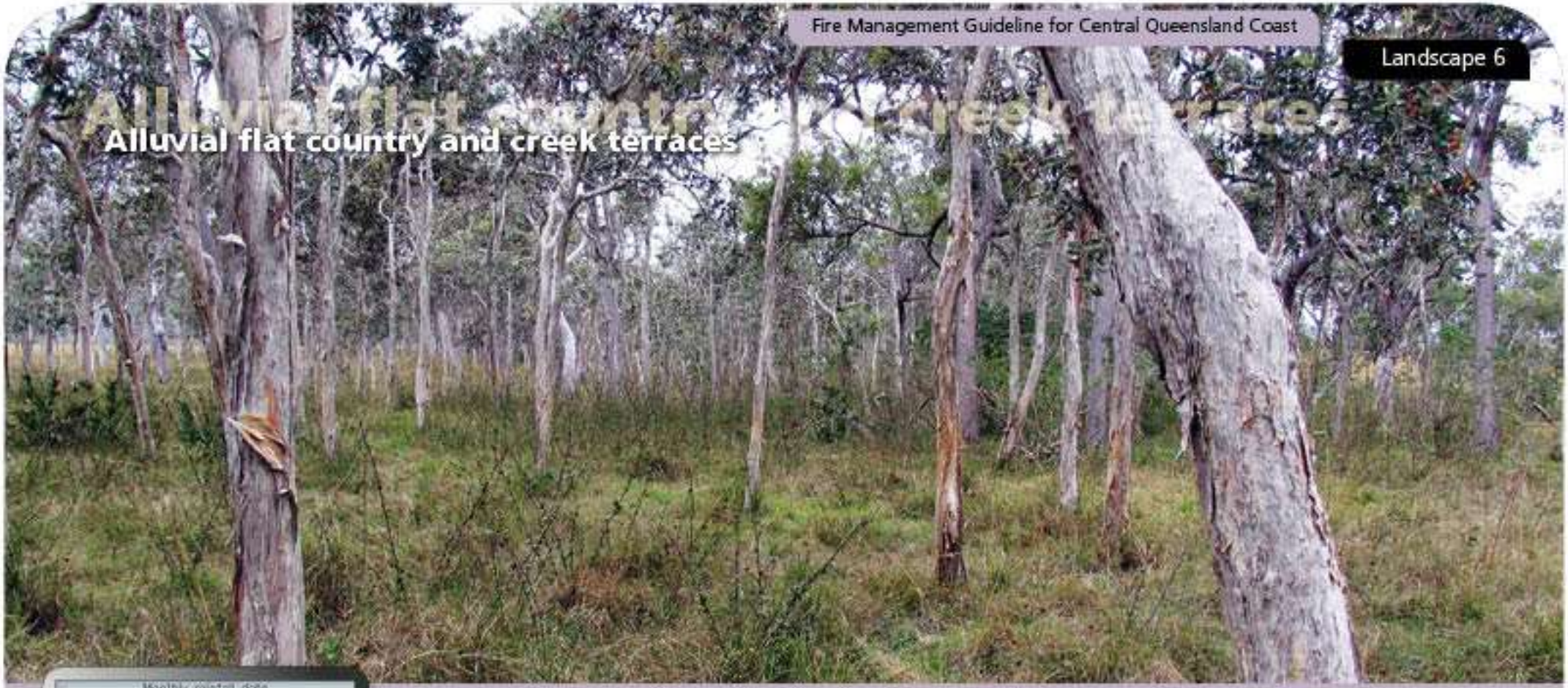
Clearing of vegetation fringing wetlands and water courses have been extensive, and most remaining areas are heavily impacted by weeds. Weed management, rather than fire management will assist in maintaining or rehabilitating these areas.

Riparian and wetland vegetation provides many services, induding protection against soil erosion, maintenance of aquatic habitats and fishery stocks, habitat for many migratory birds, and conservation dependant species such as the rufous owl.

Reducing disturbance of creek-side and wetland edges, and adjacent buffers is important to prevent the spread of weeds. Common disturbance includes feral pigs, uncontrolled or heavy grazing pressure, regular or intense fire, and damage by machinery.

Well planned burns in surrounding fire prone vegetation can help protect riparian vegetation from hot damaging fires. Indicators of successful fire management include weed free buffers and creek edges, and riparian trees are not being scorched by surrounding fires.

