Grassy Forests

MANAGING GRASSY FORESTS AND WOODLANDS OF FAR NORTH COAST NSW

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INTRO

Open grassy forests are unique, ancient and fragile and are more susceptible to becoming lost. They comprise a range of underappreciated vegetation communities and important habitat for a diverse mix of flora and fauna. Most of the grassy forests on fertile floodplains and productive northern slopes have been largely modified for grazing and cropping.

Changes in fire regimes and logging have greatly impacted open forest communities. Shrub, rainforest and weed encroachment is leading to a loss of open grassy habitat that supports many unique species of invertebrates, reptiles, mammals and birds.

ABOUT

Grassy Ecosystems of the Far North Coast NSW

Vegetation in Australia is classified into broad groups. At the broadest level are Vegetation Formations. Formations with a grassy understorey that occur in the NSW North Coast bioregion include Wet Sclerophyll Forest (WSF), Dry Sclerophyll Forest (DSF), Grassy Woodlands and Grasslands.

These Vegetation Formations are broken up into Vegetation Classes and Plant Community Types.

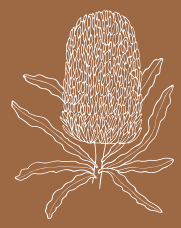
Grassy Ecosystems of the **Far North Coast NSW**

Grassy ecosystems often co-exist with shrubby ecosystems of a very similar type, but occupy the environments with less rainfall, more sun exposure (aspect), less available soil moisture, higher fire frequency or more exposure.

For example, the Northern Hinterland Dry Sclerophyll Forest class occupies the slopes and ridges of the coastal ranges and plateaus below about 600m. It is often found on northerly or westerly aspects and intergrades into North Coast WSF, with a more shrubby understorey and rainforest plants in more sheltered sites, gullies and alluvial flats.

Fire has also maintained a difference between grassy and shrubby forests, with indigenous people burning for tens of millennia followed by graziers burning regularly to encourage ‘green pick’ for cattle.

OPEN FOREST VEGETATION CLASSES



① Grassy Woodlands

- Coastal Valley Grassy Woodlands
- Far North Lowland Basalt Grassy Woodland
- Far North Ranges Redgum Grassy Woodland
- Northern Hinterland Valleys Redgum Grassy Forests

② Dry sclerophyll grassy sub formations

- Clarence Lowland/Gorges/Sandstone Dry Sclerophyll Forests
- Northern Gorge Dry Sclerophyll Forests
- Far North Hinterland Swamp Turpentine-Apple Forest
- Northern Gorge/Hinterland Hills Dry Sclerophyll Forests
- North Coast Dry Sclerophyll Forests

③ Wet sclerophyll grassy sub formations

- Far North Coastal Hills Blackbutt-Iron Bark Forest
- Far North Coast Escarpment Blackbutt Grassy Forest
- Far North Hinterland Grey Gum Forests
- Mt Warning Caldera Wet Grassy Forest
- Northern Gorges Diverse Grassy Forest
- Northern Hinterland Wet Sclerophyll Forests
- Northern Hinterland Grey Gum - Mahogany / Turpentine Mesic Forest
- Northern Hinterland Tallowood-Forest Oak Grassy Forest

PLANT COMMUNITY TYPES (PCT)

The following list includes some of the more widespread open forest types found in NSW. Some of these plant community types include less grassy elements or contain grass-like understory (Graminoid) that provides similar structure and habitat to a grassy understory.

- Grey Box - Grey Gum Wet Sclerophyll Forest
- Spotted Gum - Grey Box grassy open forest of the NSW North Coast Bioregion
- Spotted Gum dry grassy open forest of the NSW North Coast
- Forest Red Gum - Pink Bloodwood open forest of the foothills and ranges of the NSW North Coast Bioregion
- Forest Red Gum grassy open forest of the coastal ranges of the NSW North Coast Bioregion
- Swamp Sclerophyll Forest on Coastal Floodplains
- Sub-tropical Coastal Floodplain Forest
- Swamp Oak Floodplain Forest
- Headland Woodland and Coastal Headlands
- Coastal Heath
- Coastal Saltmarsh

