

PASTURE IDENTIFICATION

A field guide for the Pilbara



Mary-Anne Clunies-Ross & Andrew Mitchell

Second edition; revised and includes 9 more species

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Front cover photos: clockwise – Button grass, Spinifex grassland, Wilcox bush.

Back cover photos: clockwise – Golden bluebush, *Vigna* sp. Hamersley Clay, Flinders grasses, ruby saltbush.



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Vegetation of the coastal plains and north of the Fortescue valley, is predominantly spinifex hummock grasslands and gums and where there are alluvial or clay soils; tussock grasslands. The Fortescue Valley, the Hamersley Plateau and the semi desert high eastern plains have mulga woodlands with shrubs or grasses in between patches of hummock grasslands. This area is the interzone between the mulga shrublands to the south and the grasslands of the northern Pilbara.

The climate of the Pilbara bioregion is semi-arid desert in the east to tropical on the coast. Rainfall mainly occurs over the summer period between November and April with the median rainfall between 234–348 mm, often in association with low pressure systems and cyclones. In some winter seasons, it may rain through to June. The area around Onslow has much more reliable winter rainfall than the rest of the Pilbara. The Pilbara experiences considerable variations in rainfall and droughts come along every 10 to 20 years.

GRAZING IN THE PILBARA

Pastures in the Pilbara are diverse and complex ranging from herbs to grasses and shrubs and approximately 73% of the Pilbara bioregion is under pastoral leases. The variety of pasture species present is determined by soil type, rainfall, temperature and high evaporation rates. Erosion, fire history and historic and current grazing pressure have produced the species composition we see today.

Plant species that are affected by grazing are the primary focus of this booklet. Buffel grass (*Cenchrus ciliaris*) and birdwood grass (*Cenchrus setiger*) have been included. Although native to the Indian subcontinent, they have been in the Pilbara about 140 years and have become dominant species of the creeks and alluvial plains. Other highly invasive but less desirable introduced species have been included such as mesquite (*Prosopis* sp.) and mimosa bush (*Vachellia farnesiana* = *Acacia farnesiana*) to aid their identification.

TREES

Trees are woody perennial plants that have a single trunk from the ground to waist high (1.3m tall) and grow over 3m tall.

SHRUBS

Shrubs can be classified as multistemmed plants dividing below waist height that can grow up to 8m tall. They can range from low shrubs (less than 1m), to medium shrubs (1–2m) and tall shrubs (2–8m). Pastures dominated by shrubs in the Pilbara consist of mulga shrub or stony chenopod pastures. The mulga shrub pastures are associated with the hardpan plains of the Hamersley Plateau and the eastern plains. The stony chenopod pastures are associated with clay soils that are sometimes crab holed and support a tall shrub layer of snakewood (*Acacia xiphophylla*) with an understorey of tall saltbush, ruby saltbush and sometimes saltbush (*Atriplex bunburyana*).

Many desirable shrub species such as mulga and snakewood and their associated shrubs are fire-sensitive and should be protected from fires if possible. It is a retrograde step to burn them! As a pasture, shrubs can be preferentially grazed by livestock with some species prone to decline under continuous heavy grazing.

PERENNIAL GRASSES

Perennial grasses live for more than one growing season and in the Pilbara consist of two main types. The tussock grasses that form tight clumps and their leaves generally appear from below or just above the ground and the hummock grasses, commonly known as spinifexes, which grow from above ground stems.

Pilbara grasslands consist of two major groups: spinifex pastures and tussock grass pastures (Table 1).

TUSSOCK GRASSES

These are drought resistant, many are edible to cattle and generally resilient to grazing and capable of quick growth after drought breaking rains. They have deep fibrous roots that utilise all available soil moisture and so maximise their survival through long dry periods. Well managed perennials provide forage and soil protection during dry seasons.



SPINIFEXES

Spinifex country covers approximately 75% of the Pilbara. There are about 30 species of spinifex (*Triodia*) in the Pilbara occupying diverse habitats from sand dunes to scree; beach spinifex is not a *Triodia*. Spinifexes are perennial arid zone grasses whose leaves roll up as conditions become drier and form hummocks that generally increase in size as they age and are unique to Australia. They are fire specialists. As they age the spinifex hummocks, if common, take over country, producing ever increasing amounts of dry matter and when they cover around 30% of the ground, a hummock grassland can carry a fire. These fires generally kill the spinifex and most of the other vegetation too. The main components of the spinifex vegetation are either resprouters or fast reseeder. The resprouters either reshoot from underground stems (or tubers) such as ribbon grass (*Chrysopogon fallax*) or have insulated stems like kanji bush (*Acacia inaequilatera*) that allow them to immediately grow again from their trunks. The reseeders, which includes the annual grasses, peas and sidas have to germinate and grow very quickly on the first available rains and produce seed within the first or second year, before the spinifex again becomes dominant.

There is a very strict sequence of succession after a spinifex fire. The composition is dependent on whether there are winter or summer rains. Summer rains produce mainly grasses whilst winter rains produce a great variety of herbs. Spinifex although it's a grass, does invariably germinate and initially appears very slow to grow. However, its growth is relentless and after the second year the annual herbs and grasses are in decline and by the fourth year, they have generally disappeared and spinifex dominates once more. The speed at which this happens, all depends on the amount of rain.

Most shrubs of the mulga zone, especially mulga and snakewood are sensitive to fire and are not resprouters. A series of fires can remove these fire sensitive trees and shrubs permanently from a landscape.

Table 1 Native perennial grass pasture groups in the Pilbara

SPINIFEX PASTURES	PASTURE DESCRIPTION
<p>Soft spinifex</p>	<p>Soft spinifex hummock grasslands are found with shrublands and low woodlands in association with alluvial plains, drainage floors and some stony plains, sandplains and coastal dunes. The ground storey is dominated by soft spinifex with other grasses such as hop-along grass and ribbon grass on sandy-surfaced soils.</p>
<p>Hard spinifex</p>	<p>Hard spinifex hummock grasslands are found with saline plains, coastal plains, plains formed on granite, basalt, shale and other rocks, calcrete plains and sandplains. Other grasses found in this pasture include buck wanderrie, ribbon grass and soft spinifex on sandy sites.</p>
TUSSOCK GRASS PASTURES	
<p>Roebourne Plains grass</p>	<p>Open, treeless plains in association with valleys of major rivers and old alluvial plains with alkaline, cracking clay soils. Other less common plants found in this pasture include barley Mitchell grass, ribbon grass, native panic and sometimes patches of snakewood.</p>
<p>Ribbon grass</p>	<p>Common in numerous land units crab holed, some alluvial plains, drainage floors, shallow valleys and different soil types. Ribbon grass dominates this pasture with mulga, eucalypts, Wilcox bush, warty fuchsia bush, creeping sida, kangaroo grass, Roebourne Plains grass and neverfail also potentially occurring.</p>
<p>Mitchell grass tableland</p>	<p>Open, stony tussock grasslands without tree or shrub cover in association with basaltic uplands and tablelands and stony gilgai plains. Dominated by barley Mitchell grass with other less common plants including Roebourne Plains grass, ribbon grass, feathertop three awn, creeping sida, Mardie clover and <i>Vigna</i> sp. Hamersley Clay.</p>
<p>Mitchell grass alluvial plains</p>	<p>Tussock grasslands on open treeless plains in association with alluvial valleys of the Fortescue River and its tributaries. Dominated by barley Mitchell grass and weeping Mitchell grass with other perennials including Roebourne Plains grass, ribbon grass, neverfail and numerous herbs and forbs in season.</p>

ANNUAL GRASSES AND HERBS

Annuals germinate, grow, mature, set seed and die within one growing season. They are generally quick growing, short lived and flourish during good wet seasons. Although many species are more palatable than perennials, they are not usually as productive as perennials, due to their requirement of big opening rains for establishment. Most annuals disappear during dry seasons as they have shallow roots. Healthy pastures usually have a balance of both annual and perennial species, with annuals occupying the spaces between perennials. A natural fluctuation in the annual versus perennial ratio occurs from season to season, but under constant heavy grazing annual species tend to dominate, making the pasture less productive and less resilient. Summer rain usually favours grasses whilst winter favours the broad leaf herbaceous plants. The forage produced by broad leaves is less fibrous and higher in protein content than the grasses with animals selectively grazing broad leaves when they are present.

GRAZING VALUE

Pasture species differ in their grazing value, due to a number of factors which include:

- Nutritional value
- Palatability
- Occurrence
- Response to grazing
- Time of year

For most species their nutritional value and palatability reach their peak early in the growing season and decline as the plant matures and sets seed. In this booklet the grazing value for each species is indicated by cow symbols at the top of each page. No cow indicates no grazing value, one cow indicates a little grazing value and three cows the highest grazing value. The red cow indicates that the plant has the potential, or is known to be toxic to stock.



0 = none

1 = lowest

2 = medium

3 = highest

red = potentially toxic

PASTURE CONDITION

Pasture condition can mean different things to different people! Some people interpret pasture condition as to how much green feed they have on the ground and so what sort of a season they are having. See *Reading the Rangelands* 1995 p14

If, as a manager, you want to see if the condition of your country's vegetation and soil is improving or deteriorating, an alternative interpretation of condition is required. It's possible to assess long term condition by comparing the current perennial vegetation cover to what the potential of a particular pasture type is. We shall call this range condition (RC) and to assess it, you need to know of what sort of country you are looking at and what perennials it can potentially support. A land system map helps with the pasture type and a *Pasture condition guides for the Pilbara* (2002) provides a description of the various pastures in good, fair and poor condition.

