

Gulf Savannah

Appropriate fire management practices to help land managers plan hazard reduction burning and in undertaking planned burns for improved production and conservation outcomes

Fire Management Guidelines



Introduction

The Carpentaria Land Council Aboriginal Corporation

The Carpentaria Land Council Aboriginal Corporation (CLCAC) was established 25 years ago in Burketown to represent the rights and interests of Traditional Owners. It represents nine language groups whose traditional lands and waters are located in the Gulf of Carpentaria.

The CLCAC vision has evolved to include land and sea management with the formal establishment of a dedicated land and sea unit in 2007. This unit now employs a number of rangers and project officers who care for country. The teams are located in Burketown and Normanton and work across the region. The CLCAC has formed a partnership with Reef Catchments to develop and deliver best practice fire management guidelines for the CLCAC area.

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. The Bushfire Consortium was formed to reduce the threat of inappropriate fire on the unique natural and economic values of the Queensland Environment. For more information and contact details, visit the website: www.queenslandbushfireconsortium.net.au

Reef Catchments, in partnership with the CLCAC, volunteer rural fire brigades, government and non-government landholders, 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 the CLCAC, volunteer rural fire brigades and other respected fire managers and fire scientists. These guidelines are intended to be used by Indigenous land and sea rangers, 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 13 landscape types in the Gulf Savannah. 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 $\pm 20\%$ 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.



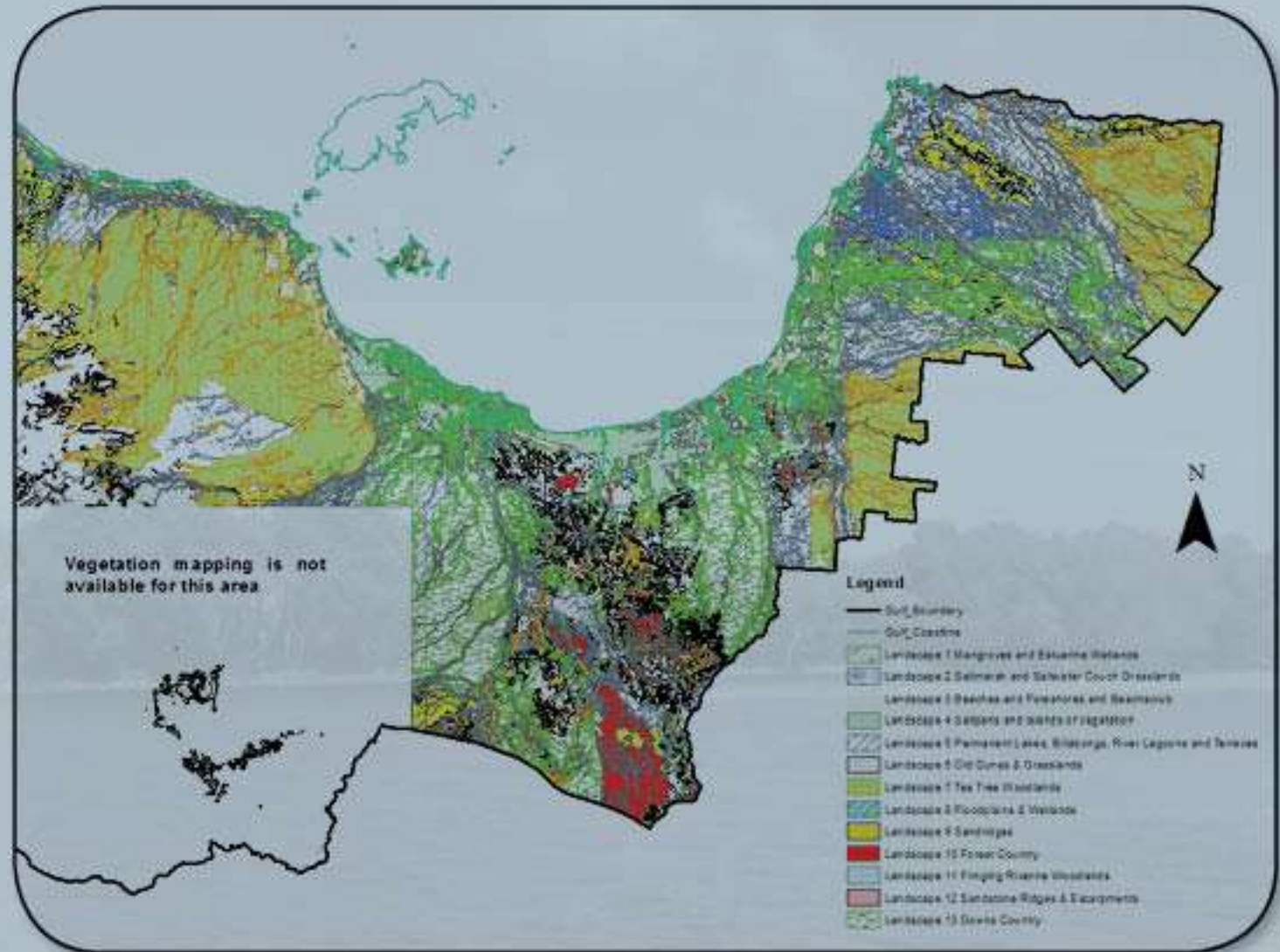
The Bushfire Consortium is a Reef Catchments initiative with funding support from the Australian Governments' Caring for Our Country program.

Disclaimer: This content is provided for information purposes only. No claim is made as to the accuracy or authenticity of the content. Carpentaria Land Council Aboriginal Corporation and Reef Catchments do not accept any liability to any person for the information or advice (or the use of such information or advice) which is provided or incorporated into it by reference.

The Climate and Vegetation Groups for the Gulf Savannah

Key Features:

- The study area of the fire management guidelines is approximately 52,000km² of the Gulf Plains bio-region.
- Generally a flat landscape of low lying tropical savannah divided by major rivers.
- The climate is tropical and monsoonal with the summer wet season expected from December through to March. The winters are the dry season and generally range from April until November.
- Rainfall is variable and normally higher toward the coast and the north-east. Burketown and Normanton average 860mm and 834mm respectively for annual rainfall.
- Air temperatures generally range between 19°C and 32°C.
- A large portion of the study area is inundated every year, often for several months. This has a direct impact on where vegetation types occur and how the country is used for a range of purposes including fire.