Alluvial flat country and creek terraces



Grassy woodlands and open forests of broad-leaved melaleuca or weeping teatree or mixed eucalypts (blue gum, Moreton Bay ash, bloodwoods, poplar gum) +/- swamp mahogany, acacia, cocky apple and cabbage palms with areas of grasslands.

Regional ecosystems

8.3.2	8.3.5	8.3.6
8.5.1	8.3.11	8.3.12
8.5.2	8.5.3	8.5.5
8.5.6		

Hazard Reduction

Widely cleared for agriculture, remaining patches may be heavily infested with weeds, especially in disturbed areas with high soil fertility, such as creek terraces. This is an important landscape for undertaking protective burns to protect mangrove and riparian (riverine) vegetation, and reduce the risk of widespread wildfires.

Smaller scale patchy fires could be burnt every 2 years, beginning soon after the wet season, generally late March-April onwards. Planned burns should be undertaken with good soil moisture to ensure rapid recovery of groundcover. Aim to burn no more than 20-40% of a patch or property in one year; coordinate with neighbours where required for protection burning.

Guinea grass and other introduced grasses rapidly colonise burnt or otherwise disturbed areas, often reaching very high fuel loads in as little as one season. Regular or intense dry season fires will promote weeds and fire loving grasses. This promotion will exclude native grasses and more desirable species, effectively increasing the fire hazard over time.

Dense infestations of flammable grasses and weeds should not be burnt too often (allow at least 2-3 years between burns), and may be best controlled by chemical or manual methods.

Production

Avoid regular or calendar burning in this landscape. Vary fire regimes by burning when conditions are suitable for management needs. Include some storm burning where possible, but avoid dry season burning unless hotter fires are required, and there is a good chance of follow up rain. Vegetation thickening and loss of grassy groundcover can occur in heavily grazed areas, or if fire is too infrequent or of low intensity.

To maintain a good balance of trees and grass, a moderate intensity fire every 5-7 years is adequate. Good pasture composition may be maintained with lower intensity fires every 2-4 years, but allow for some recruitment of canopy trees. Burn with good soil moisture, ideally after 50mm of rain to retain some litter cover. Restrict grazing post-fire when pastures are in early growth.

Control of woody regrowth and dense lantana infestations may require hotter fires. Fuel loads of 1,500 – 2,000 kg/ha may be needed, but control of dense trees and shrubs over 2 metres may be difficult once established. Spelling stock to increase fuel loads may be required in heavily grazed areas.

Indicators of successful fire management include: a diversity of grasses and herbs in the ground layer, especially in the first year after fire; reduced lantana and weed pressures; and maintenance of an open canopy structure.

Conservation

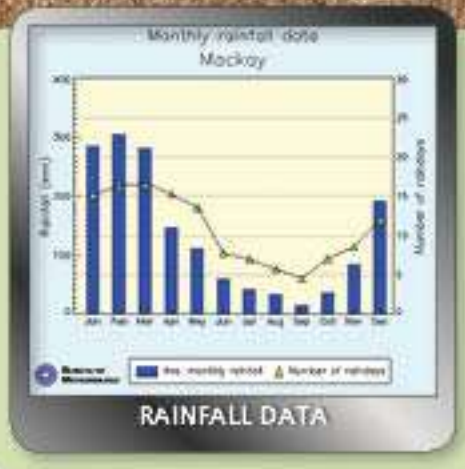
Controlling weeds, woody regrowth, and rainforest invasion is a major focus of planned burning in most areas. Vary the extent, season, and time between burns to promote a diversity of habitat types, including some areas left unburnt for 7 years or longer.

Identifying and retaining habitat trees, such as mature, hollow bearing blue gums, will help conserve significant species including gliders and rufous owls that depend on these areas. Successful fire management should aim to encourage recruitment of blue gums into the canopy; minimise grazing, fire, and weed pressures for the first 3-5 years to encourage this.

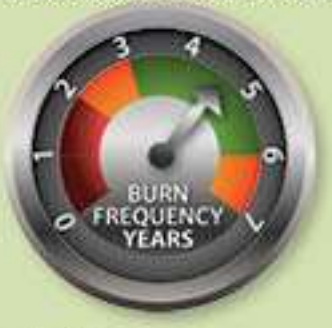
Denser woody areas including lantana infestations and rainforest regrowth may require hotter fires to initially to reduce their extent. Care needs to be taken when burning for weed control as wildfire risk is high. It is best to burn with good soil moisture or burn with early storms when follow up rain is expected. Frost or herbicide to defoliate lantana before fire is effective, as it increases available fuels and allows access for on-going management.