INDICATOR SPECIES

Changes in perennial plant species composition and their increase or decline can reliably indicate changes in range condition.

In order to assess the condition of the vegetation, plants are divided into four indicator value categories – decreaseers, increasers, intermediates and no indicator value (Table 2). By monitoring the changes in the numbers of the decreaseer and increaser species, land managers are able to assess if their grazing management practices are maintaining or improving range condition and so assess long term trends in pasture condition.

The first step in assessing range condition is to take an overview of the paddocks, or if there are no paddocks, the waters where you wish to assess the country. If you wish to establish monitoring sites, you need to be looking at your better country that is between 1 and 5 km from water.

Table 2. Species indicator values

INDICATOR GROUP	CHARACTERISTICS
Decreasers (desirables)	Decreaser species tend to decrease in health and abundance as grazing pressure increases. These are usually moderate to highly palatable preferred species also known as 'desirables'. E.g. ribbon grass (<i>Chrysopogon fallax</i>), barley Mitchell grass (<i>Astrebla pectinata</i>), weeping Mitchell grass (<i>Astrebla elymoides</i>), tall kangaroo grass (<i>Themeda</i> sp. Hamersley Station) and plume sorghum (<i>Sorghum plumosum</i>).
Increasers (undesirables)	Increaser species are generally avoided by stock and tend to increase in health and abundance as grazing pressure increases. These are generally unpalatable species known as 'undesirables'. E.g. wiregrasses (<i>Aristida</i> spp.) and blood bush (<i>Senna artemisioides</i> subsp. <i>oligophylla</i>).
Intermediates	Species which may initially increase under grazing, but being moderately or slightly palatable, later decrease under continued increasing grazing pressure (e.g. swamp grass (<i>Eriachne benthamii</i>)). The presence or absence of intermediate species should not be used with any confidence as an indicator of the "health" of rangeland vegetation.
No indicator value (stability desirables)	Species which are largely unaffected by grazing and which usually only decrease in number after natural disturbance such as hail damage or fire (e.g. mulga – (<i>Acacia aneura</i> complex), snakewood (<i>Acacia xiphophylla</i>)). These species are not palatable or only slightly palatable (or out of reach of browsing animals) and are known as 'stability desirables'. They confer stability on the landscape and contribute to important landscape functioning processes such as water retention and nutrient cycling. Annuals are also considered to have no indicator value due to their short lived qualities.

ESTIMATING RANGE CONDITION IN SOFT SPINIFEX COUNTRY

It's not possible to estimate range condition of spinifex country if the spinifex is mature. Most spinifexes are inedible to herbivores; the exception is soft spinifex (*Triodia pungens* and *T. epactia*) which are only eaten when soft spinifex is young or when animals are very hungry. All spinifex seed heads are eaten by herbivores, even those of hard spinifex!

Range condition of spinifex country can only be estimated for about three years after it has been burnt. In general terms, the more diverse the species mix, the better the range condition. Poor range condition spinifex country is indicated when inedible plants such as the increaser species cockroach bush (*Senna notabilis*) and/or poverty bush (*Acacia stellaticeps*) dominate to the exclusion of all the other annuals that are normally present.

SPINIFEXES INVADING GRASSLANDS AND SHRUBLANDS

Grassland and shrublands in poor condition can be taken over by spinifex. Snakewood communities are especially prone. Once the low shrubs such as sago bush and ruby saltbush have gone, soft spinifex can move in and when there is the inevitable fire, the snakewoods are killed and the spinifex reestablishes and if the next fire occurs within 10 years, any young snakewoods are killed and the seed bank is much diminished and the snakewood gradually disappears.

Grasslands in poor condition can be invaded by either soft or hard spinifexes. In crabhole country the grasses are sometimes grazed out and knitting needle spinifex (*Triodia longiceps*) or limestone spinifex (*Triodia wiseana*) often moves in.

MANAGEMENT OF GRASSLANDS

TUSSOCK GRASSLANDS

Managers should aim at maintaining or improving the condition of their tussock grasslands. Tussock grasslands have a large percentage of decreaser species and are very attractive to all herbivores. Maintaining their range condition requires active management. Continuous grazing of tussock grasslands leads to their decline due patch grazing and soil erosion. Tussock grasslands should be spelled during the summer growing season to allow them to grow and seed.

“The best condition tussock grassland I have seen are holding paddocks that are grazed heavily during the mustering season and then actively spelled for the remainder of the year”
Andrew Mitchell.

SPINIFEX GRASSLANDS

RESEARCH AND OBSERVATIONS INTO SOFT SPINIFEX MANAGEMENT

Burbidge (1944) observed that under extreme situations of sheep grazing, soft spinifex could be eliminated and the vegetation reduced to annuals only. She also observed areas where woolly butt (*Eragrostis eriopoda*) was dominant in an area that once supported soft spinifex and she considered this a disclimax. Stock numbers in the Pilbara had been declining in the 1930's and 40's and a research station at Woodstock Abydos was established in 1946 to address this problem (Suijdendorp 1980). In a grazing trial at Woodstock on soft spinifex country, Suijdendorp (1967) compared continuous sheep grazing versus summer spelling

over 15 years, burning the spinifex every fifth year. The continuously grazed plots remained soft spinifex whilst the summer spelled areas became a woolly butt tussock grassland. The implication of this, is that if you allow the perennial grasses to grow and seed they will effectively compete against the spinifex. Continuous grazing suppresses the grasses and other palatable plants and spinifex will dominate! Suijendorp also found that the small winter mustering fires combined with continuous grazing removed the edible plants and promoted inedible plants, especially cockroach bush and reduced the range condition of the country.

MANAGEMENT OF SOFT SPINIFEX COUNTRY

Tussock grasses are generally more productive than soft spinifex and management should try and promote them. Most spinifex dominated landscapes consist of a mosaic of soft and hard spinifexes with tussock grasses in the more favoured areas. However, continuous grazing, however lightly, allows the animals to preferentially graze the tussock grasses and these are steadily eradicated. Usually you can find an isolated tussock grass within protection of a spiny bush!

Summer burning followed by spelling will allow the grasses to grow and set seed and recolonize whatever habitat they might have once occupied. Dominant stands of cockroach bush are an indicator of overgrazed soft spinifex country that should be burnt and spelled in summer to promote the tussock grasses and edible herbs.

HARD SPINIFEX

This is much lower in productivity than soft spinifex and generally does not support tussock grasses. Hard spinifex country should be grazed opportunistically after fire.

Mitchell grass tableland pastures



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Calandrinia species

Parakeelya

4 O'clocks

Native perennial herb

PLANT DESCRIPTION

Matt forming and or climbing succulent perennials or annual herbs with pink to white flowers. The flowers open mid morning and close mid afternoon and hence their common name. The perennials have an underground tuber that people roast and eat. The aerial growth dries off and dies with the onset of dry conditions.

GRAZING VALUE

It is eaten by stock and is responsible for herbivores surviving in the desert for long periods without obvious drinking water. They contain oxalates and some animals have been poisoned from eating too much parakeelya; McKenzie 2012

HABITAT & DISTRIBUTION

There are approximately 70 parakeelya species and they occupy every habitat in the arid and semi arid parts of Australia. The images are of *Calandrinia schistorhiza* in a large hardpan intergrove. This species is perennial and when the tops dry up, the flats are bare.

INDICATOR VALUE

Parakeelya has no indicator value except to indicate a good season.



Indigofera linnaei

Birdsville horse poison

Native perennial herb



PLANT DESCRIPTION

Herbaceous perennial that dies back to its rootstock when conditions deteriorate and regrows quickly in response to rain. A matt forming plant growing to no more than 0.1 m tall but matts can be 0.3 m in diameter. Has very small 2 mm long red pea flowers that produce oblong pods that are round in cross section and 3-5 mm long. Each leaf has four pairs of leaflets and a terminal leaflet.

GRAZING VALUE

Eaten by cattle and assumed to be of high grazing value. Directly poisonous to horses from 3-NPA poison but not cattle. Horses that have grazed *I.linnaei* have meat that is poisonous to dogs due to another toxin, indospicine.

HABITAT & DISTRIBUTION

Widespread in the Pilbara from Karratha to east of Newman. Occupies a variety of habitats, especially clay flats and alluvial areas.

INDICATOR VALUE

Generally has no indicator value. However when it forms a monoculture, it is an indicator of poor rangeland condition.





Ipomoea muelleri Poison morning glory

Native perennial herb

PLANT DESCRIPTION

Vine with a large perennial rootstock. As conditions dry out the annual vines die back to the perennial rootstock and when it rains again the rootstock rapidly puts out new vines. The plant has heart shaped leaves and large purple tubular flowers.

GRAZING VALUE

Foliage and seeds reported to be poisonous to sheep and cattle. It is usually avoided by stock but can be eaten by weaners and hungry stock that have been kept in yards.

HABITAT & DISTRIBUTION

Clay plains. Large populations can be found on disturbed areas on flood plains and degraded areas with clay soils. Found across the Pilbara.

INDICATOR VALUE

Increaser (undesirable) with large numbers indicating poor pasture condition.



Portulaca oleracea

Pigweed

Purslane, Junga

Native annual herb



PLANT DESCRIPTION

Pigweed is a succulent dark green annual herb that forms slippery mats, up to 0.15 m tall and 0.5 m wide. It has small yellow flowers that are hard to see and produces fine seed (like pepper), that were harvested to make damper. There are about 20 species of *Portulaca* in Australia, all are succulent and most of which have yellow flowers. *Portulaca conspicua* is a very noticeable species on Roebourne Plains grass country when it's flowering.