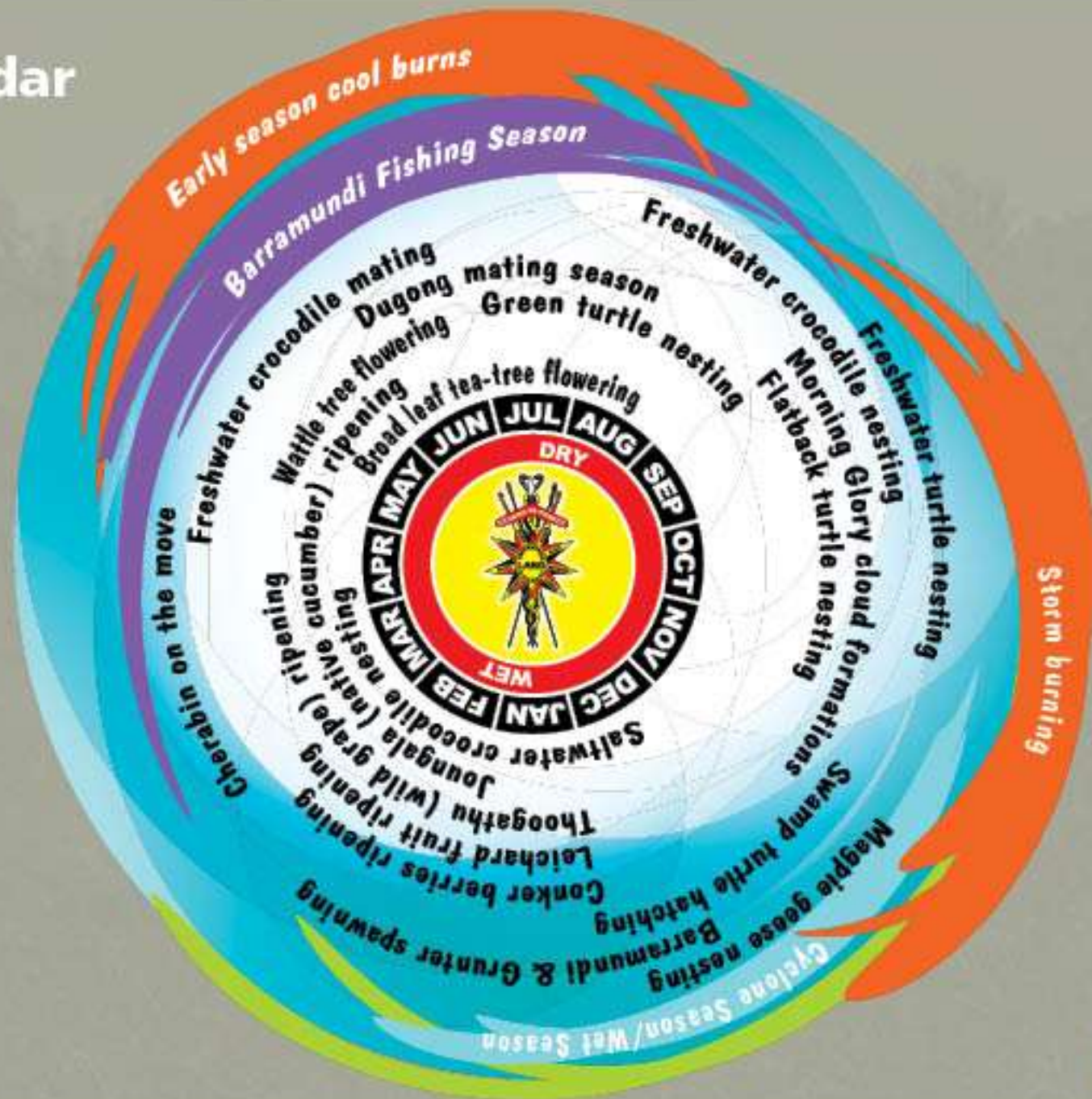


Fire Landscapes of the Gulf of Carpentaria

1. Mangroves
2. Saltmarsh and Saltwater Couch
3. Foreshore Beachscrub
4. Saltpans with Islands of Vegetation
5. Permanent Lakes, Billabongs and River Lagoons
6. Old Dunes and Grassland
7. Tea Tree Woodlands
8. Flood Plains and Wetlands
9. Sandridge
10. Forest Country
11. Fringing Riverine Woodlands
12. Sandstone Ridges and Escarpments
13. Downs Country



Seasonal Calendar



Mangroves and Estuarine Wetlands

Landscape 1



Burning is generally not recommended in this landscape

Communities consisting primarily of mangroves, as well as saltwater couch, spinifex, and various shrubs. Occur on sand, dunes and in estuarine wetlands.



Mangroves and Estuarine Wetlands

Key Features:

- Regularly flooded by the tides so limited fire risk.
- Useful as green firebreaks.
- At risk from scorching by late season wildfires.
- Should not damage mangroves by building firebreaks into the edge of the mangroves.
- Important community for seafood like mud crab, prawns and barramundi.
- Habitat for migratory shorebirds and seabirds.
- Healthy mangroves filter water before it goes to the sea.

Hazard Reduction

High tides regularly flood the mangroves keeping the soil moisture high and the mangroves growing actively throughout the year. During periods of exceptional dry weather, late season wildfires can scorch the mangroves which kill them. Hazard reduction should occur in adjacent land types with care taken not to damage mangrove areas with fire breaks.

Primary Production

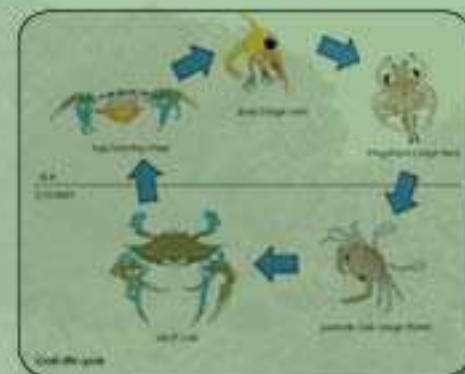
Mangroves are the breeding and nursery grounds for crabs, prawns and many of North Queensland fish species. These species are important for both recreational and commercial fishing industries. Damage to mangroves, including from fire, reduces their ability to provide breeding and nursery habitat which will reduce fisheries production.

Conservation

Apart from their fisheries value, mangroves provide essential habitat for migratory and resident shorebirds, seabirds and the threatened mangrove mouse. Healthy mangroves also assist in filtering excess nutrients and sediments from storm water runoff, preventing these from entering coastal ecosystems and coral reefs.