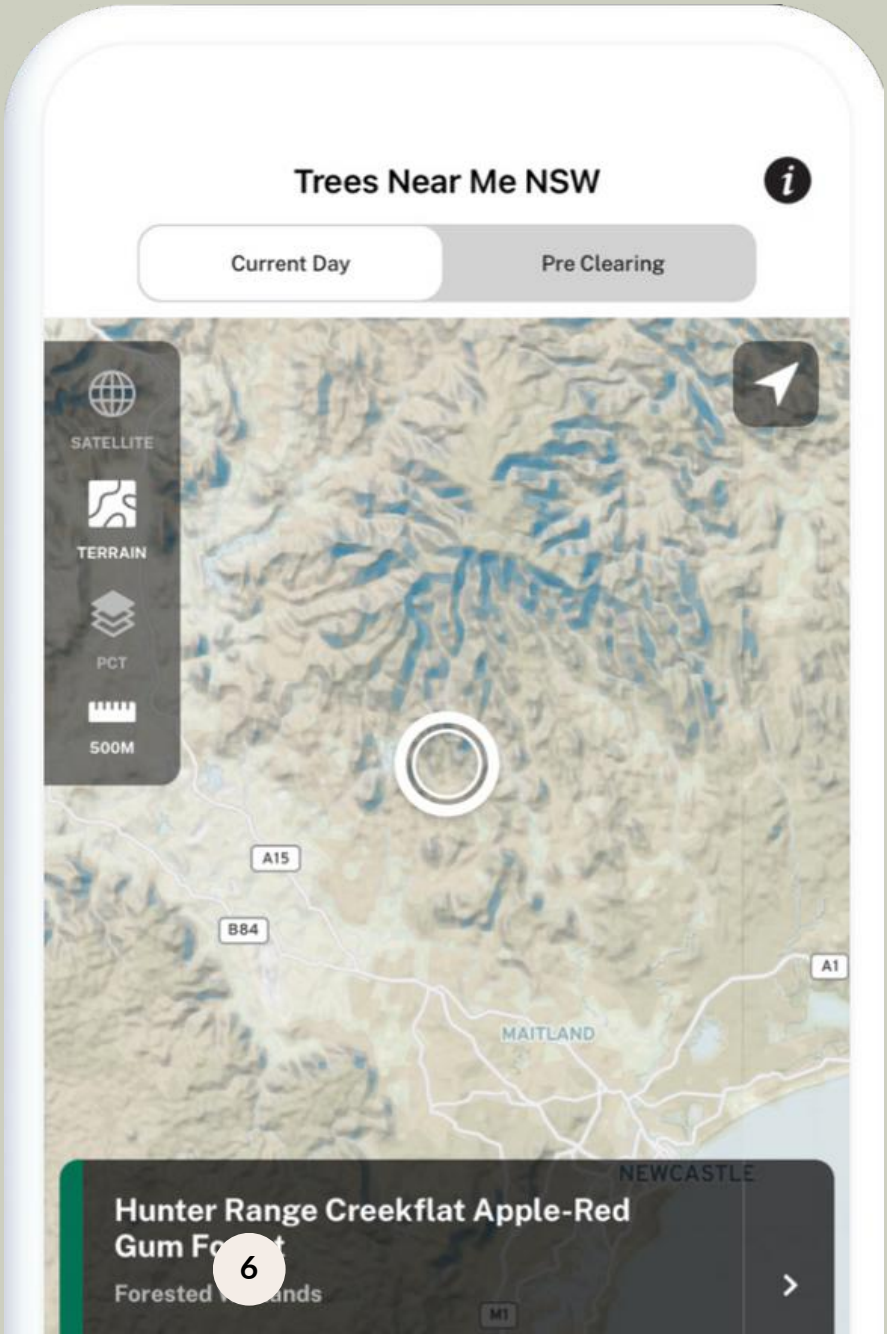
HOW DO YOU IDENTIFY YOUR OWN FOREST TYPE?