GRAZING VALUE

It is readily eaten by herbivores and humans alike but contains significant oxalates and nitrates that can be toxic to herbivores; it is especially dangerous in yards where it is well fertilised and stock are usually hungry. Pigweed and parakeelya are responsible for herbivores staying out in the desert without free water. There are no known cases of it being toxic to humans (McKenzie 2012).

HABITAT & DISTRIBUTION

Widespread throughout Australia and the world. It does not favour any particular habitat and likes disturbance. It is a significant weed of horticulture.

INDICATOR VALUE

As it is an annual, it has no indicator value.





Ptilotus species Mulla mullas

Native perennial herb

PLANT DESCRIPTION

Mulla mullas range from perennial shrubs that are 1 m tall to prostrate annuals but they all have the same sort of spikey flower heads. These range in colour from white to green to mauve to orange. Some of the prostrate species are herbaceous perennials, and these die back to an unseen rootstock. There are about 60 species in the Pilbara, the most noticeable being the purple mulla mulla (*Ptilotus exaltatus*)

GRAZING VALUE

Most species are grazed, especially when green and the annual species especially so, as they contain less fibre than their woody relatives.

HABITAT & DISTRIBUTION

Widespread in the Pilbara, occupying almost all habitats.

INDICATOR VALUE

The annuals have no indicator value whilst the perennials are decreaser species.



Stemodia kingii

Native herb



PLANT DESCRIPTION

Upright herb with bright green foliage and large mid blue tubular flowers that grows to 0.4 m tall.

GRAZING VALUE

No grazing value, rarely eaten and only by hungry young and/or inexperienced stock. This species is poisonous to sheep and is presumed to be poisonous to cattle.

HABITAT & DISTRIBUTION

Cracking clay plains supporting Roebourne Plains grass and other tussock grasses.

INDICATOR VALUE

Increaser (undesirable) with large numbers indicating poor rangeland condition.





Rhynchosia minima Mardie clover

Native perennial herb

PLANT DESCRIPTION

Herbaceous perennial that produces annual vine like growth after rain which then dies off when growing conditions deteriorate. It produced spikes of small (about 5 mm long) yellow pea flowers that form flattened beans that are up to 20 mm long. It has trifoliate leaves and a limited ability to climb up other plants.

GRAZING VALUE

It is a high value pasture plant in the Pilbara grasslands but unfortunately never produces large amounts of forage.

HABITAT & DISTRIBUTION

Clay plains and valleys, usually in association with tussock grasslands and soft spinifex hummock grasslands. Found throughout the Pilbara and Kimberley.

INDICATOR VALUE

Decreaser (desirable) with large numbers indicating good rangeland condition.



Senna notabilis

Cockroach bush

Native annual herb



PLANT DESCRIPTION

Spreading annual herb growing to 0.5 m tall and 1.5 m in diameter. Has small pale yellow flowers which give rise to distinctive yellow and black, ribbed pods that resemble a native cockroach, hence this plants common name.

GRAZING VALUE

No grazing value. Pungent plant that repels grazing animals.

HABITAT & DISTRIBUTION

Burnt spinifex country from the Gascoyne to the southern Kimberley.

INDICATOR VALUE

This is an increaser (undesirable) species. Large stands usually indicate soft spinifex country in poor rangeland condition. Cockroach bush will replace the edible biennial herbage species when overgrazed.





Vigna sp. Hamersley Clay

Native perennial herb

PLANT DESCRIPTION

Annual vine growing from a perennial rootstock with 3 leaflets per leaf and small (5 mm) long yellow pea flowers and thin round pods growing to 50 mm long.

GRAZING VALUE

Excellent, grazing value is relatively high. The leaves of some *Vigna* species (*Vigna unguiculata*) containing up to 25% crude protein and the stems 12%.

HABITAT & DISTRIBUTION

Cracking clay alluvial plains, especially in or near river channels.

INDICATOR VALUE

Decreaser (desirable) species that is never abundant but its presence is usually an indicator of good rangeland condition.



Aristida contorta

Wind grass

Native annual or short lived perennial grass

**PLANT DESCRIPTION**

Erect, weakly tussocking grass that is dense and rounded, growing to 0.3 m tall. Leaves are tightly rolled and are likely to curl as the plant hays off. Seeds have 3 distinctive slender arms or awns that are triangular in shape.

GRAZING VALUE

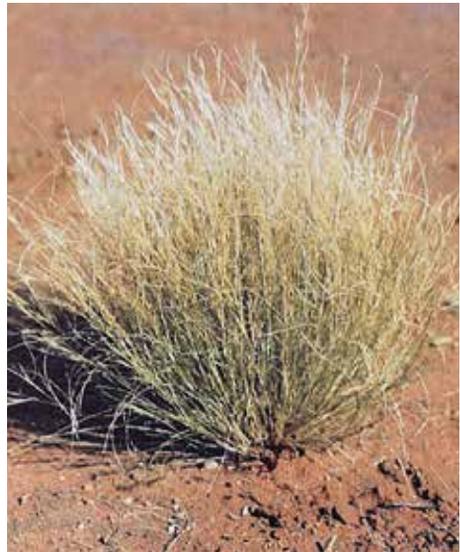
Generally low palatability. Palatable when green with high crude protein levels but becomes unpalatable as it seeds and dries out.

HABITAT & DISTRIBUTION

Grows in habitats that are devoid of perennial species and is widely distributed from the southern Kimberley to the Goldfields. It is particularly abundant in good seasons in mulga country.

INDICATOR VALUE

It is an annual and sometimes short lived species that has no indicator value.



Aristida holathera var. *holathera*

Erect kerosene grass

Native annual or short lived perennial grass



PLANT DESCRIPTION

An erect, compact weakly tussocking grass growing between 0.3 m to 0.6 m tall. Leaves are finely pointed, narrow, tightly rolled, 10-25 cm long, 2-4 mm wide, and tend to curl on drying. Seed-head is a straw coloured panicle, 8-41 cm long and 3-10 cm wide. It consists of many one-flowered spikelets, which may be flecked with purple when immature. Each seed has 3 slender, unequal, spreading brown awns, 2-8 cm long, on a spirally twisted column up to 4 cm long.

GRAZING VALUE

Some grazing value when green but usually not grazed when dry, particularly if growing in sandy soil.

HABITAT & DISTRIBUTION

Common in the Pilbara and Kimberley where it is found in disturbed areas.

INDICATOR VALUE

Tends to be an increaser species (undesirable), with dense stands indicating declining rangeland condition. Can rapidly colonise bare areas.



Aristida inaequiglumis

Feathertop three awn

Native perennial grass



PLANT DESCRIPTION

A leafy, erect, loosely tussocking grass growing to 1m tall, with hairless smooth stems. Leaves are green to blue-green, flat, narrow in-rolled 15–30 cm long, 2–5 mm wide, and tend to curl with maturity. Seed-head is a branched panicle, 13–40 cm long, 15–40 cm wide, with numerous characteristic three awned seeds that lack a shaft between awns and seed, giving it a feathery appearance. Seed-heads are a yellowish to purple-brown colour.

GRAZING VALUE

Nil as it is an unpalatable species usually avoided by stock. This species may be grazed when young and green but generally unpalatable once dry and mature.

HABITAT & DISTRIBUTION

Areas with sandy or loam soils and is found from the Gascoyne to the Kimberley.

INDICATOR VALUE

An increaser species invading disturbed or degraded areas. Can dominate areas and is a good indicator of declining rangeland condition on sandy or loam soils.



Aristida latifolia

Feathertop wiregrass

Native perennial grass

PLANT DESCRIPTION

An erect, loosely tussocking grass growing to 1m tall. Leaves are green to blue-green, finely pointed, sometimes leaves are rolled, 35–70 cm long, 4–5 mm wide. They often curl and twist into a tangled mess around the tussock as they dry. Seed-head is a panicle 8–69 cm long, 3–3.5 cm wide yellowish to purple–brown coloured, that turns white with maturity. This species is distinguished from *A. inaequiglumis* by the presence of a twisted column between the seed and the three awns.

GRAZING VALUE

No grazing value; it is neither nutritious nor digestible and is unpalatable to stock.

HABITAT & DISTRIBUTION

Restricted to clay soils from the Pilbara to the Kimberley.

INDICATOR VALUE

A key undesirable increaser species in tussock grasslands on cracking clays. Feathertop wiregrass is an indicator of poor rangeland condition. It can, however, proliferate in some years on country that is in good rangeland condition.



Astrelba elymoides

Weeping Mitchell grass

Hoop Mitchell grass

Native perennial grass



PLANT DESCRIPTION

A sprawling, tussock-forming grass growing up to 0.7 m tall with a thickened, hairless butt. Leaves are deep green, 12–35 cm long, 3–5 mm wide, with a flat surface that often becomes rolled and very narrow when dry. The upper leaf surface is hairless. Seed-head is a solid slender, narrow and weeping spike, 10–40 cm long, 2–3 mm wide. They consist of spikelets tightly pressed along the length of long stems that curve and drop to the ground entire, creating a hoop like appearance. Can be easily identified when seeding by the mounded appearance created by the long weeping seed-heads and after seed shed by the hoop-like seed heads and stems on the ground. These are spread by wind/ water.

GRAZING VALUE

An important pasture grass, weeping Mitchell grass is productive, nutritious and tolerant of grazing. Palatability is good when young but it is less preferred than barley Mitchell grass.