Wetlands Composition



Crab Life Cycle



Beach Stone Curlew

Regional Ecosystems

2.1.2 2.1.3

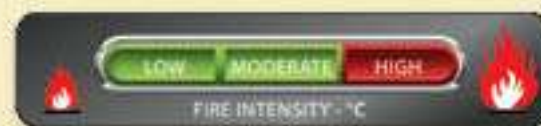
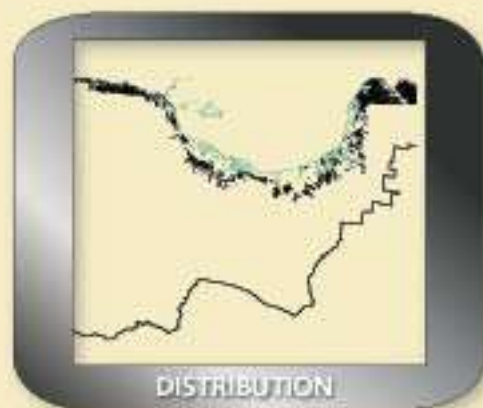
Saltmarsh and Saltwater Couch Grasslands

Landscape 2



Burning is generally not recommended in this landscape

Saltmarsh and Saltwater Couch Grasslands.



Saltmarsh and Saltwater Couch Grasslands

Key Features:

- Regularly flooded so limited fire risk, useful as a green break.
- Patchy with saltpan and clay in between vegetation.
- Fires will have a negative effect on this vegetation so minimise fire damage.
- Good fattening feed for cattle but overgrazing can cause wear channels in the saltpan and dieback when high tide water evaporates.

Hazard Reduction

Saltmarsh and saltwater couch grasslands are regularly flooded 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. These grasslands are often broken up by large areas of saltpan which provides a separation between vegetation communities.

Production

Saltmarsh and saltwater couch provide good quality feed for cattle, particularly during the dry season because the tidal flooding keeps them green. Over grazing can cause wear channels in the saltpan and this creates dieback when the high tide water evaporates. Fire does not improve pasture productivity and can lead to a loss of nutrients.

Conservation

Saltmarsh and saltwater couch grasslands are important filters reducing the amount of sediment and nutrients moving into coastal waters, particularly after fire and other disturbances upstream. Apart from their value to coastal fisheries, saltmarsh and saltwater couch provide essential habitats for a range of conservation dependant species. Minimising fire and other disturbances within these areas provides significant positive benefits for migratory and resident shorebirds, seabirds and the threatened mangrove mouse.

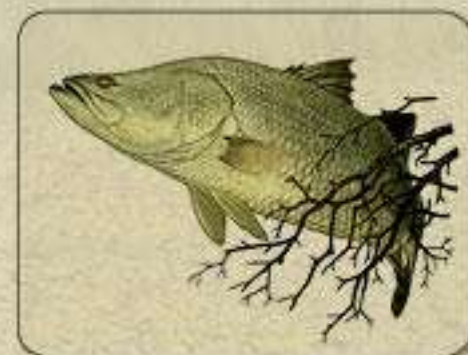
Two main weeds, Rubber Vine and Calotrope can infect this area. Rubber Vine seedlings are killed by fire and fire will suppress Calotrope if burnt before seeding, but too much fire removes nursery habitat for fish such as barramundi. Target weed infestations early to minimise the area burnt.



Brolga



Estuarine Habitat



Barra

Regional Ecosystems

2.3.1

Foreshores and Beaches

Landscape 3

Burning is generally not recommended in this landscape

Beach She-Oak, Spoon Tree, Cluster Figs, Pear Tree, Wild Plum, Lady Apple; may also contain Moreton Bay Ash and Bloodwoods, often as a canopy tree.



Foreshores and Beaches

Key Features:

- Hind dunes may need protection burning.
- Avoid repeated use of fire.
- Important area for campsites.
- Source of medicine plants.
- Removing vegetation by fire can result in erosion and loss of turtle nesting areas.
- Lack of shade can cause sex change in turtles.

Hazard Reduction

Beaches: Burning is not recommended in coastal dune systems and adjacent buffer zone unless for rehabilitation or protection purposes in special circumstances. Many introduced grasses are favoured by disturbance and rapidly re-grow after fire, often accumulating similar fuel loads in as little as one season.

Hind Dunes: Landowners in some areas may desire protection burning to reduce hazards in hind dune areas. Fire should only be used to gain initial control of weedy areas as part of a long-term weed management plan. Burn with low intensity fire; ensure good soil moisture is present (e.g. after 50mm of rain) and burn no more than once every 3 to 7 years. Avoid regular or repeated burning. Exotic grasses are 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 create higher fire risks. Open dune grasslands supporting native grasses such as spinifex and 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.

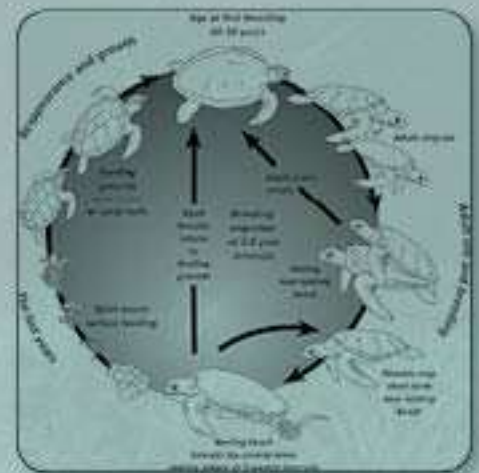
Conservation

Beach vegetation such as she-oak woodlands has the ability to effectively bind dune sands reducing erosion. Grasses and shrubs disrupt wind, reducing its speed at ground level, causing windblown sand to fall and replenish dunes. Beach vegetation and she-oaks in particular are highly sensitive to fire and even very low intensity events will cause death and consequent beach erosion. Also, loss of these trees reduces shading and causes dune sand to become hotter.

The sex of marine turtles is dependent on nest temperature and thus these changes can alter the sex ratio in turtle populations.



Beach Scrub



Turtle Life Cycle

Regional Ecosystems

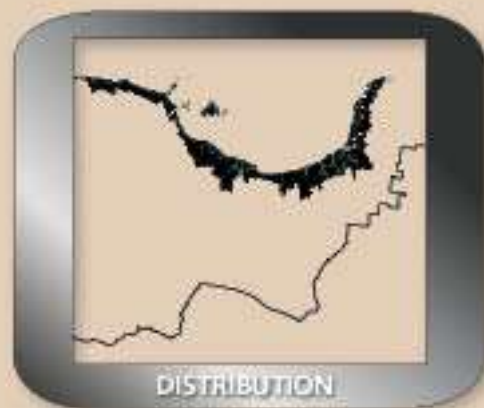
2.2.1 2.2.2

Saltpan and Islands of Vegetation

Landscape 4



Open areas of saltpan with islands of grasses, mainly Spinifex or islands with mature Kapoks, Beefwood, Eucalypts and/or Tea Tree.