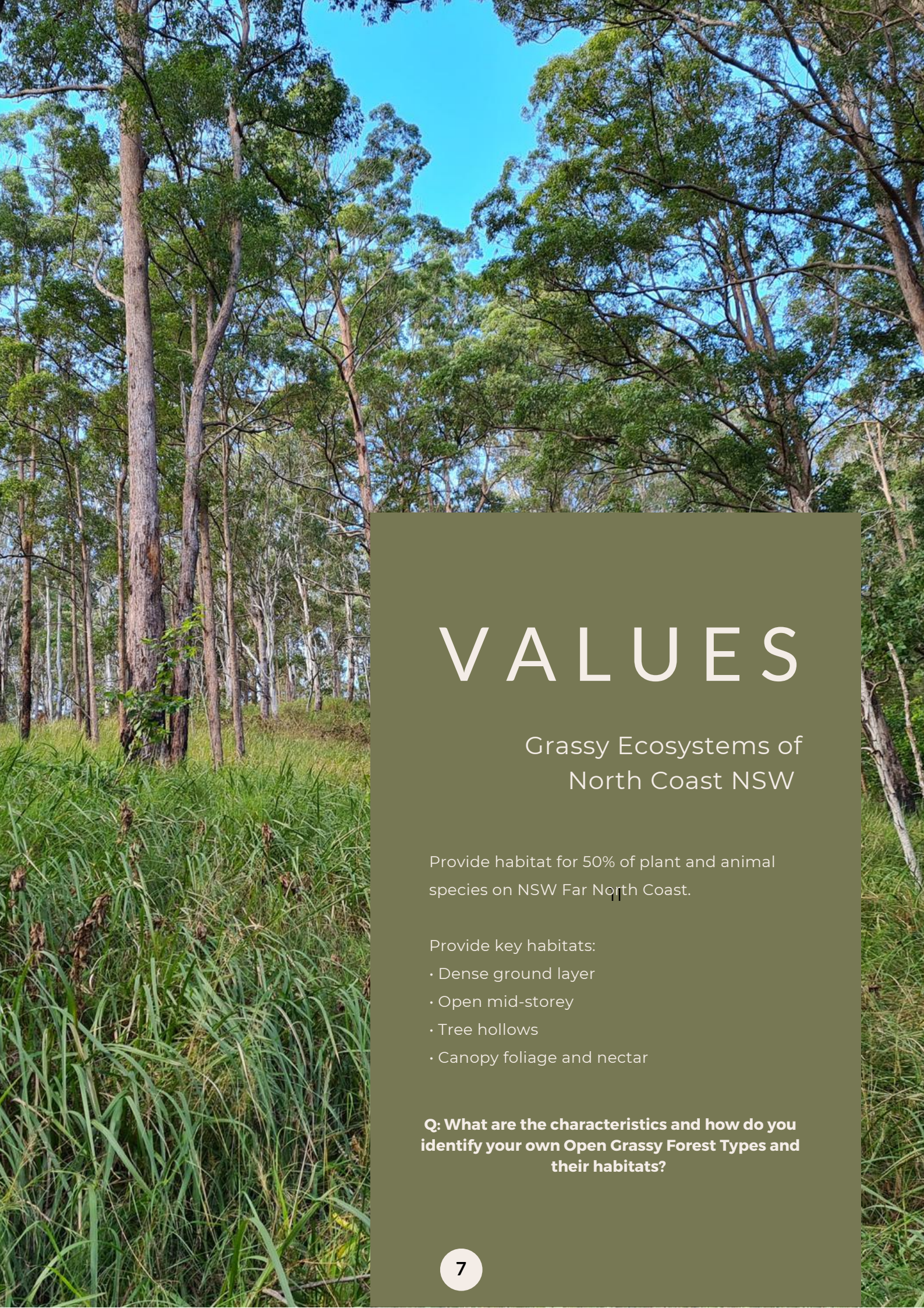
The Trees Near Me App can help you identify the Plant Community Type (PCT) in your local area. There is a Browser version available https://treesnearme.app/explore

Trees Near Me provides a description and species lists for tree, shrub, understory and ground covers for each PCT.

These lists provide guidance on what species are expected to be present or could be established by assisted regeneration, planting or direct seeding, where the PCT is in poor condition due to weeds, grazing, change in fire regime or other impacts.

The Trees Near ME App is an indicative guide only and should be confirmed by expert inspection on-ground.





VALUES

Grassy Ecosystems of North Coast NSW

Provide habitat for 50% of plant and animal species on NSW Far North Coast.

Provide key habitats:

- Dense ground layer
- Open mid-storey
- Tree hollows
- Canopy foliage and nectar

Q: What are the characteristics and how do you identify your own Open Grassy Forest Types and their habitats?

CHARACTERISTICS OF

GRASSY FORESTS

CHARACTERISTICS

- Trees with overlapping canopies
- Ground layer dominated by shade-intolerant grasses
- Scattered shrubs, ferns and vines

KEY GRASS SPECIES

- Blady grass (*Imperata cylindrica*)
- Kangaroo Grass (*Themeda triandra*)
- Mat Rush (*Lomandra longifolia* and *Lomandra multiflora*)
- Wiry Panic (*Entolasia stricta*)

Open grassy forests can grow as Dry or Wet Sclerophyll Forests. They are dominated by eucalypts, with other trees and shrubs such as *Angophora, Acacia, Allocasuarina, Banksia* and *Xanthorrhoea* also present in a second layer. Trees usually grow further apart in Dry Sclerophyll than Wet Sclerophyll Forest, with a more spreading branch structure.