HABITAT & DISTRIBUTION

Found in small to large patches of self-mulching cracking clay soils (crabhole plains) of either alluvial or tableland origin. Seems to need more water than barley Mitchell grass. Found from east of Wiluna to the Kimberley. A fire tolerant species.

INDICATOR VALUE

Presence indicates good rangeland condition. A decreaser species (desirable) if grazed too heavily.





Astrebala pectinata Barley Mitchell grass

Native perennial grass

PLANT DESCRIPTION

An erect, tussock grass growing to 0.8 m tall, with short, thick growing points and a hairless butt. Leaves are deep green to blue-green 7–25 cm long, 4–8 mm wide, with hairs on the upper surface (other Mitchell grasses are hairless), often becoming curled and twisted on drying. Seed-heads are a solid spike, 4–13 cm long, 10–20 mm wide. Spikelets form two distinct rows of seeds, smooth on one side, and similar to the ears of barley or wheat. Seed-heads are held well above the grass tussock.

GRAZING VALUE

Barley Mitchell grass is a valuable pasture species with high crude protein levels but young plants are easily pulled out of the ground by grazing animals.

HABITAT & DISTRIBUTION

Self-mulching cracking clay soils that can be found in big to small patches in crabhole plains of either alluvial or tableland origin. Found from Wiluna to the Kimberley.

INDICATOR VALUE

A decreaser species (desirable) with its presence indicating good rangeland condition. This plant will decrease if grazed too heavily. A fire tolerant species.



Cenchrus ciliaris

Cenchrus setiger

Buffel grass (*C. ciliaris*)

Birdwood grass (*C. setiger*)

Introduced perennial grasses



PLANT DESCRIPTION

Buffel and Birdwood grasses are almost identical tussock grasses except for their seed heads; buffel has fluffy seed whilst Birdwood has seeds covered with tough bristles. Their tussocks grow up to 0.4 m in diameter and 0.5 m tall. They are very resistant to grazing due to their large basal buds, that are well anchored into the ground.

GRAZING VALUE

Able to produce green grass from small amounts of rain and is a very good soil stabilizer. When buffel grass is lush and stock are very hungry, animals have died from oxalate poisoning (McKenzie 2012) and horses can get big head disease.

HABITAT & DISTRIBUTION

Buffel grass is found in the semi arid and arid parts of Australia that receive summer rainfall. It is absent from some small catchments. These grasses were introduced accidentally at first from the Middle East and later were deliberately introduced. They compete aggressively with native grasses and shrubs and favour disturbed areas. Most of the creeks and floodplains in the Pilbara are now dominated by buffel grass. It produces root chemicals that deter the germination of other species (Cheam 1984). In national parks it is disliked because it invades mulga/shrubby creeks and makes them more fire prone and the mulga and shrubs are killed (Miller et al. 2010) in the consequent fires.

INDICATOR VALUE

It is loved by pastoralists and loathed by the national parks.



Cenchrus setiger



Cenchrus ciliaris



Cenchrus ciliaris

Chrysopogon fallax

Ribbon grass

Native perennial grass



PLANT DESCRIPTION

A long-lived, deep-rooted, dense tussock grass growing up to 1.2 m tall. The base is hairy and very fibrous. When chewed to ground level, looks like the end of cut rope. Leaves arise from deep underground buds. Seed-heads are an open panicle and are a golden brown colour. Plant gets its name from its long thin but sharp leaves that will cut your hand to ribbons if you attempt to pull them out of the ground.

GRAZING VALUE

A hardy desirable perennial grass, most nutritious and palatable when green.

HABITAT & DISTRIBUTION

Habitat varies from spinifex plains, alluvial plains to mulga groves. Many of these areas have crab holed soils. Ribbon grass is found across the Pilbara, the Ashburton and Gascoyne catchments and the southern Kimberley.

INDICATOR VALUE

This is a decreaser (desirable) species and it is an indicator of good rangeland condition.



Dactyloctenium radulans

Button grass

Native annual grass



PLANT DESCRIPTION

Low spreading but dense grass growing up to 0.3 m tall with circular compact groups of seeds on short stalks that are said to resemble buttons. Stems can be a purple colour. Leaves are flat green, 4–8 cm long, 3–4 mm wide, with edges that are softly hairy and tapering gradually to a fine point.

GRAZING VALUE

A grass that is readily eaten when green but quickly crumbles to dust when dry. In the absence of other feed, dense stands of button grass around stockyards can cause nitrate poisoning in hungry stock.

HABITAT & DISTRIBUTION

Prefers open clay plain areas but not in crabhole country. Common on roadsides, around yards, and along stock routes, where grazing has been heavy and fertility is higher than normal. Found from the Goldfields to the Kimberley.

INDICATOR VALUE

It is an annual species that has no indicator value. In poor rangeland condition tussock grasslands, its density does increase due to the lack of competition. However it has not been observed to disappear where there has been grazing unless an area has been eroded.



Dichanthium fecundum

Bundle bundle

Curly bluegrass

Native perennial grass



PLANT DESCRIPTION

A leafy, deep rooted, long lived tussock grass growing up to 0.8 m tall. The stems are erect or slightly bent at the lower nodes. The nodes have a ring of hairs. Leaves have a prominent white mid rib and margins. The seeds easily fall from the heads but the plant can be readily distinguished from silky brown top by the remains of the seed head; see the photo. The plants turn a pinkish brown when mature.

GRAZING VALUE

Highly productive, palatable and nutritious fodder, especially when young. Preferentially grazed when green and largely ignored when mature.

HABITAT & DISTRIBUTION

Found in narrow flow lines on the Hamersley Plateau and the Chichester Tablelands. It was probably more widespread in the past.

INDICATOR VALUE

It is a decreaser species and large population indicates good range condition.





Dichanthium sericeum

Slender bluegrass

Queensland bluegrass

Native annual grass

PLANT DESCRIPTION

Slender bluegrass is an annual with thin weak stems that grow up 0.4 m tall. Its seed heads are digitate and these readily fall apart upon maturity and they do not noticeably stick into man or beast. Each seed has lots of fine silky white hairs and a single bristle that is about 25 mm long.

GRAZING VALUE

A nutritious grass that is highly digestible but unfortunately does not produce large volumes of forage, especially when young. Preferentially grazed when green.

HABITAT & DISTRIBUTION

Widespread in the Pilbara, especially in the tussock grasslands..

INDICATOR VALUE

As it is an annual, it has no indicator value.



Enneapogon polyphyllus

Limestone grass

Native annual or short lived perennial grass



PLANT DESCRIPTION

A loosely tussocking, grass growing up to 0.5 m tall, covered with dense, soft, often sticky hairs. The wiry stems often bend at the lower nodes and branch at the upper. Leaves are flat, erect 7–15 cm long, 2–4 mm wide with fine pointed tips, covered with soft fine hairs. Seed-head is a dense, purplish to dark grey, solid spike 4–9 cm long, 1–3 cm wide and consists of crowded spikelets. Spikelets are hairy and fringed by a ring of pink-purple awns.

GRAZING VALUE

Limestone grass produces little bulk but is palatable and nutritious, readily grazed by stock. It can provide high quality, early feed for a short period of time but must be stocked lightly as it will disappear under heavy grazing.

HABITAT & DISTRIBUTION

Large populations are found on calcareous soils but is found in almost all habitats but in lesser numbers. Found from the Gascoyne to the Kimberley.

INDICATOR VALUE

It has no indicator value within the Pilbara region because it is generally short lived.



Enteropogon ramosus

Curly windmill grass

Native perennial grass



PLANT DESCRIPTION

Weakly tussocking grass with a windmill like seed head and tightly curled leaves, Grows to 0.4 m tall.

GRAZING VALUE

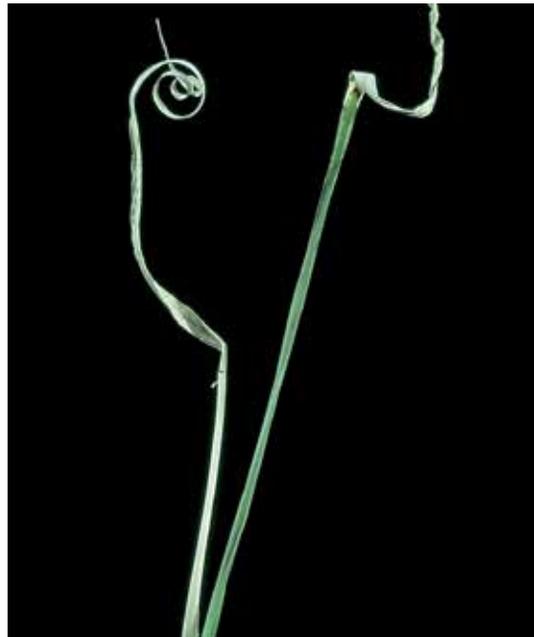
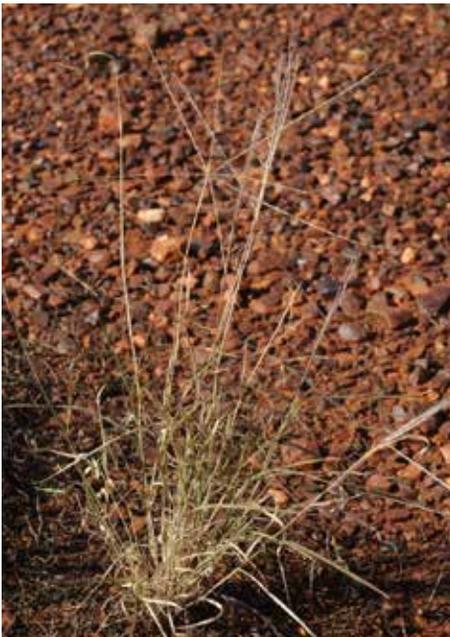
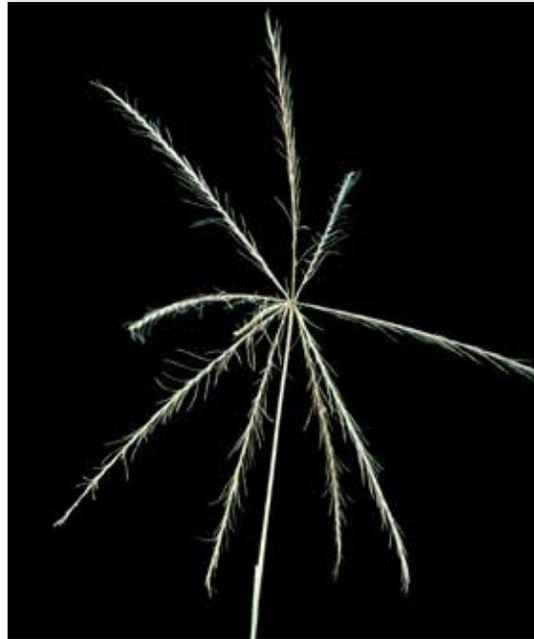
Very palatable grass that disappears under continuous heavy grazing.