Low lying wetter areas may not burn often (between 5-10+ years when conditions are suitable), but require fire for canopy tree recruitment and maintenance of ground layer diversity.

Grassy woodlands and open forests on low hills and undulating areas; sedimentary



Grassy woodlands and open forests of ironbark, bloodwoods, Moreton Bay ash, poplar gum, blue gum and stringybark often with grasstrees and/or cycad. May have a dense understorey layer of broad-leaved paperbark, brushbox and/or acacia and/or hibiscus.



Regional ecosystems

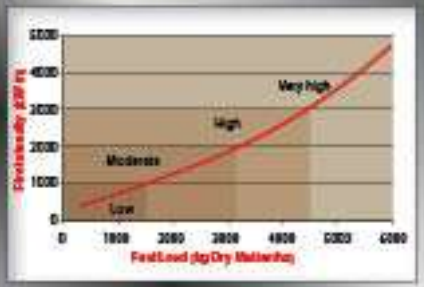
8.11.1 8.11.3 8.11.4
8.11.5 8.11.8

1000 kg/ha

2000 kg/ha

3000 kg/ha

4000 kg/ha



Fuel Load
(kg Dry Matter/ha)

Hazard Reduction

Most common on the lower foothills on the eastern edge of the Clarke-Connors Range near Homebush, Walkerston, and Mia Mia in the south, through Kuttabul, Mt Ossa, and Calen area in the north.

This landscape benefits from a mix of fire regimes, including occasional higher intensity fires in spring, best timed around the first storms. Moderate intensity and occasional hot fires promotes grass and groundcover density, and assists in control of lantana and woody regrowth. Burning after the first storms is the optimal timing for hotter fires when follow up rain is expected.

Aim to burn an area every 3-6 years with varying fire regimes. When planning for hotter fires late in the season, implement early patchy burns as soon after the wet season as possible. These early burns will provide a break to contain the later, hotter fires.

Guinea grass and other exotic fire-favoured grasses rapidly colonise burned or otherwise disturbed areas, often reaching very high fuel loads in as little as one season. Herbicide treatment is an option where hazards exist, and is very effective when applied after fire.

Production

3-6 years between burns is suitable for production areas, providing a mix of fire intensities are planned for. Include some winter and storm burning, or burn as soon as possible after the wet season.

Appropriate fire management will maintain the high diversity of grasses and herbs in this landscape. However, with heavy grazing or lack of fire over time, dense lantana infestations can remove the productive grasses from the ground layer.

Conservative grazing on steeper slopes and wet season spelling after fire in this vegetation type will reduce soil erosion and assist in reducing weed pressures.

Hotter fires can be used to control lantana and woody regrowth, providing sufficient fuel loads are available. Surrounding areas should be protected from the risk of hot fires by implementing early patchy burns. Fire can be ignited on ridge tops and allowed to burn downhill or along rainforest edges to protect them from hot fires.