Open forests can exist in grassy, heathy shrubby states and rainforest shrubby forms, influenced by moisture, aspect, soil type and fire regime.

Fire plays a very big role in the distribution of these forest states whether from natural causes, or through deliberate human action, both indigenous and European.

Ideally, these forests can co-occur in a mosaic of different forest types from grassy woodlands through to closed rainforests. This diversity provides the full range of ecological niches for all plants and animals to exist.

As well as the grasses listed , grassy forests may also support: Barbed-wire Grass (*Cymbopogon refractus*), Plume Grass (*Dichelachne micrantha*), Snow Grass (*Poa sieberiana*), Poa Tussock (*Poa labillardiere*), Native Sorghum (*Sorghum leiocladum*), Weeping Rice Grass (*Microlaena stipoides*) and *Aristida* spp.

CHARACTERISTICS OF

GRASSY WOODLANDS

CHARACTERISTICS

- Wide-spaced trees with canopies just touching
- Open understorey dominated by grasses, with sparse shrubs.
- High diversity of grass and forb species.
- Occurs in areas drier or more prone to fire than forests, or shrubby ecosystems.

KEY GRASS SPECIES

- Kangaroo Grass (*Themeda triandra*)
- Barbed-wire grass (*Cymbopogon refractus*)
- Wire or spear grass (*Aristida* spp)
- Weeping Rice Grass (*Microlaena stipoides*)
- Blady Grass (*Imperata cylindrica*)

Dichelachne sp and *Echinopogon* sp can be common in frequently burnt areas.

Coastal Valley Grassy Woodlands occur on the alluvial floodplains and surrounding foothills below about 350m altitude. The soils are usually fertile, but Coastal Valley Woodlands are in drier areas compared to wet sclerophyll forests and rainforests in similar areas. Forest Red Gum (*Eucalyptus tereticornis*) and Swamp Box (*Lophostemon suavelons*) *are* the most common tree species, but may occur with Rough-barked Apple (*Angophora subvelutina*), Grey Ironbark (*Eucalyptus siderophloia*), Pink Bloodwood (*Corymbia intermedia*) and Grey Box (*Eucalyptus moluccana*).

The understorey is typically dominated by a mix of dense tussock grasses interspersed with a variety of forbs, vines and ferns. There may also be patches of shrubs such as *Acacia*, *Melaleuca, Leptospermum, Leucopogon*, *Ozothamnus* and *Dillwynia.*

These grassy woodlands are similar to the grassy woodlands on the Tablelands and Western Slopes of NSW and have similar species in the ground layer although the trees are often different. They may be the product of more frequent fire compared to shrubbier forests in surrounding hills. These woodlands have been extensively cleared or modified for agriculture and often have a ground layer dominated by exotic grasses and forbs. Because they occur in highly fertile parts of the landscape, they support very dense stands of weeds which can be difficult to manage.

CHARACTERISTICS OF

GRASSLANDS

CHARACTERISTICS

- Treeless or sparse trees
- Natural, due to frost, poor drainage or exposure, or
- Human-made through clearing, fire, mowing etc
- High grass and forb diversity
- Rare in the NSW North Coast bioregion e.g. Kangaroo Grass grassland on coastal headlands and sea-cliffs

KEY GRASS SPECIES

- Kangaroo Grass (*Themeda triandra)*
- Marine Couch (*Sporobolus virginicus*)
- Native Sorghum (*Sorghum leiocladum*)
- Poa Tussock (*Poa labillardiere*)
- Swamp Foxtail (*Cenchrus purpurascens*)

There are few examples left of original inland grasslands on the NSW north coast. Dorrobbee Grass in Dunoon is the last remaining intact native grassland ecosystem (dominated by *Themeda*) within the Big Scrub bioregion. The Widjabul people looked after this site from time immemorial using traditional firestick management.