Saltpan and Islands of Vegetation

Key Features:

- Self protected refuge areas, areas of long unburnt spinifex for quails and medicine plants.
- The isolation of the islands provides unusual cross over zones for different vegetation types to mix with each other.
- Islands act as stepping stones for birds and animals as they move across the landscape.
- Refuge for animals in times of extensive wildfires.

Hazard Reduction

The islands of vegetation within the saltpans do not present a fire risk as they are surrounded by water for months of the year and as the water subsides they are surrounded by saltpan.

Production

These islands are important sources of food such as quail and medicine plants like dog's balls. They offer a variety of habitat and therefore species of plants and animals. In grazing areas the islands offer some feed on higher ground during the wet season, although the feed is of poor pasture quality. Burning will not improve pasture production in these areas but may be necessary for initial control of weeds such as Rubber Vine and Parkinsonia. Burn when there is good soil moisture either during the storm season or early dry if aerial ignition is available.

Conservation

The islands are very important for a range of birds, reptiles, mammals and plants. They offer long termed unburnt country for a range of ground nesting birds. The variety of vegetation mix also provides a range of foods for animals and birds. The islands act as stepping stones for animals and birds as they move across the landscape. They provide a refuge for animals in times of extensive wildfires. Fire may be required in this landscape for weed control, particularly for weeds like Rubber Vine and Parkinsonia that can be killed by fire. Care must be taken to only burn when there is good soil moisture, and do not burn more area than required to treat the weed.



Black Headed Python



Dog's Balls Medicine Plant



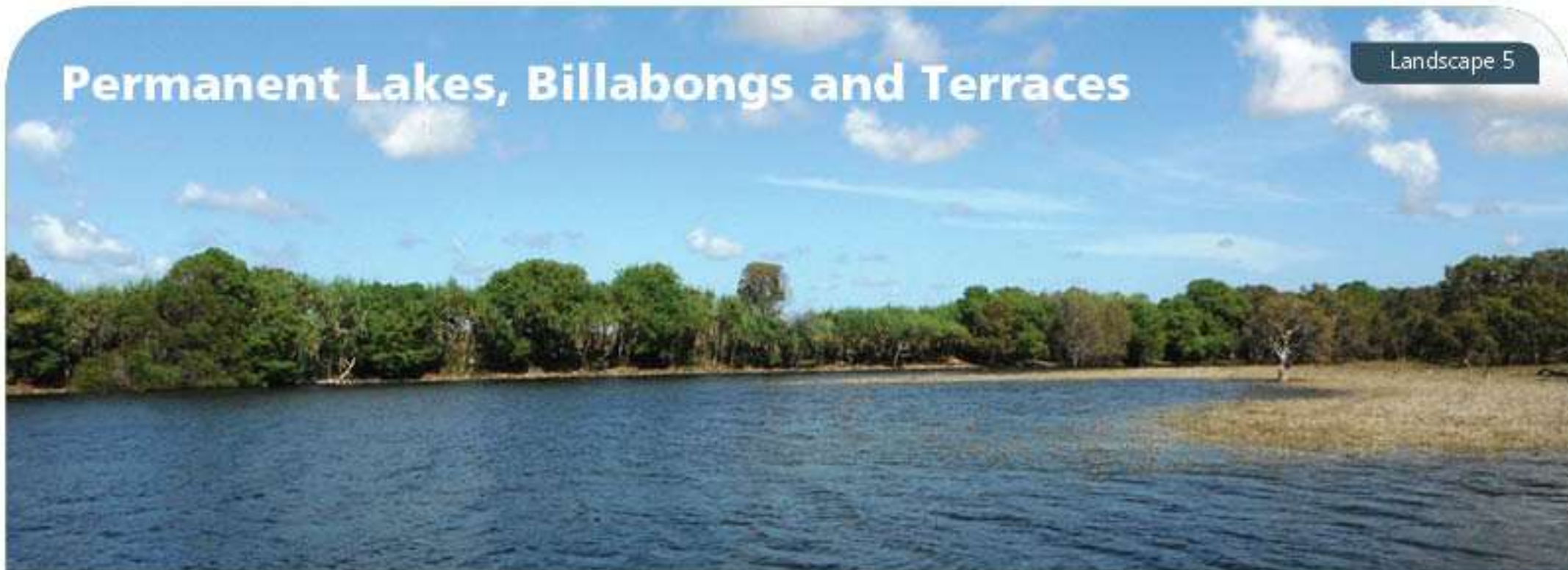
Saltpan Without Vegetation

Regional Ecosystems

2.14

Permanent Lakes, Billabongs and Terraces

Landscape 5



Permanent water bodies that may have fringing vegetation in a mix of Tea Trees, Eucalypts, Pandanus and scrub trees may be surrounded by grasses and sedges.



Permanent Lakes, Billabongs and Terraces

Key Features:

- Capable of accumulating maximum fuel loads in three years.
- Provide a natural fire break to establish early burns.
- Important to have good soil moisture to ensure rapid regrowth of pasture grasses.
- Retains moisture longer than surrounding country and so holds grass longer for grazing.
- Broad landscape burns are best done as storm-burns which reduce the fuel quickly but allows for good re-establishment of grasses.
- Good vegetation cover filters water, maintains good water quality which is important for resident species like freshwater long neck turtles.

Regional Ecosystems

2.3.5	2.3.6	2.3.8	2.3.9
2.3.10	2.3.11	2.3.14	2.3.18
2.3.22	2.3.23	2.3.24	2.3.25
2.3.26	2.3.28	2.3.34	

Hazard Reduction

This landscape holds soil moisture longer than surrounding vegetation which means it is capable of accumulating maximum fuel loads in three years. The natural waterway offer a natural break that can be expanded by using fire early in the season in neighbouring landscapes as a property protection measure.

Production

This country is important for the provision of fish, freshwater turtles and other important food sources during the dry season. It holds grass longer than surrounding landscapes and offers freshwater for stock to remain in the area during the dry season. The combination of good grass and water can lead to overgrazing by cattle or horses which can reduce the fuel available for burning for weed control and pasture regeneration. Patch burning can ease the grazing pressure on these areas as the season progresses; however ensure that there is adequate soil moisture for regeneration of grasses. Burning of larger areas is best achieved in the storm season so that grasses can recover before the wet.

Conservation

Good vegetation cover filters water before it enters the waterway, which maintains water quality for many important resident species, like the northern long necked turtle that depend on the waterway for habitat. The landscape provides a mix of vegetation from fringing forests through to grasslands which creates a range of habitats and roosts. Fire is an important tool in controlling major weeds such as rubber vine and Parkinsonia in this landscape; ensure good soil moisture is present prior to burning so that the native grasses recover quicker than the weed seeds can germinate.



White Faced Heron



Northern Long Necked Turtle

Old Dunes and Grasslands

Landscape 6



Grassy plains with some trees and shrubs on the crests of the old dunes.