Conservation

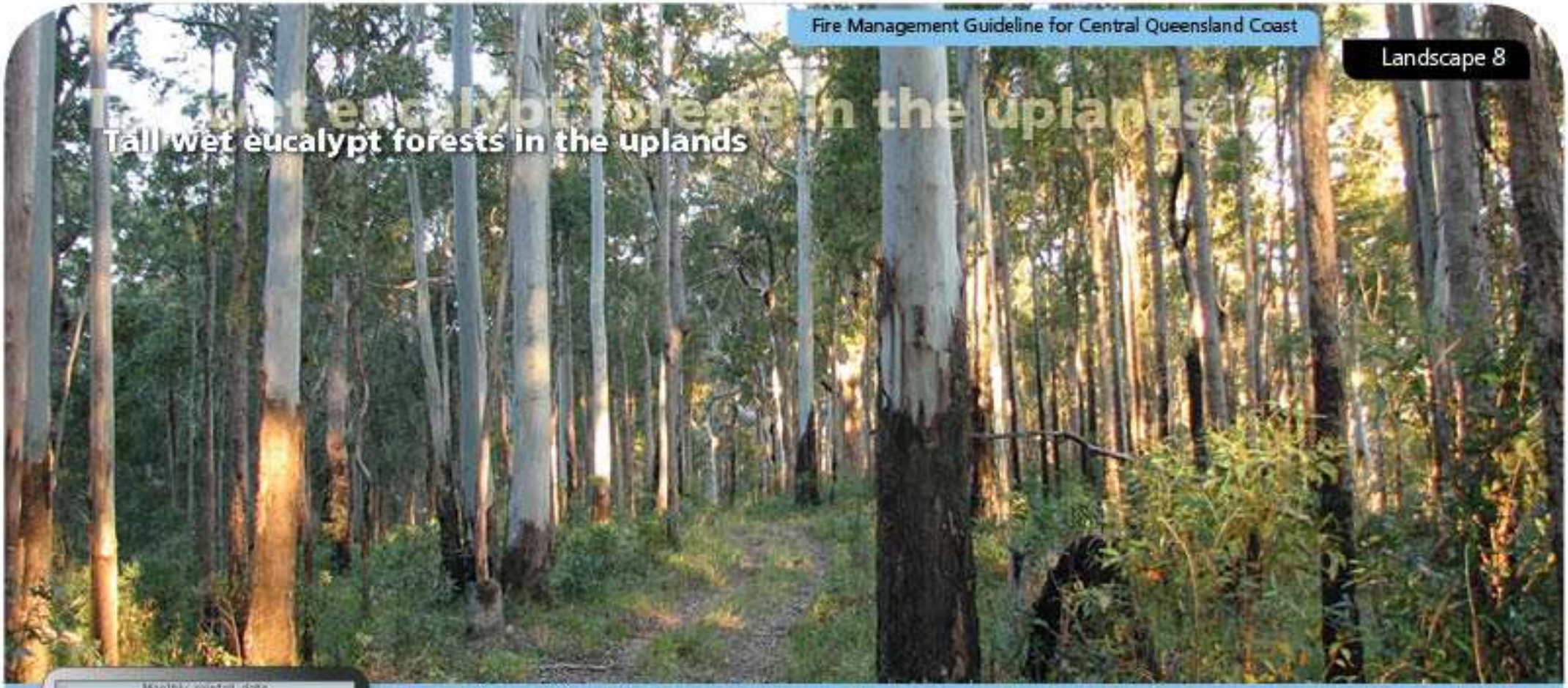
Exposed, rocky outcrops in these eucalypt woodlands are core habitat for the endangered northern quoll. Quolls breed in August-September in our region, and juvenile quolls are most vulnerable to late spring wildfires.

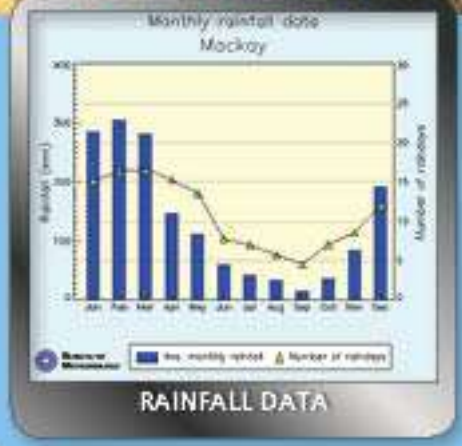
Small scale patchy burns are recommended around rocky outcrops to reduce threats to quolls from late dry season fires. Burn early after the wet season when the ground, leaf litter, and vegetation are moist, or during winter after rain, when good soil moisture is present.

Vary fire regimes in this landscape and leave some areas unburnt for 7 years or longer, especially in years after a hot fire has occurred.

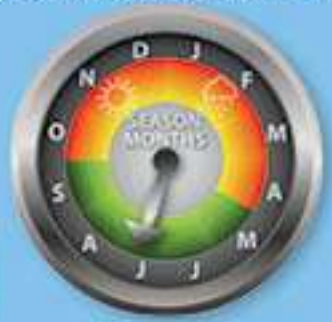
Indicators of successful fire management in this landscape would include: maintaining native ground layer density, reducing weeds, especially lantana, and monitoring quoll population numbers.

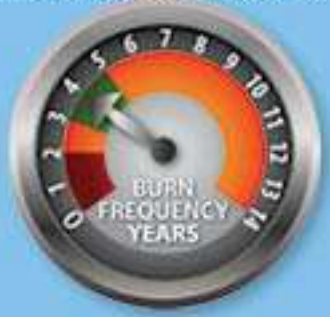
Tall wet eucalypt forests in the uplands





Tall grassy forest of flooded (rose) gum, pink bloodwood, red mahogany, New England blackbutt, sometimes with yellow stringybark, blue gum, brown bloodwood. A sub layer of black oak, banksia or rainforest species may be present. Bracken and grasses as ground layer.