Another grassland type on the North Coast is the coastal headland and seacliff grasslands, on wind and salt-swept headlands with free- draining soils. These grasslands are dominated by Kangaroo Grass (*Themeda triandra*) and a range of stoloniferous (with runners) grasses such as Marine Couch (*Sporobolus virginicus*), Beach Fescue (*Austrofestuca littoralis*) and *Spinifex sericeus*. A range of low-growing forbs is common and patches of shrubs such as Coast Banksia (*Banksia integrifolia*) in more sheltered spots. These grasslands are usually very short, pruned by the fierce coastal winds laden with salt. There are examples of these indigenous-managed grasslands developing into littoral forest in the absence of fire.

Fire is more commonly used as a management tool on coastal grasslands of South Coast NSW.

IMPORTANCE OF THESE ECOSYSTEMS

threatened communities and species

Modification of open forest habitats in NSW has impacted on many unique species of flora and fauna. Threatened species like the Parma Wallaby, Rufous Bettong, Kate's Leaf-tailed Gecko and the Eastern Bristlebird, inhabit dwindling open forest habitats. The degree of disturbance of these remnants can vary, from almost pristine to highly modified.

Many of the open grassy forest types on the NSW north coast are listed as Endangered Ecological Communities (EEC) or Threatened Ecological Communities (TEC). Even small patches or areas that have been disturbed in the past by activities such as selective logging, or grazing may still be important remnants and considered as endangered.

Endangered Ecological Communities with open forests on the NSW north coast include:

- Grey Box - Grey Gum Wet Sclerophyll Forest
- Swamp Sclerophyll Forest on Coastal Floodplains
- Sub-tropical Coastal Floodplain Forest
- Swamp Oak Floodplain Forest

Other useful information

- Travelling Stock Reserves Vegetation Guide North Coast Local Land Services

THREATS TO THESE ECOSYSTEMS

lack of appropriate fire regimes

Clearing , forest dieback, grazing, frequent burning and other disturbances accelerate the invasion of weeds into forests and woodlands.

The 2019/20 bushfires impacted heavily on a range of open forest communities. Percentage cover lost in open forest communities of the NSW north coast ranged from 75 to 100% of the Chaelundi-Mann River Granite Scrub Woodland, Clarence Sandstone Blackbutt-Bloodwood Forest, Chandlers Creek Dry Grassy Forest, Clarence Gorges Granite Grassy Forest, Clarence Gorges Grey Gum-Ironbark Grassy Forest, Far North Escarpment Blackbutt Grassy Forest, Northern Hinterland Tallowwood -Forest Oak Grassy Forest and Northern Gorges Diverse Grassy Forest.

Recommended fire regimes for forest types that occur in the NSW north coast bioregion include:

Grasslands 50% extent burnt every 2-3 years depending on woody weeds
Open Grassy Forests 40-60% extent burnt every 3-6 years
Open Shrubby Forests 40-60% extent burnt every 7-25 years
Dry Coastal Heath 40-60% extent burnt every 8-12 years

More detail is presented in Living with fire - Recommended fire regimes.

THREATS TO THESE ECOSYSTEMS

rainforest encroachment, BMAD

Wet sclerophyll forest are threatened by eucalypt dieback associated with over-abundant Bell Miner birds and psyllids (BMAD). This complex process is associated with substantial changes in community composition and structure, including the defoliation and eventual death of canopy eucalypts, increased densities of mid-stratum plant species and decline in diversity of small forest birds. The impacts of forest eucalypt dieback are indicative of a large reduction in ecological function.

Rainforest encroachment into open forests is pronounced on forest margins (gaps/edges), in moist gullies and on more protected (shaded) aspects or where terrain is steep & inaccessible preventing routine vegetation maintenance. In such instances where habitat is at threat, particular pioneer* species of vines, shrubs and trees may need to be thinned and managed selectively to prevent grassy eucalypt forest loss and closure.

**Pioneers germinate abundantly and are fast growing but not so long lived*

MANAGEMENT

MANAGEMENT AND CONSERVATION
OF UNDERSTORY DIVERSITY

Fire for healthy habitats

Fire may be the most cost-effective means to restore the diversity and structure of open forests. Fire reduces biomass and creates light and space.

Appropriate fire has a significant and positive role to play in maintaining the diversity of native plants, animals and fungi species in fire-adapted communities.

Guidelines for landholders

A template is available here to help prepare Good Fire Restoration Plans on private property in the Northern Rivers.

The South East Queensland Fire and Biodiversity Consortium has a wide range of resources to inform landholders, including the recently updated manual.