Old Dunes and Grasslands

Key Features:

- At risk of being completely burnt out during a late dry season wildfire.
- Important landscape for grazing.
- Cattle stocking rates must retain enough fuel for storm burning or thickening can occur.
- Finches and other seed eating birds need a continual grass seed supply so mosaic burning is important.
- Weeds to manage include Rubber Vine and Parkinsonia.

Hazard Reduction

Grasslands are at risk of being completely burnt out during a late dry season wildfire. Recovery to useful pastures can take up to 3 years. Protection burning is a compromise between accepting some tea tree or weed invasion from the disturbance of early burning to protect the majority of adjacent pastures. Do not repeatedly burn the same area for protection, rather light off the edge of the previous fire scar, as repeated early burning will cause woody thickening.

Production

Grasslands have an active growing period over the wet season and then tend to dormancy in the mid to late dry, depending on the species. Do not burn when the grasses are actively growing because this can weaken the plant. For a storm season burn, manage stocking rates to ensure that there is enough fuel at the end of the dry. A storm burn every 3-5 years is recommended for pasture composition and to remove woody thickening. Aim to use grazing patterns or natural features to achieve the 50% mosaic.

Conservation

The main aim for grassland conservation burning is to get as much variation or mosaic as possible in a flat, evenly grassed landscape. Patch burning with dews, lighting from last year's fire scars and lighting a mix of forwarding and backing fires are all possible strategies to give a wide range of grass growth stages. This range of grass ages is important for seed eating birds like the finches, which need a continual supply of grass seed for survival. Fire management for the control of weeds like Rubber Vine and Parkinsonia should also focus on patch burning the weed clumps, rather than burn the whole paddock.



Long-tailed Finch



Zebra Finch



Pictorella Finch

Regional Ecosystems

2.3.3 2.3.32 2.7.4 2.9.1
2.9.3

Tea Tree Woodlands

Landscape 7



Woodlands to thickets containing a mix of tea tree including: Black Tea Tree, Coastal Paperbark, Broad Leaf Tea Tree, Silver Weeping River Tea Tree, River Tea Tree, may also contain Fibrebark and Golden Parrot Tree.



Tea Tree Woodlands

Key Features:

- Variety of tea-tree provides different flavours of sugar bag throughout the year.
- Medicine plants.
- Timber is used as rails for cattle yards.
- Aerial ignition is a good way to burn breaks early in the season.
- Sorghum grasses are important for seed eating birds and grazing.
- Suckering and thickening will occur if fire is too frequent; thickening shades out grasses and reduces diversity of plants and animals.

Regional Ecosystems

2.3.18 2.3.30 2.3.31 2.5.14
2.5.15 2.5.16

Hazard Reduction

The tea-tree landscapes occur on wetter, heavy soils that dry out later than the surrounding country.

Tea-tree will burn with very high fire intensity, late in the dry season, so it should not be overlooked in early season property protection plans.

Aerial ignition is a good way to burn protection breaks early in the season between tea-tree and neighbouring vegetation.

The main threat to the tea-tree woodlands is thickening of the tea-tree, stimulated by a disturbance such as overgrazing or a wildfire when the soil is dry.

The disturbance will cause the dominate species of tea-tree to sucker and over-populate as a response. The dominant species then reduces the opportunity for other trees to emerge and as the canopy closes, the shading reduces the perennial grasses.

Change the boundaries of early protection burnt areas regularly, to avoid thickening.

Production

This landscape offers a great variation in flowering plants and perennial grasses such as sorghums. These plants in turn produce a wide range of resources such as sugar bag (native bee honey), medicine plants, good mid-season grazing and timber for rails in cattle yards.

The aim of fire management for production purposes should be to keep the tea-tree open, so that there is a variety of trees and grasses.

Grazing and fire should be used collaboratively to manage fuel loads on a three to five year rotation, depending on the extent of the wet season.

A hot backing fire after the first storm can remove suckers and keep the country open, making it more productive for bush foods and grazing.

Conservation

The tea-tree woodland can range from low sparse woodlands to tall woodlands. Thickening of vegetation from disturbance is the greatest threat to this landscape.

Fire has little effect on tree survival once the tree height is above flame height and thickening shades out perennial grasses thereby reducing the fuel and the fire intensity. Thus a moderate to high intensity backing fire during the storm season every three to five years will keep the vegetation open and retain the variety of plants and animals.



Blue Tongue

Floodplains and Wetlands

Landscape 8



Seasonal to semi-permanent wetlands and the associated floodplains.



Floodplains and Wetlands

Key Features:

- Seasonal green fire break that separates wetlands from adjoining country.
- Seasonal drying patterns are important for planning and timing burns.
- Do not burn until soils have mature drying cracks to allow snakes, lizards, small mammals and frogs to escape fire into burrows.
- Important bird breeding habitat through the early dry offers late dry season grazing for cattle.
- High intensity fires can damage the ground layer.

Hazard Reduction

At both landscape and property scales, floodplains and wetlands act as early season fire breaks, or a place to secure the ends of firebreaks from surrounding vegetation. Seasonal drying patterns will indicate whether they may be considered at risk from a wildfire late in the season. The aim of hazard reduction for wetlands should be to provide separation between the wetland and the surrounding vegetation as soon as practical after the wet.

Production

Grazing value of wetlands is important in the dry season as the surrounding pasture gets grazed down or becomes too dry for cattle to eat. Consideration should be given to protection of this resource by early season burning in surrounding country. Weed infestations established or made worse by grazing pressures may be controlled by fire in the mid dry season.

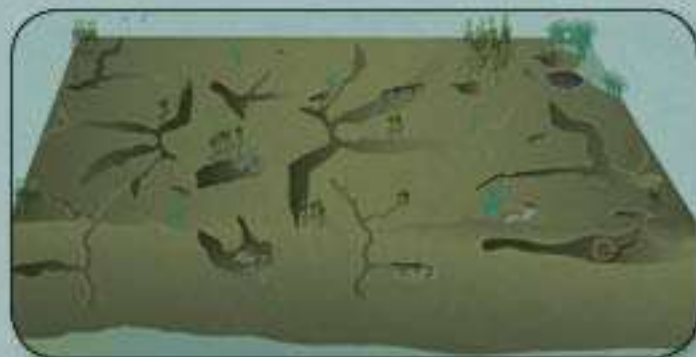
Grazing on the gradually drying edges of wetlands provides a fuel-reduced buffer between the wetlands and surrounding grasslands. Heavy, late dry season grazing of ponded pastures reduces the risk of intense fire and is useful prior to wet season flooding when un-grazed patches can drown. Wetland grasses benefit from a low intensity fire every 3-5 years to remove older grass and stimulate fresh growth.