Regional ecosystems

8.12.4 8.12.8 8.12.31

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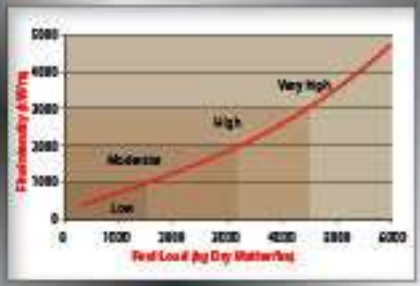
1000 kg/ha

2000 kg/ha

3000 kg/ha

4000 kg/ha



Fuel Load
(kg Dry Matter/ha)

Hazard Reduction

Tall wet 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 2-3 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 the first storms as 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 frost has defoliated plants can result in a better kill rate. Reducing weedy fuel hazards with approved herbicide is often a good option either before or after fire.

Production

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 mid-late dry season burning to maintain productive groundcover.

Fire exclusion, overgrazing, or regular low intensity burning can result in a loss of grassy ground layer. Fuel loads of 2000 kg/ha or more is recommended for promoting green pick in native pastures.

Spelling country 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.

Vary fire regimes to prevent a simplified forest structure. In areas more frequently burnt, ensure there is some recruitment of canopy trees. Rainforest regrowth can be controlled by fire, but this may be difficult once trees reach 2 metres or more. Fire can still be used in these areas for maintaining a grassy layer.

Conservation

Less frequent burning of these forests over the past 100 years has resulted in dense thickening of trees and shrubs in many areas. A dense rainforest understorey may develop over a 15-17 year period, to the point that the forest will not burn unless in extreme conditions.

Where areas of grassy understorey remain, a moderate intensity patchy burn every 3-5 years is recommended.

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 dependant on these habitats. Intense dry season fires are the key threats to these habitats.

Protect adjacent rainforest edges from 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.

Landscape 9

Eucalypt forest and woodlands on hill slopes, ranges and ridges

Variable woodlands to open forests of ironbark, Moreton Bay ash, bloodwoods, poplar gum, blue gum, yellow stringybark, brushbox, white mahogany, lemon scented gum, depending on altitude and exposure.

Regional ecosystems

8.12.5	8.12.6	8.12.7
8.12.12	8.12.20	8.12.22
8.12.23	8.12.27	8.12.32
8.12.26		

Hazard Reduction

Fire intensity, and therefore risk, increases as the dry season progresses when fuel and soil moisture is low. Conversely, fires in the early dry and wet seasons are usually of lower intensity and more patchy.

Guinea grass and other fire-favoured introduced grasses rapidly colonise burned or otherwise disturbed areas, often reaching very high fuel loads in as little as one season. Because of its superior adaptation to fire, guinea grass will out-compete native and desirable species if burnt too regularly or in dry conditions, and spread into new sites.

To reduce the severity of wildfires and the threat they pose to life and property:

- Coordinate controlled burns with neighbours to manage fuel hazards, and maintain a mosaic of different ages of vegetation in the landscape;
- Aim to burn 60-70% of a patch or property in a year. Remaining grassy patches can be relit or sprayed in protection zones post-fire;
- Vary the timing and frequency of burning, and burn with good soil moisture. Burning is generally not advised between September and December, unless after rain with a high chance of follow up rain;
- Observe response of vegetation and fuel load accumulation and adapt management if needed;
- Construct and maintain strategic fire breaks in populated areas or 'hot spots', potentially across several properties.

Production

Burning season, and years between burns will vary depending on seasonal climatic conditions, grazing pressure, the type of eucalypt community, and whether country has a grassy or dense shrub understorey. Varying the season, intensity, and area burnt will create a mosaic of habitats; whereas too frequent fire (annual or every second year) reduces understorey, and has serious impacts on soil health and long term sustainability.

A fire after 50mm or more of rain (or first storms) every 3-5 years (longer in dryer and/or steeper and/or heavily grazed country) will maintain a good balance of trees and grass. A dense shrub layer or thicker regrowth may increase with longer intervals.

For effective control of woody regrowth and dense shrub layer undergrowth, fuel loads of at least 2,500 kg/ha are required. Tree and shrubs below approximately 2 metres high will be suppressed with a moderate intensity fire; however control of regrowth greater than 2 metres will be difficult, as greater fuel loads are required and most eucalypts will resprout after fire.

Care must be taken to protect adjacent rainforest and creek edges from hot fires. Igniting along rainforest edges and allowing fire to burn downhill will reduce intensity and resulting damage to fire sensitive vegetation.