HABITAT & DISTRIBUTION

Semi saline and none saline clay country growing inside the protection of dense patches of shrubs. Found from the Goldfields to the southern Kimberley.

INDICATOR VALUE

Decreaser (desirable) species. Presence in dense shrub clumps indicates fair rangeland condition and when growing out in the open, indicates good to excellent rangeland condition.



Eragrostis eriopoda
Woolly butt grass
Wire wanderrie grass

Native perennial grass



PLANT DESCRIPTION

A tussock forming grass growing up to 0.6 m tall, with a bulbous, thickened, densely woolly base. The stems are stiff and wiry. Leaves are bright green, stiff, narrowly in-rolled, up to 10 cm long, and 2–3 mm wide. They are gently curved when young with prominent veins and sharp pointed tips. Seed-heads are erect, open and purple coloured. The seeds are small red grains less than 1 mm in diameter.

GRAZING VALUE

A moderately palatable pasture species with low grazing value, which is extremely hardy and tolerant of medium to heavy grazing.

HABITAT & DISTRIBUTION

Burnt spinifex plains and wandarrie banks in the east. Found throughout the Pilbara, south to the Goldfields and north to the southern Kimberley.

INDICATOR VALUE

This species is a decreaser (desirable) in the Pilbara. It is a very hardy grass and its absence in soft spinifex hummock grassland pasture would imply that the country is in poor condition.



Eragrostis setifolia

Neverfail

Native perennial grass



PLANT DESCRIPTION

Upright, tight tussocking grass growing up to 0.4 m tall. Its flower heads are shortish tight panicles and has fine leaves growing from the base.

GRAZING VALUE

The grass remains green for extended periods and is a source of green forage when all the annuals have dried off. It provides good forage value and is readily eaten by stock.

HABITAT & DISTRIBUTION

Cracking clay plains and drainage depressions. Grows from the Nullarbor to the southern Kimberley.

INDICATOR VALUE

This is a decreaser (desirable) species and large populations indicate good rangeland condition.



Eragrostis xerophila

Roebourne Plains grass

Native perennial grass



PLANT DESCRIPTION

Low open tussock grass growing up to 0.4 m tall that grows outwards by sturdy above ground runners. The centre of each tussock is usually moribund. It has short wide leaves and a very narrow but elongated panicle.

GRAZING VALUE

The old foliage is very fibrous and usually unpalatable except to hungry stock. Once grazed, the new growth is palatable and grazed when conditions are dry.

HABITAT & DISTRIBUTION

Poorly developed, semi saline cracking clay plains. Found from the Goldfields, north to the southern Kimberley.

INDICATOR VALUE

This is a decreaser (desirable) species indicating fair to good rangeland condition when there are large populations. Significant numbers of this species also indicates there has been little soil erosion.



Eriachne benthamii
Swamp grass
Swamp wanderrie grass
Native perennial grass

PLANT DESCRIPTION

Upright tussocking grass with grey foliage growing up to 0.5 m tall. Has a moderately dense panicle.

GRAZING VALUE

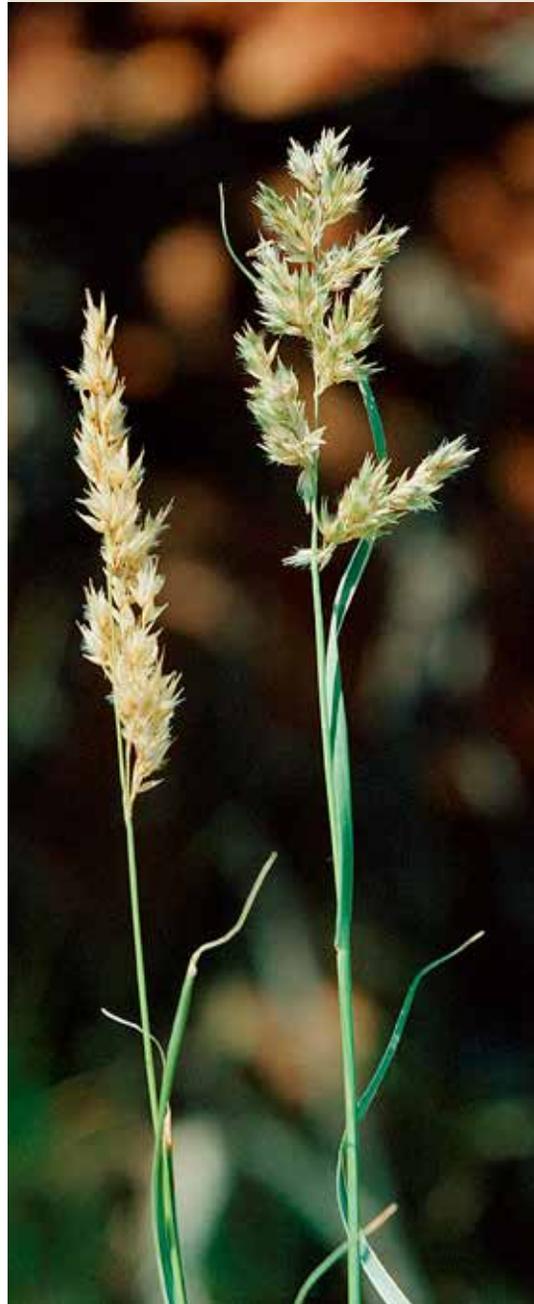
Is rarely grazed.

HABITAT & DISTRIBUTION

Grows in areas subject to flooding with clay soils, sometimes in large crabholes. Often found in association with Roebourne Plains grass (*Eragrostis xerophila*) and neverfail (*Eragrostis setifolia*) in Roebourne Plains or ribbon grass pastures. Found from the Gascoyne to the Pilbara.

INDICATOR VALUE

An intermediate species. Where it is the dominant grass it indicates poor rangeland condition (increaser). It is also an indicator of erosion when it is the only plant growing in scalded claypans.



Eulalia aurea

Silky brown top

Native perennial grass



PLANT DESCRIPTION

An erect, tussocking, long-lived grass growing up to 1.5 m tall, with thin slender stems and a hairy, bulbous base. Leaves are blue-green 4–30 cm long, 2–7 mm wide and smooth. In the dry season the leaves turn a very distinctive rusty red–brown colour. Seed-heads consist of 2–5 dark brown digits 6–12 cm long.

GRAZING VALUE

Low grazing value. Grazed when young but ignored as plants become mature.

HABITAT & DISTRIBUTION

Sparsely scattered in creeks and depressions. Found from the Gascoyne to the north Kimberley.

INDICATOR VALUE

A species that has no indicator value due to its relatively restricted occurrence in native pastures.



Iseilema species Flinders grasses

Native annual grass



PLANT DESCRIPTION

A group of low spreading grasses growing up to 0.3 m tall, with distinct red-purple colouration on both the stems and leaves. Leaves are narrow, hairless, up to 20 cm long, 3–5 mm wide, with long, pointed tips. They are a green colour, which develop red or pink tinges with maturity. Seed-heads are dense, 2–2.5 cm long and consist of groups of erect, leafy spikelets on thin stalks, which easily break apart on maturity.

GRAZING VALUE

These species are palatable and nutritious, readily eaten by stock when both green and dry.

HABITAT & DISTRIBUTION

They occupy a variety of habitats including coastal clay plains, alluvial plains and tablelands. Found from the Murchison to the Kimberley.

INDICATOR VALUE

As they are annual species they have no indicator value. In poor condition tussock grasslands, its density does increase due to the lack of competition. However it has not been observed to disappear under grazing unless an area has been eroded.



Panicum decompositum

Native panic

Native millet

Native perennial grass



PLANT DESCRIPTION

An erect, coarse, tussocking grass growing up to 1 m tall, with thick, hollow stems forming large clumps. Leaves are smooth, flat blue-green to green 30–50 cm long, 3–12 mm wide, often with a distinct mid-vein. The basal leaves can appear shiny and are generally papery white or yellowish in colour. Seed-heads are a loose, open, panicle 15–40 cm long, and almost as wide, and consist of stiff, whorled branches bearing few spikelets which are normally clustered towards branched tips. Seed-heads break off intact and seed is spread as the head blows around. The seed is a small round hard shiny grain.