Conservation

Floodplains and wetlands provide important habitat for many species and breeding grounds for migratory birds, like magpie geese. Small mammals, snakes, lizards and frogs need well developed cracks in the dried floodplain for protection against fires. Burning in the mid dry or storm season allows these cracks to be developed enough to provide protection for fauna. Avoid very dry conditions as a ground fire can develop in peat layers, which can burn for extended periods and damage the capacity of the soil.

Regional Ecosystems

2.3.12	2.3.13	2.3.15	2.3.16
2.3.29	2.3.33	2.3.35	2.3.38
2.3.39			



Cracking Clay



Magpie Geese and Goslings

Sand Ridges

Landscape 9



Mainly Eucalypt and Bloodwood species often with Silver Box, Beefwood, Whitewood and Cooktown Ironwood with a grass layer and / or wattle shrub layer.



Sand Ridges

Key Features:

- Important habitat for emus and goannas.
- Large number of hollow nesting trees.
- Sand ridges offer wet season grazing and refuge for wildlife and stock during the wet season.
- Rubber Vine and Parkinsonia weed problems.

Hazard Reduction

The sand ridges are mainly a wet season refuge for fauna and stock. Grazing over the wet season keeps fuel levels low in the early dry. Burning early in the dry season on vegetation boundaries provides protection from late season wild fires. In non-grazed areas, there will be greater fuel build up, so early dry season protection burns should be used to provide a buffer between vegetation types.

Production

The sand ridges offer low capacity grazing with tracts of spear grass, golden beard grass and sorghum occurring. The grasses tend to be robust and benefit from storm burning every three to five years depending on seasons and stocking rates. Storm burning in the sand ridges may require some 'whole of property planning' to ensure that the resulting green

pick is not overgrazed during the wet season, following the storm burn. A dense shrub layer of wattles can develop with fire intervals longer than five years or dry season wildfires.

Conservation

These areas are habitat for a number of important species, including emu and sand goanna. This woodland should have the full range of tree development from juvenile through to mature canopy trees and include dead or hollow habitat trees. These hollows are important to hollow nesting birds, bats, reptiles and small mammals. Control of Rubber Vine and Parkinsonia invasions in this landscape may require shorter fire intervals. Patch burning weed areas only, will reduce the impacts of shorter fire frequencies, with the surrounding country offering temporary refuge for fauna.

Regional Ecosystems

2.3.20 2.3.21 2.5.5 2.5.8
2.5.9 2.5.11 2.5.12 2.7.3
except 2.7.3.i



1000 kg/Ha



3000 kg/Ha



2000 kg/Ha



4000 kg/Ha



Emus

Forest Country

Landscape 10



A mixed woodland of Eucalypts, Bloodwoods, Guttapercha, Ironwood, Breadfruit tree, False Sandalwood, Tea Tree and Wattles, often with spear grass, blue grass or soft spinifex.



Forest Country

Key Features:

- Often beside wetlands so it provides a wet season refuge for some fauna.
- Good variety of trees and shrubs provides a good range of flowering times for sugar bag and honeyeaters.
- The forest country sits between wetlands and sand ridges and provides a grazing link between wet season and late dry season.
- Forest country soils are prone to erosion so care must be taken in selecting fence lines, roads or fire break locations.

Regional Ecosystems

2.5.1	2.5.2	2.5.6	2.5.10
2.9.5	2.9.6	2.9.7	2.11.1
2.12.1			

Hazard Reduction

The forest country is often the linking landscape between seasonal wetlands and the sand ridge country. It therefore dries out later than the sand ridges and earlier than the wetlands. Early protection burns are best undertaken in the forest country because of their position in the landscape. The adjoining sand ridge country will have low fuel levels from wet season grazing and the wetland margins will be too wet to carry fire. A series of low to moderate patchy burns is better than a single fire event because it creates variation in the grass return and tree recruitment.

Production

The forest country offers average grazing pastures but importantly after the wet, it provides the next stage of grazing before the wetlands have dried out. The variety of tree and shrub species in forest country also produces good native honey supplies. The soils of the forest country are sands and loams with an underlying clay sub soil. This soil feature shows up in places as poor drainage even though the upper soil appears sandy. The soils are an important factor in fire management because the tree and shrubs can access moisture for longer time periods than the shallower rooted grasses. Stocking rates should maintain ground cover to minimise woody thickening. Burning in the mid to late dry will cause woody thickening so broad production burns are best conducted with the first storms, ensuring quick grass recovery.

Burning for production should occur every 3-5 years with no more than 50% burnt. It is important to keep a leaf, litter layer and good grass coverage as protection from thickening and erosion.

Conservation

The aim for fire management in this land type is to maintain the diversity of plants and animals that occur within it. Early patchy mosaic burns will break the country up and offer close by unburnt country as a temporary refuge. The large scale storm burning will reduce the thickening that can occur from early burning. The mosaic of burning 50% should give a good rotation between early burns and storm burns to maintain the forest country's diversity.



Bellyache Bush

Fringing Riverine Woodlands

Landscape 11



Silver Weeping River Tea Tree, Weeping River Tea Tree, River Tea Tree, Leichhardt Tree, River Red Gum, North West Ghost Gum, Coolibah, Cluster Figs and Bean Tree.



Fringing Riverine Woodlands

Key Features:

- A number of trees in this landscape are fire sensitive and need protection from fire.
- Protection burns early in the season to restrict movement of fires into the riverine area.
- Control of cattle is important to control erosion and improve water quality.
- Grass and leaf litter help filter water and prevent erosion of river banks.
- Rubber vine management is very important.

Hazard Reduction

The riverine woodlands offer a good green fire break if they are supported by early dry season burns in the adjoining landscapes. Aim to burn away from the riverine areas rather than burn up to them, using the soil moisture and shading to prevent fire scorch of the edge trees. Aerial ignition is a good way to cover large areas early in the season when the areas are just drying out.

Production

The river system provides a range of important food sources for local people such as fish and turtles. Riverine woodlands are part of frontage grazing, offering good grazing, shade and fresh water access in the mid to late dry. Stocking rates must be carefully managed to avoid overuse. It is better to use wet season spelling to encourage grass recovery rather than broad burning to remove old grass. Early burning in the adjacent landscapes will provide green pick and a buffer for the riverine country.

Conservation

A number of the plants in the riverine woodlands are fire sensitive and therefore need protection from wildfire events. Erosion from wild horses as pigs as well as areas that are overgrazed can greatly affect the water quality. It is important to maintain ground cover from the grasses into the woodland mulch layers to slow the movement of water and thereby erosion and filter the water before it enters the stream.