Country may need to be de-stocked prior to a burn to allow fuels to accumulate. Wet season spelling after fire will promote native grasses and diversity in ground cover.

Conservation

Planned burning in this landscape should aim to promote patchy fires to ensure a mosaic of different vegetation types, and differing time since fire across the landscape. Rangelands are prone to widespread intense fires in the dry season, which is a key threat to biodiversity.

Fire too regularly leads to a loss of vegetation cover and directly threatens yellow-bellied glider, rufous owl, and glossy black cockatoo habitat, and the mature hollow bearing eucalypts they depend on.

Rocky outcrops in the forest are essential habitat for the endangered northern quoll. Do not burn between mid-September and mid-December when juvenile quolls are most vulnerable to fire.

In potential or known quoll habitat, small scale patch burns of 17ha or less are best. Burn with good soil moisture or just after the wet season when the ground, leaf litter, and vegetation are still very wet. Burn around every 5-7 years and leave some areas unburnt for 7 years or longer, especially in years after a hot fire has occurred.

Controlling weeds (especially lantana), woody regrowth, and rainforest invasion is a major focus of planned burning in most areas. Dense areas of lantana may require well planned hotter fires to reduce infestations. Frost or herbicide spray before a burn can cure fuels and give better control.

Woodlands and intervening grassy areas along drainage channels in the uplands

Blue gum and swamp mahogany grassy open woodlands on alluvial flats and associated grasslands in drainage lines on gently undulating upland areas.

Regional ecosystems

8.12.9 8.3.14

Hazard Reduction

Large areas of blue gum (Eucalyptus tereticornis) have been cleared and many of the remaining areas are heavily grazed and/or logged and infested with weeds, including dense lantana.

These areas can be difficult to burn if sufficient fuels in the ground layer are not available due to grazing pressure or woody thickening.

Lantana infestations can support very intense fires in dry years, as can areas supporting largely exotic grasses.

Surrounding fire prone habitats should be managed to break up country into a mosaic of vegetation ages to reduce widespread fires in the landscape.

Grassy areas along drainage channels do not generally require fire. However, disturbance from feral pigs leading to greater weed pressures can alter fire regimes.

Production

A moderate intensity fire every 3-6 years in this country will reduce woody regrowth, and maintain open woodland canopy with a grassy understorey. Burn after rain or with good soil moisture to encourage rapid recovery of the ground layer.

Spelling country after fire or over the wet season will promote native grasses and canopy tree recruitment. Where possible, protect blue gum saplings from fire and stock browsing until they are at least 2 metres high.

A moderate intensity, downhill fire in autumn may be effective in managing lantana. For dense areas, burn after frost when fuels are cured, or selectively spray prior to burning to increase the fuel load and ignition potential.

For control of woody regrowth, fuel loads of at least 1,500-2,000 kg/ha are required. However, very dense tree and shrub growth can be difficult to burn if ground layer fuels have been shaded out.

Conservation

Very few intact stands of these grassy woodlands remain. The aim of good fire and grazing management is to maintain an open woodland structure, with some recruitment of blue gums into the canopy.