MANAGEMENT

MANAGEMENT AND CONSERVATION OF UNDERSTORY DIVERSITY

Specific methods used in managing exotic grasses include:

- Hand pulling or chipping
- Flame or steam weeding
- Smothering
- Mulch mats
- Clear plastic (solarisation)
- Herbicide
- the use of fire can make it easier to distinguish native grasses from exotics

Weed management

There are a number of methods to manage open grassy forests including fire, herbicides and slashing, and grazing. The approach may include some of these methods in combination, particularly where introduced grasses like *Setaria* or invasive weeds are the dominant species.

VIDEOS

- Cultural burning
- Zerobyron CO2 drawdown stories
- Eastern Bristle Bird habitat and cultural burning

UNDERSTOREY SPECIES OF GRASSY FORESTS AND WOODLANDS

There are a diverse range of understory and mid-stratum species that are found in open grassy forests.

Grasses, orchids, herbs, forbs, ferns, vines and shrubs are encountered in different sites, relative to the fertility, aspect and soil conditions that are present.

Useful species lists for open forests are found in Table C2 of Good-Fire-Healthy-Country.

Many of these species have a direct relationship to the local fire regime, and some are likely to become extinct without a frequent low intensity fire regime.

Species list for understory planting in Grassy Red Gum Floodplain Forest at Rappville Commons (Max Watt)

Alloteropsis semialata	COCKATOO GRASS
Bothriochloa decipiens	PITTED BLUEGRASS
Capillipedium spicigerum	SCENTED TOP GRASS
Carex appressa	SWAMP SEDGE
Cymbopogon refractus	BARBED WIRE GRASS
Cyperus exaltatus	TALL FLATSEDGE
Daviesia umbellulata	NORTHERN BITTER PEA
Dianella longifolia	SMOOTH FLAX LILLY
Eleocharis cylindrostachys	CYLINDRICAL RUSH
Eragrostis elongata	CLUSTERED LOVE GRASS
Goodenia rotundifolia	STAR GOODENIA
Hardenbergia violacea	PURPLE CORAL PEA
Heteropogon contortus	SPEAR GRASS
Juncus prismatocarpus	BRANCHING RUSH
Lomandra longifolia	MAT RUSH
Microlaena stipoides	MEADOW RICEGRASS
Pennisetum alopecuroides	SWAMP FOXTAIL
Poa labilardierii	TUSSOCK GRASS
Scaevola albida	WHITE FAIRY FAN FLOWER
Themeda triandra	KANGAROO GRASS

COMMON GRASS SPECIES

KANGAROO GRASS (*THEMEDA TRIANDRA*)

Banbun in Bundjalung language

A tufted C4 warm-season perennial grass that flowers from November to February. Kangaroo grass persists in the landscape, providing an important habitat and feed source year-round. It is widespread across grassland and grassy woodland ecosystems, particularly in predominantly undisturbed areas where periodic light grazing or fire are the primary disturbance factors. Kangaroo Grass presence decreases under increased grazing pressure and fertiliser. It is moderately palatable to stock depending on growth stage. Traditionally used in baking of damper, with seed separated from chaff and ground with grinding dish and stone. Commercial trials are currently underway to determine if it is viable for large scale production.

SEEDS: Seeds generally ripen from December depending on rainfall and temperature. It can be difficult to determine whether seed is present or not due to sterile spikelets. Fertile spikelets are indicated by presence of black awn, if awns are no longer present then seed has fallen. Optimum harvest time can be difficult to predict, however generally indicated by a colour change from green to yellowish-brown. Various harvest methods are used including hand removal (stripping), cutting (sickle, mowing) and brush harvesting (Grass grabber). Seed cleaning can be time consuming and labour-intensive owing to large proportion of vegetative matter to fertile seed ratio. Seed should be dried at low temperatures and will generally break dormancy following 12 months of storage.

SOWING: Best germination results in mid-summer to early autumn. Various sowing methods are suitable including; broadcasting, direct drilling and press wheels. Can also be collected with a forage harvester and spread evenly across bare ground. Develops slowly after germination, meaning preliminary weed control is crucial in early stages.

KEY IDENTIFICATION CHARACTERISTICS:

- Tufted grass up to 150cm tall
- Inflorescence a spatheate panicle, 10- 25cm long consisting of clusters of spikelets.
- Large drooping seed heads turning reddish-brown when mature, with clusters sterile of spikelets surrounding a single fertile awned spikelet.
- Flowering variable depending on climate and rainfall, generally from December – February
- Bluish-green leaves up to 50cm long and 2-5mm wide, arising from hairless to very hairy sheaths.
- Clusters consist of a central fertile spikelet with a thick black awn surrounded by six sterile spikelets lacking awns.