Rubber vine is the major weed in these areas. The vines climb and smother the river edge trees until they die and collapse. Fire is an effective tool in the control of rubber vine, particularly seedlings; however care must be taken to not burn more area than required. Rehabilitation of rubber vine areas may exceed the recommended mosaic but over time the long term goal should return to 80% unburnt.



Cattle



Erosion of Riverine



Regional Ecosystems

2.3.2 2.3.17 2.3.22 2.3.24
2.3.26

Sandstone Ridges and Escarpments

Landscape 12



Rocky outcrops or jump ups with sparse trees and shrubs, mainly Rough Leaved Ghost Gum, Snappy Gum, Normanton Box, Dryander's Grevilliea, Turkey Bush and Wattles.



Sandstone Ridges and Escarpments

Key Features:

- Early season fires in the adjoining country for protection of this landscape.
- Important cultural places
- Provides wet season spelling of surrounding landscapes from grazing.
- Habitat for remnant populations of Spinifex pigeons.
- Hazard Reduction

Hazard Reduction

This stony high country is very important to Traditional Owners because it has high cultural values. The landscape is also important to graziers because it provides a wet season refuge for stock and allows neighbouring landscapes to spell. Hazard reduction should be undertaken as soon as possible in the early dry, when the neighbouring landscapes can carry a patchy fire. Plan burns to move away from the ridge rather than run up to the ridge.

Production

The grass in the stony hills is sparse and access for stock can be limited, however during the wet season stock will graze the spinifex and other grass willingly. Fire is used keep the dumps of spinifex fresh for stock. Soil moisture is critical to success of burning in spinifex so early dry or storm seasons are the best times. The fire should be lit to burn down from the ridge top with a low intensity rather than from the bottom of the slope and allowed to race up. High intensity fires in this landscape will severely damage the spinifex, reducing the amount of feed it will produce for several years. A moderate to high fire intensity will also crack the wattle seed leading to a mass seeding of wattles.

Conservation

This landscape provides refuge for a range of native fauna during the wet season, and habitat for species that reside in the stony hills. Echidnas, geckos, skinks use the stone country as habitat and forage into the surrounding landscapes. Spinifex pigeon populations have reduced dramatically in other areas due to altered fire regimes, overstocking and interference or predation by exotic pests. The spinifex pigeons have persisted in the stone country because the habitat offers some defence from their threats. A low intensity fire every 5-7 years, early in the dry season, lit to burn away from the ridge will support the conservation of this important landscape.

Regional Ecosystems

2.7.2	2.7.3i	2.7.4	2.10.1
2.10.2	2.10.3	2.10.4	2.10.5
2.10.6	2.10.7	2.10.8	



Spinifex Pigeon



Landscape

Downs Country

Landscape 13



Open grassland plains, practically treeless except on drainage lines, with a wide variety of grass species including: Forest, Queensland and Gulf Bluegrass, Kangaroo Grass, Curly and Bull Mitchell Grass, Black Speargrass, Silky Browntop, Downs Sorghum.



Downs Country

Key Features:

- Early dry season protection burns to protect the landscape from late season wildfires.
- Soil can grow maximum fuel loads in one year.
- Important landscape for seed eating birds due to the variety and seasonal range of grass seeds available.
- Stocking rates have to be managed to leave enough grass for self mulching clays to maintain fertility over the long term.
- Can be prone to native species woody invasion from *Guttapercha* after flood events.
- Valuable grazing country.

Regional Ecosystems

2.3.4 2.9.2

Hazard Reduction

The broad open areas of the downs country provide good grazing for most of the year and therefore should be a priority for protection burning, early in the dry season. The fertile black soils and cracking clays can produce maximum fuel loads in a year. The aim for protection burning should be to create a series of patchy burnt areas beside possible areas of ignition like roads, or known wildfire paths. The early burns and grazing should break up the grass mass to prevent a late dry season wildfire rolling through the entire plain.

Production

The grazing values of the downs country comes from the fertility of the soils, many of which are self-mulching, cracking clays. These soils replenish their fertility by taking dry grass matter into their cracking surfaces during the dry. Once the wet starts, the cracks close and the trapped grass matter breaks down, feeding the soil. Over grazing or too frequent a fire regime will take away the grass matter that

feeds the soils, reducing fertility and thereby yield over time. The landscape is also at risk from vegetation thickening from the native species *Guttapercha*. The *Guttapercha* thickening seems to occur with flooding events after heavy grazing years. The fire regime for maintaining production values should be a storm season burn of low to moderate intensity every 3-6 years which burns 50% of the landscape. The storm burn should target any woody thickening, and allow follow up storms to wash the ash into the soil cracks before they close. The grazing of the grasslands leading up to the storm season should give enough of a mosaic to achieve the 50% area burnt.

Conservation

A series of patchy burns early in the season will break up the fuel load and provide a range of grass seeding times for seed eating birds. Storm season burns should occur as soon as possible after the first storm of greater than 50mm. The start of the wet is a trigger for breeding in Plains Turkey (Bustards), with the nest built on the ground.

Storm burning should be used to target woody weeds particularly Rubber Vine, *Parkinsonia*, *Calotrope* and Prickly *Acacia*.



Plains Turkeys (Bustards)



Zebra Finches



Guttapercha Thickening

Healthy Woodland Communities



Old tree hollows provide nesting for birds and microbats, food for termites and habitat for geckos and skinks.

When adult trees flower, they provide food for birds, insects and bees. They are replacement for the old trees and a seed source for future regeneration.