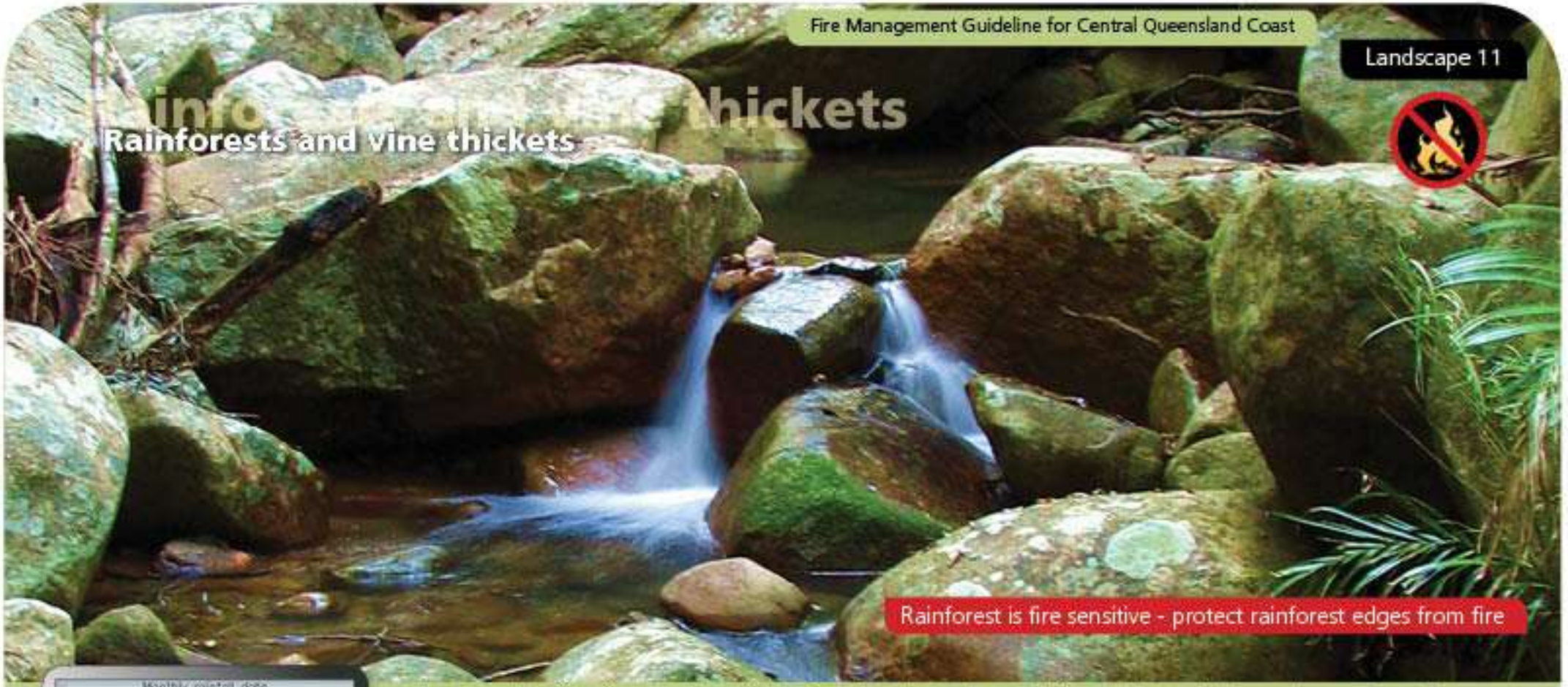
Blue gums (Eucalyptus tereticornis) grow into very large hollow-bearing trees and have special significance for fauna species such as squirrel gliders, yellow-bellied gliders, powerful owls, and rufous owls. Burning practices should account for the long term protection and persistence of these larger trees in the landscape.

Care needs to be taken when burning to thin woody regrowth, as hot fires can result and damage adjacent fire sensitive areas.

An indication of good fire management in this landscape is the presence of blue gum seedlings allowed to recruit into the canopy. Seedlings are much smaller than coppice shoots of saplings which are often multi stemmed.

Landscape 11

Rainforests and vine thickets



Rainforest is fire sensitive - protect rainforest edges from fire

A great variety of rainforests and vine thickets from dryer vine scrubs and rainforest in lower altitudes and exposed coastal hills to complex vine forests on high mountain plateaus.

Regional ecosystems

8.12.1	8.12.2	8.12.3
8.11.2	8.12.11	8.12.16
8.12.17	8.12.18	8.12.19
8.12.28	8.12.30	8.3.9
8.3.10	8.2.5	8.8.1

Hazard Reduction

Rainforests will generally not burn, however fire scorch of rainforest edges can encourage grassy fuels and lantana to build up.

Some lantana and grass burning may be justified along margins to gain initial control of weeds, but follow-up control is essential to effectively reduce fuel loads over time. Care must be taken to ensure burning does not intrude into rainforest. Check for scorching as an indicator of appropriate fire. Burn with no or very low wind in areas of high fuel load. Burning small patches is less hazardous than a continuous line.

Patch style, protective burns in the country adjacent to rainforest should be undertaken to create a mosaic of burnt and unburnt country; this will break up the fire front in a wildfire and reduce rainforest loss. Good practice is to ignite from rainforest edge at the top of ridges, and allow fire to burn downhill to reduce fire intensity.

Production

Rainforest supports little to no grassy understory, so there is no viable grazing production. Disturbance facilitates weed invasions, so it is preferable to restrict access to stock into rainforest.

Lack of fire allows rainforest species to spread out into adjacent areas of open forest and woodland if not regularly burnt back.

Burn surrounding fire prone communities to maintain species and canopy composition with an open understorey to reduce rainforest invasion.