POA TUSSOCK (*POA LABILLARDIERE*)

A densely tufted perennial C4 grass with widespread distribution across eastern Australia that flowers October to February. Poa Tussock has a high biodiversity value, often utilised by birds for seed resource and nesting material, along with fodder for grazing marsupials. It is common in moister open forest and woodland communities, with a high frost tolerance and declines under intensive grazing pressure. Poa regenerates well after fire, provided an infrequent fire regime is applied.

SEED: Poa Tussock produces large quantities of viable seed that readily germinate with minimal pre-treatments. It can be harvested using various methods including; hand harvested (stripping), cut (sickle/mow) or brush harvested (GrassGrabber). Minimal processing is required, seed and floral parts readily fall off once dry. Seed is stored in a container and shaken once dry. Poa Tussock has a high germination rate compared with Native Sorghum and Kangaroo Grass. Poa Tussock can also be readily propagated by division.

SOWING: Suitable for direct seeding or seedlings, seed is palatable to birds, so timing is crucial. Sow in winter on the North Coast of NSW.

Poa germinating after hand sowing Photo: P. Daley

KEY IDENTIFICATION CHARACTERISTICS:

- Densely tufted grass to 120cm with coarse grey-green leaves that cure to light brown in winter.
- Inflorescence a large open panicle with small, laterally compressed spikelets lacking awns.
- Produces small cream coloured seeds.
- Leaves basal, very long with upper half distinctly scabrous. Flat to inrolled leaves up to 3.5mm
- Culms terete and scabrous below the panicle.
- Distinguished from similar *Poa sieberi* by larger leaves and copious web at base of floral bract.

NATIVE SORGHUM (*SORGHUM LEIOCLADUM*)

A perennial summer-active C4 tussock grass that flowers November to January/March. Native sorghum is dormant in winter. It has a distinctive hairy ligule (ballet skirt). flat, grey to blue green leaves with white midrib and red-brown spikelets on an open panicle and tall stem

Native sorghum is a key nesting habitat for northern populations of the critically endangered Eastern Bristlebird. It occurs on a range of soil types in lightly grazed to ungrazed grassy woodlands and dry forest ecosystems and occurs in association with Kangaroo Grass. Native sorghum is wind pollinated and locally dispersed. Moderately drought tolerant, little to no tolerance to frost and declines under heavy grazing and fertiliser. If present in a grazing environment, *Sorghum leiocladum* benefits from regular rest periods during growing seasons.

SEED: Similar seed viability, storage and dormancy breaking requirements as Kangaroo Grass. Relatively simple to harvest and process using hand harvested (stripping), cut (sickle/mow) or brush harvested (GrassGrabber), the seed falls quickly when ripe.

SOWING: Variable dormancy in mature seeds. Some will germinate immediately, others over two years.

KEY IDENTIFICATION CHARACTERISTICS:

- Tall, tufted grass up to 130cm tall with rust brown/purple inflorescence in an open panicle. Easily distinguished from *Themeda triandra* by hairy ligule and open inflorescence (as opposed to spatheate flowerhead in Themeda).
- Flat leaves up to 70cm long with a white midrib.
- Leaf sheaths are hairy with a ring of long white hairs around the ligule.
- Hairy paired spikelets, 2-flowered with the lower awned and the upper un-awned.

NATIVE MILLET (*PANICUM DECOMPOSITUM*)

A large perennial C4 tussock grass that flowers from December to May. Small hard, millet-like seeds in large open panicles held above broad, green with a white mid-vein. Native Millet is often a pioneer in disturbed areas, with wide distribution across different soil types and especially productive on alluvial soils.

Native millet was a staple Indigenous food source due to high seed productivity and was eaten raw or ground, using a grinding dish and stone and made into bread. It is common in native pastures, woodlands, and disturbed areas such as roadsides, and benefits from moderate grazing with only brief periods of rest. Native Millet 'hays off' in winter, allowing seed to be dispersed long distances., withstands prolonged periods of flooding but is susceptible to drought.

SEED: is usually collected with a brush-harvester and can be harvested at the same time as other species such as Queensland Bluegrass (*Dicanthium sericeum)* owing to hairless seed, which may be easily sieved and separated. Seed is dried and stored at low temperature with no special storage requirements, it can be stored easily in cloth bags.