GRAZING VALUE

Palatable when young, but less preferred when growing amongst more desirable perennials.

HABITAT & DISTRIBUTION

It grows as isolated individuals in crab holed soils and is found from the Goldfields to the Kimberley.

INDICATOR VALUE

It is generally not a good indicator of rangeland condition but can be a decreaser (desirable) species in ribbon and Roebourne Plains grass pastures.





Sorghum plumosum Plumed sorghum

Native perennial grass

PLANT DESCRIPTION

Tightly tussocking perennial grass growing up to 1.7 m tall. Each tussock consists of a leafy base to 0.4 m tall and the seed heads are produced on 1 m tall robust stems with open panicles of dark brown seeds 12–40 cm long, 2–5 cm wide, with loosely arranged spikelets and prominent dark brown awns 5–10 cm long, with sharp points. Leaves are green to blue-green, flat or folded 10–40 cm long, 4–12 mm wide, smooth and arising mainly from the base of the plant.

GRAZING VALUE

It is a very palatable grass but is a rare find in the Pilbara where it may have been more common.

HABITAT & DISTRIBUTION

Narrow creeks and flow lines in the east and west Pilbara. Found from the Pilbara to the Kimberley.

INDICATOR VALUE

A decreaser (desirable) species with large populations indicating good to excellent rangeland condition.



***Themeda* sp.**
Hamersley Station
Tall kangaroo grass
Native perennial grass



PLANT DESCRIPTION

A tussocking, leafy grass growing up to 2 m tall, bluish green in colour. Leaves are 30 cm long and tend to be concentrated at the base of the plant. The leaf blade is generally flat or slightly folded, smooth, and with small hairy appendages at its base. Seed heads are tight panicles, 20–50 cm long with groups of leafy looking spikelets that droop from the slender, flowering stalks. They are green, ripening to golden brown. Spikelets occur in groups of 3. Seeds are dark brown and shiny 6–11 mm long with a single, dark twisted 5–7 cm long awn coming from its tip.

GRAZING VALUE

Moderate grazing value. Basal leaves of the plant are eaten when green but once the flower heads are produced, the top of plants are not grazed.

HABITAT & DISTRIBUTION

Themeda sp. Hamersley Station occupies the calcareous cracking clay soil of the Hamersley Plain. Also occurs on the Hamersley plateau and Fortescue floodplain where there are calcareous cracking clay soils and limestone boulders.

INDICATOR VALUE

Themeda sp. Hamersley Station is consistently found on the one soil type at Hamersley and Millstream and can be used as a decrease (desirable) indicator in this special habitat.



Themeda triandra Kangaroo grass

Native perennial grass

PLANT DESCRIPTION

A tussocking, leafy grass growing up to 1 m tall, bluish to yellow green colour when young maturing to yellowish brown or red colour. Leaves are 30 cm long and tend to be concentrated at the base of the plant. The leaf blade is generally flat or slightly folded, smooth, and with small hairy appendages at its base. Seed heads are tight panicles, 20–50 cm long with groups of leafy looking spikelets that droop from the slender, flowering stalks. They are green, ripening to golden brown. Spikelets occur in groups of 3. Seeds are dark brown and shiny 6–11 mm long with a single, dark twisted 5–7 cm long awn coming from its tip.

GRAZING VALUE

Low grazing value and minimal palatability when green.

HABITAT & DISTRIBUTION

A species with a very broad range of habitats and equally broad distribution found in isolated pockets on and around basalt hills across the Pilbara. *T. triandra* is found from the Perth Hills to the Kimberley.

INDICATOR VALUE

T. triandra cannot be used as an indicator of condition as it is not consistently present in any particular habitat.



Triodia epactia
Triodia pungens
Soft spinifex

Native perennial grass



Triodia pungens



PLANT DESCRIPTION

Resinous hummock forming grasses, growing up to 1 m tall with seed-heads to 1.5 m tall. Leaves are rigid, flattened, up to 34 cm long and 0.8–1.2 mm wide, with a visible mid-vein when young, becoming rolled with maturity. Seed-heads are a slender, light brown, panicle 14–27 cm long and 1–2 cm wide. Spikelets are neatly packed on short branches which usually run parallel to the stem. Spikelets are 7–12 mm long with tightly packed, individual florets that break off at maturity.

GRAZING VALUE

Soft spinifex has a low grazing value and is most palatable when young.

HABITAT & DISTRIBUTION

Wide range of habitats from coastal sand plains in the west Pilbara, degraded clay plains and to flow lines in granitic landscapes in the Abydos area. Coastal “pindan” plains are the core habitat of these species. Found from the Ashburton Catchment to the Kimberley. Most plants are killed by burning with regeneration mainly from seed.

INDICATOR VALUE

These species have either no indicator value or on cracking clay plains is an increaser species.



Triodia pungens

Triodia longiceps

Knitting needle spinifex

Native perennial grass

PLANT DESCRIPTION

Knitting needle spinifex has very long round and very sharp leaves as the common name implies. Each leaf can be up to 25 cm long and the hummocks up to 2.5 m tall and 6 m wide

GRAZING VALUE

Nil, nothing goes near it and these hummocks are probably a good place to hide from predators.

HABITAT & DISTRIBUTION

Hills, breakaways, clay flats and creeks. Found in an arc from the Pilbara to Queensland.

INDICATOR VALUE

This is an increaser species, especially on crabhole plains.



Triodia wiseana

Limestone spinifex

Native perennial grass



PLANT DESCRIPTION

Limestone spinifex has thin but very sharp leaves and its stems are often hairy. Each leaf can be up to 25 cm long and the hummocks up to 1.2 m tall and 1.5 m wide. It does not have any resin. Each seed ends in three broad triangular lobes that are about 5mm long.

GRAZING VALUE

Nil, nothing goes near it and these hummocks are probably a good place to hide.

HABITAT & DISTRIBUTION

Limestones, hills and breakaways. It is abundant on limestone and is probably the most common hill spinifex in the Pilbara. Its is also found in the southern Kimberley and just into the NT

INDICATOR VALUE

This is an increaser species in tussock grass habitats.





Acacia aneura complex

Mulga



PLANT DESCRIPTION

Tree or tall shrub growing up to 10 m tall. These species can vary in shape from a multi-stemmed plant to one with a single trunk. There are now 12 species described under what used to be mulga and their leaves vary from fine needle like to broad leaves. All the flowers and pods are similar between these species. The flowers are yellow multi-flowered cylinders and the pods are flat and papery containing flattened hard black seeds.

GRAZING VALUE

These species are generally not palatable with only new leaves (which are generally out of reach of browsing animals) the most useful fodder. Mulga are high in tanins and animals only eat it as a last resort. It will keep them alive for a time in droughts. Bulls hook down branches for their herd to graze on giving these mulgas a distinctive 'tented' appearance. Camels can break down mulgas higher than cattle and have the ability to kill these trees.

HABITAT & DISTRIBUTION

Hills and hardpan plains from the Goldfields near Menzies to the Fortescue River valley.

INDICATOR VALUE

These species usually have no indicator value. Mulgas are fire sensitive and generally do not grow in areas that are regularly burnt. Its disappearance from areas where it should be the dominant tree, indicates increased fire frequency or environmental collapse due to loss of their normal water flow.



Acacia stellaticeps Poverty bush

PLANT DESCRIPTION

Low, flat topped shrub growing to about 1 m tall and up to 3 m wide. It has yellow globular flower heads. It holds its woody asymmetric shaped pods upright.

GRAZING VALUE

Nil as stock are not known to touch it.

HABITAT & DISTRIBUTION

Coastal plain from Exmouth to De Grey Catchment in the Pilbara.

INDICATOR VALUE

Large populations in soft spinifex pasture indicate poor range condition.



Acacia synchronica

Bardie bush



PLANT DESCRIPTION

Straggly prickly tall shrub with greyish foliage growing up to 6 m tall. It has short, flattened curved greyish green leaves, with a pair of straight prickles at the base of each leaf. Flowers consist of a ball of creamy yellow florets with seed produced in flattened papery pods. Flowering time is mainly in August.

GRAZING VALUE

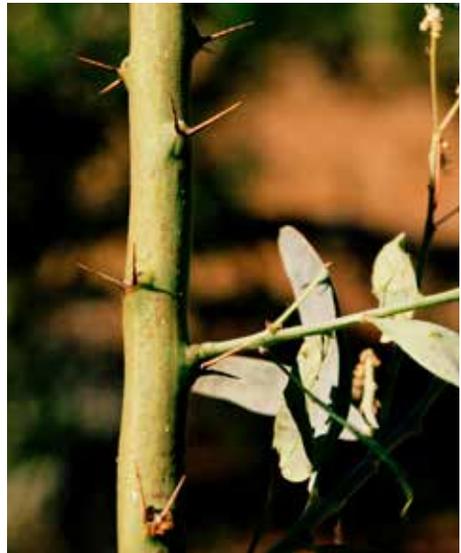
Minimal grazing potential with stock occasionally eating the lower leaves. Flowers and the pods may also be eaten in season.

HABITAT & DISTRIBUTION

Alluvial plains and on rocky alluvial flats especially in disturbed areas. This species is common from the Murchison to the southern Kimberley.

INDICATOR VALUE

This is an increaser (undesirable) species which indicates areas of disturbance with large numbers suggesting poor rangeland condition.



Acacia xiphophylla Snakewood



PLANT DESCRIPTION

Low tree or tall shrub with twisted branches growing up to 4 m tall. Leaves are long and grey green with flowers consisting of a cylinder of numerous yellow florets. Pods consist of elongated beans.