Maintain the forest edge weed and grass free with herbicide where possible, and facilitate natural regeneration to increase rainforest edge where desired.

Conservation

Rainforest edges provide persistent, effective fire breaks, and are highly valued in wildfire situations. It is important to burn surrounding fire prone landscapes in a mosaic patch style to break up fuels and wildfire front, to protect rainforest.

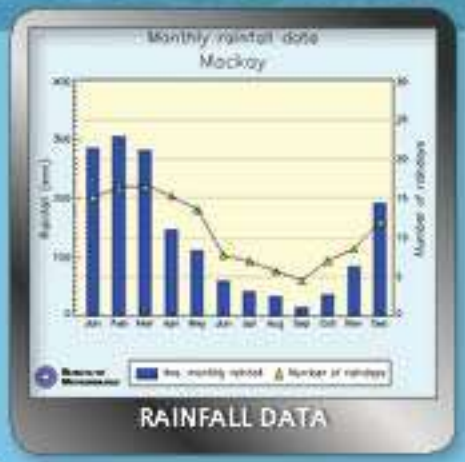
When burning edges for weed control, ensure sufficient soil moisture is present and allow for follow up control. Avoid exposing to fire when conditions are hot and dry, as further weed infestations will result, increasing fire risk and reducing integrity of rainforest edges.

Many rare and threatened plant species exist on rainforest edges, and many are susceptible to repeated fires.

Feral pigs cause damage to soil surface and encourage the spread of weeds including fire prone grasses and lantana.

Island and rocky headland landscapes

Island and rocky headland landscapes



Grassy headlands to acacia and brushbox and ironbark forest-shrubland, blue gum and poplar gum woodlands (including hybrids), Moreton Bay ash and blue gum woodland with a dense understorey of vine forest species.

Regional ecosystems

8.12.13 8.12.14 8.12.25
8.12.29

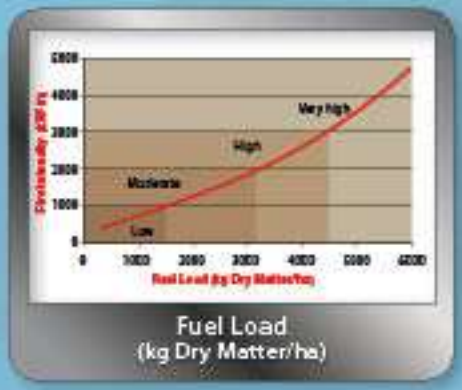
The Clarke Connors Range bushfire consortium

1000 kg/ha

2000 kg/ha

3000 kg/ha

4000 kg/ha



Fuel Load
(kg Dry Matter/ha)

Hazard Reduction

Island woodlands and coastal headlands can be infested with introduced grasses and lantana which promote hotter fires, and rapidly regrow after fire. In general, it is the more disturbed areas that are impacted by weeds. Disturbance can be from repeated fires in the past.

Control of weeds and exotic grasses by means other than fire may be preferred in areas surrounding campgrounds, island leases, and picnic areas.

Where hazard reduction burning is required, fuel loads of 1500kg/ha are adequate to ensure fire intensity is low to moderate. Greater fuel loads will increase fire intensity and the chance of fire spreading. In areas of high fuel loads, fire management should begin as soon as possible after the wet season, relying on the moisture content of the fuel to reduce fire intensity

On the mainland, four wheel drive tracks and other areas of high visitation are a conduit for introducing weeds which can pose a fire risk to surrounding areas.

Conservation

Some areas of open grassland are being invaded by woodland or vine forest pioneers, whilst other areas remain as open grasslands. Research is needed to determine the role of fire in maintaining vegetation types to determine optimum fire regimes.

Dense thickets of swizzle bush (Timonius timon) are replacing grasslands in some areas. Swizzle bush flowers and fruits between July and November, and could be set back if burnt at during this time. Hotter fires may be needed to reduce woody vegetation and maintain an open canopy, requiring fuel loads of 2000-3000 kg/ha.

Maintain extent and area of grasslands, where they remain, by trialling burning every 2-3 years with a low-moderate intensity fire; retain at least 50% unburnt. Monitor vegetation and adapt management depending on response to fire regime.

Lantana can be managed by fire in the same way as other woody vegetation. Suitable fuel loads must be available, between 2000-3000 kg/ha to reduce infestations. Slow burning moderate intensity fire can suppress lantana, as it damages the root and lower stem zone.

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