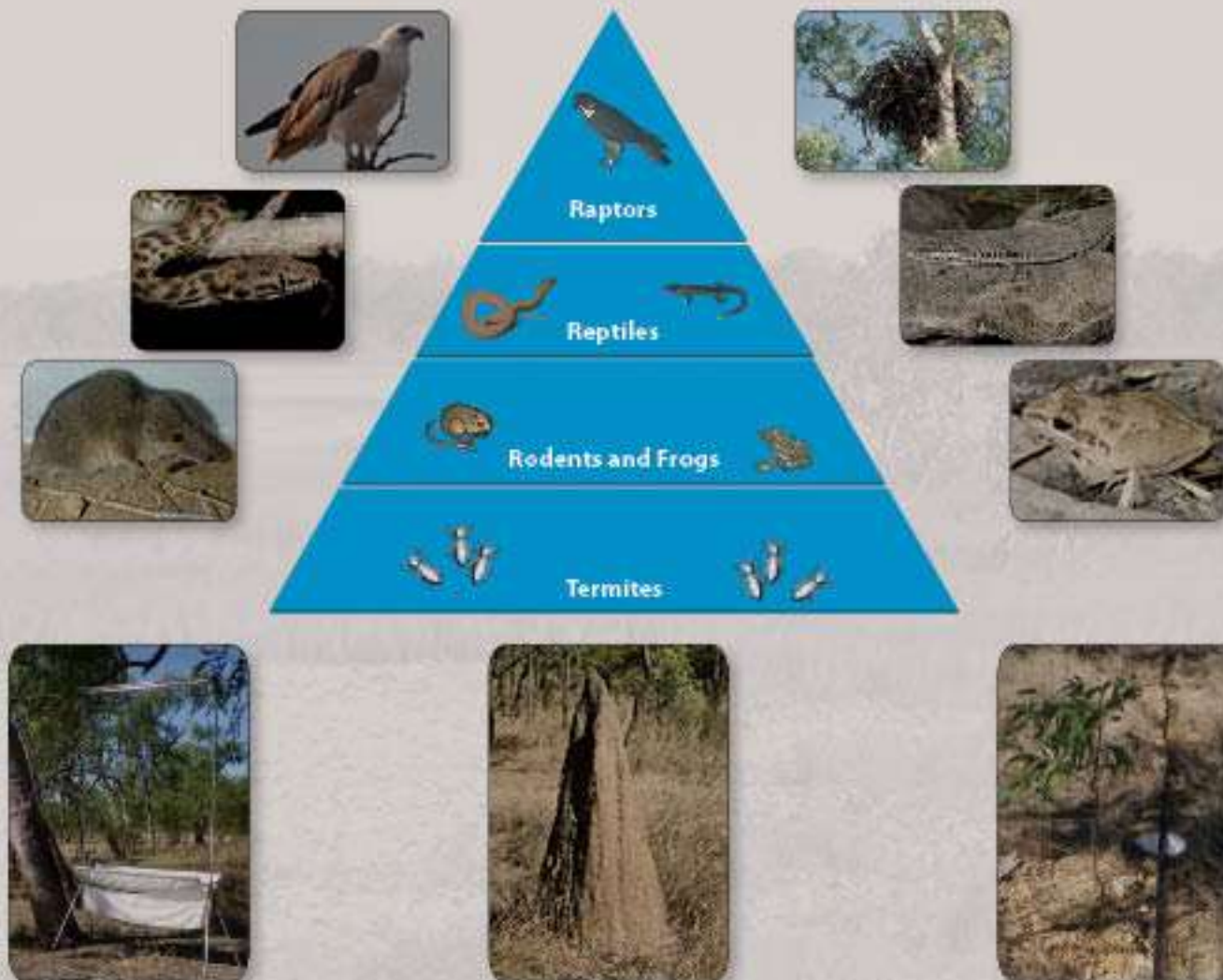
Young adult trees are recruits for the canopy and provide the same benefits for wildlife as adult trees.

Woodlands like this one may have a shrub layer. The species in the shrub layer differ from the canopy.

Juvenile trees are often more numerous than canopy trees. They provide flowering and young sap for insects which attracts lots of small reptiles from the ground layer.

Community Diagram

Healthy Country is More than Trees



Key Features:

- Healthy plants doesn't mean healthy animals.
- Some fauna like fire and increase whilst others don't like fire and decrease.
- Fauna should have the variety of types and age classes just like the woodland trees.
- Surveying and monitoring flora and fauna before and after burns lets us keep populations in balance.
- Healthy systems resist invasive weeds, erosion, drought and floods better than country that is already struggling.

Rubber Vine

Rubber Vine Infestation



Infestations of *Cryptostegia grandiflora* (Rubber Vine) as an understory woody shrub in closed and open forests or as a vigorous climber.



Rubber Vine Infestation

Method

Burning can be used as an effective control method of Rubber Vine both independently and in conjunction with other methods such as chemical control. A moderate to high intensity fire when there is good soil moisture (after ~50mm rain) will provide the best initial results. Burning in the early dry or after a storm will ensure adequate soil moisture to promote quick recovery of grasses following the fire. Ensure there is a suitable fuel load (3-4 tonne/ha) before burning to allow fire to infiltrate the infestation. Once a high intensity fire has reached the edges of the rubber vine, the green leaves of the plant will ignite and carry the fire through the infestations.

A fire of high intensity can kill up to 70% of mature plants and most juveniles, as well as impacting on the seed bed. Rubber vine seed has a high viability, but is short lived (12 months). For this reason, it is important to follow up the fire with further control methods. For scattered infestations, a single fire followed up with basal barking, cut stumps, or foliar spray should suffice. For denser infestations, two consecutive burns will be required followed by a chemical treatment.

Fire can also be very effective as a final step to chemical control, by killing the seed bed and cleaning up the dead vines.

Production

Regular fire management will prevent infestation of agricultural land by rubber vine. Rubber vine generally starts along riverine areas or against rainforest edges where fire management is not commonly used. When the initial infestation occurs, action should be taken to include the rubber vine patch with

the broad scale burning area to prevent further spread of the infestation. When conducting a burn, soil moisture is crucial to stimulate grass recovery quickly after the fire. This will also reduce the possibility of erosion and infestation by rubber vine and other woody weeds. Aim to seed with native grasses soon after the burn to provide competition against sprouting of rubber vine. Continuing effective management and good pasture growth will compete against rubber vine.

Conservation

When controlling rubber vine infestations adjacent to rainforest or riparian edges, care should be taken to ensure fires do not encroach into these sensitive vegetation types. Frequent high intensity fires will slowly reduce the extent of these vegetation types, and possibly promote rubber vine and other weed infestations. Use of terrain and/or wind direction should be utilised to direct fire towards the infestations encroaching on these ecosystems.

Burning with a mosaic will provide refuge for fauna. Aim to keep around 20% of the landscape unburnt to ensure the longevity of fauna species. Ensure there is moisture in the soil when burning to allow for natural regeneration of native species.

References

- `'''Description''': Spinifex Pigeon ("Geophaps plumifera") in Australia * '''Photograph''': en:User:Sputnikcccp first upload in en wikipedia on 02:22, 27 May 2005 by Sputnikcccp * '''License''': {{GFDL-self}}`
- Finch photos copyright Alex Dudley
- Black Headed Python & Plains Turkey Photos Rosanne Houley
- Forest Community & Cracking days Graphics Reef Catchments
- Photos of Beach Stone Curlew; Blue Tongue Lizard; Magpie Goose and Goslings, Long necked turtle; and various landscape photos by Carpentaria Land Council Rangers

Notes and Sketches





CARING
FOR
OUR
COUNTRY



Queensland
Government



RURAL FIRE SERVICE



KORAGANG ISLAND COUNCIL



REEF
CATCHMENTS

www.reefcatchments.com.au