GRAZING VALUE

Grazed in dry times as is often the only green feed available and the last alternative.

HABITAT & DISTRIBUTION

Areas with clay soils with some salinity at depth, sometimes crab-holed. Found from the Gascoyne to the central Pilbara (Fortescue Valley).

INDICATOR VALUE

This species has no indicator value. It is fire sensitive and highly prized as firewood. Its presence usually indicates a stony chenopod pasture. When all the snakewood are dead in a patch, this suggests they have either been overgrazed by stock or killed by fire. With the advent of cattle to areas of low snakewood, whole populations of snakewood have died in the last 10 years.



Chenopodium auricomum Northern bluebush



PLANT DESCRIPTION

Mid level shrub with grey foliage growing up to 2 m tall. Its long spear shaped grey leaves grow up to 5 cm in length, are covered in mealy hairs and when crushed it has a foetid smell. Small flowers spikes are produced at the end of branches.

GRAZING VALUE

Very high. It is often grazed down to stumps.

HABITAT & DISTRIBUTION

Swamps with crab-holed clay soils in the central and eastern Pilbara. Found from the Gascoyne to the Kimberley.

INDICATOR VALUE

A decreaser (desirable) shrub that is an indicator of good rangeland condition.



Enchylaena tomentosa

Ruby saltbush



PLANT DESCRIPTION

Low spreading shrub with grey foliage, normally growing up to 0.4 m tall but it can grow up to 2 m with the support and protection of a dense groups of shrubs. Cylindrical leaves are normally covered in hair. The fruits are yellow or red succulent berries that turn black when dry.

GRAZING VALUE

Very palatable and sought after by stock but it is never found in abundance.

HABITAT & DISTRIBUTION

Widespread in a variety of soils from the south coast to the Kimberley. Widely spread in the landscape (by birds) it is usually found under trees, especially snakewood.

INDICATOR VALUE

A decreaser (desirable) species found in most shrubland types such as bluebush/saltbush, stony chenopod, hardpan mulga shrubland and Roebourne Plains grass with mature plants an indicator of good rangeland condition. Juvenile populations are relatively short lived with high mortality and are an unreliable indicator of condition trend.



Eremophila forrestii Wilcox bush



PLANT DESCRIPTION

Grey, upright shrub growing up to 1.5m tall. The oval leaves are covered in a thick layer of hairs giving the plant a grey appearance. It has distinctive tubular, pink to light orange flowers with dark spots on the inside. The style and stamens extend about 1 cm out from the mouth of the flower. Plants usually flower in August.

GRAZING VALUE

It has a mixed grazing reputation in the rangelands but in the Pilbara it is not the preferred feed for cattle and is very rarely grazed.

HABITAT & DISTRIBUTION

Found growing in areas with sandy and loamy soils that are rarely burnt such as mulga groves and thickets. Found from the Goldfields to the Pilbara. It is rare in spinifex country.

INDICATOR VALUE

It has no indicator value when it isn't grazed by cattle. If grazing is evident, this suggests a probable feed shortage and potential decline in rangeland condition.



Eremophila latrobei Warty fuchsia bush



PLANT DESCRIPTION

Upright, sparse shrub with warty leaves, growing up to 1.5 m tall. The long thin leaves and juvenile stems are covered in distinctive warts. It has red or yellow tubular flowers, the style and stamens of which, extend up to 5 mm from the mouth of the flowers.

GRAZING VALUE

It is regularly grazed but as the species is not found anywhere in significant numbers, it is not an important grazing resource.

HABITAT & DISTRIBUTION

Mulga country and tops of hills in spinifex country where there is minimal fire. It is fire sensitive and disappears if burnt too frequently. Not usually present in spinifex country. Found from the Goldfields to the southern Kimberley.

INDICATOR VALUE

A decreaser (desirable) shrub that is an indicator of good rangeland condition when present.



Gastrolobium grandiflorum Wallflower poison



PLANT DESCRIPTION

Spreading tall shrub with opposite leaves growing up to 2.5 m tall. Its grey leaves are rounded and indented at their tips. It has brick red pea type flowers and round pods. Usually flowers in July or August.

GRAZING VALUE

Nil. Contains the poison 1080 and cattle deaths have been reported in the Hamersleys from this species.

HABITAT & DISTRIBUTION

Narrow undissected flow lines and creeks in the upper parts of the landscape in spinifex country. Found from Ashburton Catchment to the southern Kimberley.

INDICATOR VALUE

It has no indicator value.





Isotropis atropurpurea Poison sage

PLANT DESCRIPTION

Spreading shrub with brown to purplish pea type flowers growing up to 0.6 m tall. Its leaves are grey to rusty coloured with cylindrical pods.

GRAZING VALUE

Nil. Cattle deaths have been reported in the southern Pilbara from this species.

HABITAT & DISTRIBUTION

Found in recently burnt spinifex country especially over limestone. Found from the Murchison to the Kimberley.

INDICATOR VALUE

It has no indicator value.



Maireana georgei Golden bluebush



PLANT DESCRIPTION

Low grey compact shrub growing up to 0.5 m tall. Its long thin succulent leaves are covered in grey hairs and it produces masses of golden winged seed capsules after rain.

GRAZING VALUE

High, with foliage containing up to 26 % crude protein and is not high in fibre.

HABITAT & DISTRIBUTION

Grows in stony clay country or around salt lakes. It is usually found growing with snakewood and sometimes with mulga. Found from the Goldfields to the Fortescue Valley and Nullagine.

INDICATOR VALUE

A decreaser (desirable) shrub that is an indicator of good or improving rangeland condition.



Maireana pyramidata

Sago bush



PLANT DESCRIPTION

Mid level shrub with spikey branches growing up to 1 m tall. Its short succulent leaves are grey green and produces pyramid shaped seeds.

GRAZING VALUE

Moderate with other species preferred. Its leaves are small with a woody (fibrous) structure that grazing animals have to eat a part off, if they browse its foliage. Up to 22% crude protein can be found in the leaves.

HABITAT & DISTRIBUTION

Found in a wide variety of habitats ranging from river flood plains, salt lake margins, granitic valleys and some crabholes. These areas usually have clay soils and have accumulated salts in their profile. Found from the Goldfields to the Pilbara.

INDICATOR VALUE

A decreaser (desirable) shrub that is an indicator of moderate rangeland condition in bluebush/saltbush, stony chenopod pastures.



Prosopis species

Mesquite

Introduced species



PLANT DESCRIPTION

An introduced, highly invasive species. Tree or tall shrub with compound leaves consisting of 1 to 3 pairs of pinnae. They have 2 stout spines at the base of each leaf, some of which are 5 cm long. They have yellow cylindrical compound flowers and long pods. Plants look similar to Mimosa bush (*Vachellia farnesiana*).

GRAZING VALUE

Minor. Animals can eat this plant but find it difficult to do so due to the spines. The seeds and their pods are relished by all the animals from grazers to birds and are responsible for their spread across the landscape.

HABITAT & DISTRIBUTION

Clay, sometime saline soils. Currently present in the coastal Pilbara from Onslow to Port Hedland.

INDICATOR VALUE

Has no indicator value.



Hybrid mesquite flowers



Ptilotus obovatus Cotton bush



PLANT DESCRIPTION

Low rounded, multi stemmed shrub with grey foliage and pink flowers growing up to 0.4 m tall. Cotton bush's leaves are very hairy and its flowers consist of whitish pink balls that break up on maturity. Seeds enclosed in the old flowers are blown across the landscape. It responds quickly to minor rainfall events.

GRAZING VALUE

Moderate, with the crude protein content ranging from 8-14%. Does not seem to be the first species to be eaten by stock.

HABITAT & DISTRIBUTION

Hard pan plains and hills in areas without spinifex. Common in the eastern Pilbara. Found from the Goldfields to the Fortescue Valley.

INDICATOR VALUE

A decreaser (desirable) shrub that is an indicator of good rangeland condition as it is sensitive to climate and grazing.



Rhagodia eremaea

Tall saltbush



PLANT DESCRIPTION

Tall straggly shrub growing to 3 m tall. It has greyish green foliage that is covered with white mealy scales and produces bunches of red succulent berries that are bird dispersed. Most plants are found under trees or within thickets and there it can grow to 3 m tall, intertwined with the other plants. Without the support of other species it can only grow to 1.5 m.

GRAZING VALUE

Leaves and new growth are moderately palatable but the species has a spiny woody architecture that protects the plant to some degree and makes it less palatable than similar species. It is not usually common and does not provide large amounts of forage.

HABITAT & DISTRIBUTION

It is fire sensitive and is restricted to mulga and snakewood country. Found from the Murchison to the southern Kimberley.

INDICATOR VALUE

It is not a good indicator of rangeland condition trend due to its resistance to heavy grazing. Other companion desirables such as ruby saltbush, ribbon grass and cotton bush should be considered in parallel when using this plant to assess change.



Scaevola spinescens

Currant bush



PLANT DESCRIPTION

Spiny low shrub growing to 0.7 m tall. Leaves are in bundles along the stems with an occasional single spine growing from the centre of these leaf bundles. Currant bush has white fan flowers that are born singly and develop into small succulent black fruit, hence the common name.

GRAZING VALUE

Leaves and new growth are moderately palatable but the species has a spiny woody architecture that protects the plant to some degree, making it less palatable than similar species. It is not common and does not provide large amounts of forage. However, its foliage persists in dry times, which makes it a valuable grazing resource.

HABITAT & DISTRIBUTION

It is present in mulga and snakewood country but never common. It is fire sensitive and does not commonly grow in spinifex country. Found from the Goldfields to the southern Kimberley.