SOWING: Seed can be sown un-treated with high germination success. Native Millet colonises bare ground quickly due to widespread windblown dispersal mechanism.

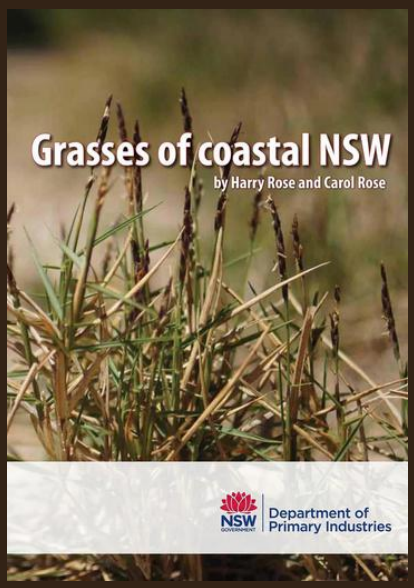
KEY IDENTIFICATION CHARACTERISTICS:

- Densely tufted grass to 120cm tall. Bluish-green leaves with distinct whitish midvein and nodes hidden by the leaf sheath.
- Inflorescence a large open panicle up to 40cm long, containing 2-flowered spikelets sparsely distributed along panicle branches.
- Hairless fertile upper lemma, with sterile upper glume and lower lemma.

IDENTIFYING GRASSES

Grass identification is primarily based on the structure of the flowerhead.

There are a number of great resources to assist in the identification of grass species occurring on the NSW North Coast.



Grasses of Coastal NSW, Harry Rose and Carol Rose https://shop.regional.nsw.gov.au/products/grasses-of-coastal-nsw-b935

Identifying native perennial grasses, Evergraze http://www.evergraze.com.au/wp-content/uploads/2013/06/Native-grasseslowres.pdf

Flowering Sorghum (left) and ripe Sorghum seed (right)

Collection Methods

Hand collection:

- Used for small patches or to collect individual species growing among other species
- Hand-stripping – wear gloves
- Tools – secateurs, sickle, scythe
- Blower Vac

Grass Grabber

The “Grass Grabber” is a small brush harvester which is either mounted onto the front of a 4WD vehicle, or can be mounted on bicycle-style wheels and pushed by hand. It is lightweight and maneuverable so can be used in areas with small stands of grass or where the grass is patchy. It is ideal for roadsides or for collecting amongst trees.

Drying seed

Storing seed

- Store seed in DRY and COOL conditions
- 5-8% moisture content and less than 20oC is ideal for long term storage.
- Small batches – ziplock bags or food vacuum sealer
- Large batches – nylon mesh bags or cloth bags in a dry room

RIPE?

When is a grass seed ripe? To determine the difference between flowering grass and ripe seeds:

- Look for anthers
- Cut or squash test
- Feel for hard seed
- Break open spikelet
- Take a sample across the site to determine variation in ripeness

Collecting Native Grass Seed

Propagation

Methods of establishing grass species include:

- Seedlings - Ideal for small areas, adding diversity to established areas or best use of limited or rare seed.
- Division - Best for large tussock grasses and grass-like plants *such as Lomandra, Carex, Juncus*
- Direct seeding - Establishing grasses on a restoration site. Single species or a mix of species. Methods include broadcast sowing by hand or with a spinner and there is a variety of machinery that suits larger sites.

More information about seed collection, propagation and monitoring is found here.

Monitoring

It is important to monitor germination of the grass species. Monitoring can tell you:

- If all species are germinating,
- How many seedlings per area are germinating,
- If your seeding rate is too high or too low,
- How many seedlings make it to maturity,
- Whether weeds are taking over.

Quadrats thrown across the site randomly are a good method to count grass germination and establishment over time. Photo monitoring points are also helpful, both across a site and of quadrats.

CASE STUDIES

1 Grassy Clay Heath and Open Forests

2 Northern Eastern Bristlebird Open Forests

3 Broken Head Open Forests

ONLINE RESOURCES

- NSW Plant Community Type classification
- Ausgrass
- Grassland Society
- Good Fire - Healthy Country: Supporting Information for Good Fire Restoration Plans
- The role of native pastures in the Mid North Coast landscape
- CSIRO The use of Australian native grains
- Native seed storage guidelines
- Using native grass seed in revegetation

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BRRVLN
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