INDICATOR VALUE

It is a decreaser (desirable) species and an indicator of good rangeland condition but cannot be solely used to indicate range condition as there are usually few plants in a given area.



Senna artemisioides
subsp. *oligophylla*
Bloodbush



PLANT DESCRIPTION

Upright mid-level shrub with grey foliage and yellow flowers, growing up to 1.3 m tall. Its leaves are covered in a waxy layer that can be rubbed off. It produces masses of bright yellow flowers which give rise to flat pods. It is not a long lived shrub.

GRAZING VALUE

It is grazed slightly by cattle but is more favoured by horses and when they eat it, their saliva becomes red and hence its common name.

HABITAT & DISTRIBUTION

Grows on hardpan country and soft sedimentary rocks, especially in the eastern end of the Ashburton Catchment where in places, it can dominate the vegetation. Rarely present in spinifex country. Found from the Gascoyne to the southern Kimberley.

INDICATOR VALUE

Although slightly palatable it is an increaser species with dominance indicating poor rangeland condition.



Senna hamersleyensis

Creeping cassia



PLANT DESCRIPTION

Low spreading shrub growing up to 0.4 m tall and 0.6 m wide with bright 2 cm wide yellow flowers, light brown papery pods and grey foliage. Flowering occurs in response to rain.

GRAZING VALUE

It is regularly grazed, sometimes grazed down to its woody perennial base, from which it re-sprouts following rain.

HABITAT & DISTRIBUTION

Crabhole plains and tablelands in the southern Pilbara, Ashburton and Gascoyne Catchments.

INDICATOR VALUE

A decreaser (desirable) shrub that is an indicator of good rangeland condition.



Sida fibulifera

Creeping sida

Native perennial shrub



PLANT DESCRIPTION

Flat, prostrate, sprawling short-lived plant growing up to 0.3 m tall. Leaves are greenish or blueish in a narrow oblong shape up to 15 mm wide and 35 mm long. Has small hibiscus like, pale yellow flowers.

GRAZING VALUE

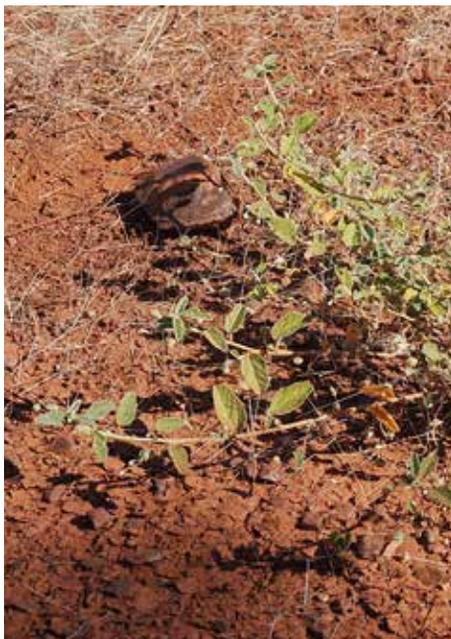
Moderate value feed.

HABITAT & DISTRIBUTION

Crabhole plains and tablelands growing in association with tussock grasslands. It is usually present on the margin of crabholes. Found from the Goldfields to the Kimberley.

INDICATOR VALUE

A decreaser (desirable) shrub in grassland and stony chenopod pastures. Being a relatively short lived species, whose numbers fluctuate widely, it may not be useful as an indicator species.



Vachellia farnesiana (*Acacia farnesiana*)

Mimosa bush

Pre European introduced species

PLANT DESCRIPTION

Tall shrub with spines and yellow round compound flowers growing to 3 m tall. Each leaf consists of 1 to 3 pairs of pinnae, like the introduced and highly invasive mesquite. It also has a pair of small spines at the base of each leaf. However this species has white eruptions (lenticels) on the young stems, round pom pom flowers and pods that are circular in cross section. Its height rarely exceeds 3 m and its top branches do not droop.

GRAZING VALUE

Little forage value as not grazed regularly and forms thickets.

HABITAT & DISTRIBUTION

Clay plains, where it thickens up in disturbed areas. Found from the Murchison to the Kimberley.

INDICATOR VALUE

It is an increaser species and indicates declining rangeland condition.



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GLOSSARY OF TERMS

Awn: a fine, long bristle protruding from the end of a floret, it may be straight or twisted or there may even be more than one.

Basal: applies to stems or leaves originating from the base of a plant.

Butt: the base of a plant.

Floret: basic unit of a grass flower.

Leaflet: segment of a compound leaf, often leaf-like in appearance.

Lenticels: lens-shaped pore on a stem that may be raised or cork like.

Moribund: Appears to be dead.

Node: thickened stem joint on grass stems from which leaves, leaf sheaths or flowers may arise.

Panicle: seed-heads or flower-heads where the branches coming from the main axis are themselves branched.

Pinnae: Leaflets of a compound leaf, arranged on opposite sides of an elongated axis.

Spikelet: small flowering unit of a grass seed-head.

Style: Narrow part of the female flower that allows transmission of the pollen to the ovules.

Stamen: Part of male flower that produces pollen.

Tuft: small clump or bunch of grass stems.

Tussock: larger clump or bunch of long lived grass stems often forming an elevated tussock or mound.

Whorled: plant parts radiating in a circle from a given point or end of a stem.

PILBARA COLLABORATION GROUP



The Pilbara Collaboration Group (PCG) is made up of six not-for-profit groups that undertake or have an interest in natural resource management (NRM) activities in the Pilbara and can provide a support to pastoral and Indigenous land managers. The group's focus areas include, but are not limited to, weed and feral animal control, fire, threatened species management, property planning, restoration and rangelands rehydration work, rangelands self-monitoring and education and capacity building.

The group, whilst not an incorporated body, is made up of like-minded members and delivered through the Kimberley Pilbara Cattleman's Association. The Pilbara Collaboration Group has received initial funding by the WA State Government Natural Resource Management Program Community Capability Grants and supported by Royalties for Regions.

As part of the Pilbara Collaboration Group project, KPCA reprinted this pasture guide to help land managers better understand and manage their pastures. These guides work in conjunction with the Gascoyne Catchment Group's Rangelands self-monitoring app, which has also had Pilbara land systems and plants added into it under funding from this project. Together, these two tools will help land managers to better understand the health of their landscape and make informed management decisions.

For full contact information for the Pilbara Collaboration Group members please check out their page on the KPCA's website:

<https://www.kpca.net.au/about-us/pilbara-collaboration-group/>

PILBARA COLLABORATION GROUP MEMBERS

KIMBERLEY PILBARA CATTLEMEN'S ASSOCIATION

The KPCA is the driving force behind the Pilbara Collaboration Group. Through the Pilbara Manager, the KPCA wishes to build relationships between the different NRM Groups in the Pilbara to increase collaboration, coordination and improve on-ground outcomes. Furthermore, we wish to build relationships between pastoralists and the NRM groups to ensure better and more coordinated land management outcomes which in turn lead to better production outcomes for a more profitable and sustainable pastoral industry.

KPCA Contact

<https://www.kpca.net.au/>

admin@kpca.net.au

RANGELANDS NRM

Rangelands NRM (RNRM) works in the outback 'rangelands' of WA with people who manage the land. RNRM help people look after the community's natural resources including plants, animals, and the environment in which they live.

RNRM Connect by bringing different land managers together, such as pastoralists, ranger groups, government agencies, industry and community groups.

RNRM Coordinate by seeking ways to maximise results and more can be achieved on the ground through coordination of effort and resources.

RNRM Deliver by working with local people and organisations to deliver on-ground results. We help our partners look after threatened species, reduce weeds and animal pests, and manage fire across the landscape. RNRM assist pastoralists to improve their grazing practices, reduce erosion and make the most of water in the landscape and undertake Ecologically Sustainable Rangelands Management Plans (ESRMs). The ESRM planning process aims to improve the profitability of rangeland businesses through promoting improved grazing systems, enterprise productivity, resource sustainability and nature conservation. RNRM have undertaken 18 ESRMs in the Pilbara so far.

Rangelands NRM's current Pilbara priority areas are pastoral/desert interface, the Fortescue River/Catchment and Fortescue Marsh.

RNRM Contact

<https://rangelandswa.com.au/>

info@rangelandswa.com.au

PILBARA MESQUITE MANAGEMENT COMMITTEE

The Pilbara Mesquite Management Committee (PMMC) is a non-profit, non-government community group established in 2001 to coordinate effective and efficient declared weed management with all land managers in the Pilbara Region. PMMC's membership includes 20 active members representing all key stakeholders and the committee is led by a full time, regionally based Project Manager. The PMMC has a diverse role which includes:

- Coordinating, delivering and managing on-ground declared weed control programs across multiple tenure types in the Pilbara region;
- Participating in and leading research to support best practice weed management; and
- Advocating, educating and resourcing declared weed management within broader land management programs with a range of Pastoral, biodiversity and cultural values.

PMMC Contact

<https://pilbaramesquite.com.au/>

info@pilbaramesquite.com.au

PILBARA REGIONAL BIOSECURITY GROUP

The Pilbara Regional Biosecurity Group (PRBG) is a not for profit association, providing declared pest control programs for land managers, particularly in the pastoral zone. The PRBG's primary purpose is the control of declared pests using funding from Declared Pest Rates paid by pastoral leaseholders. These Declared Pest Rates funds are matched dollar for dollar by the WA Government to reflect the public benefit of controlling declared pest animals and weeds. The PRBG aims to:

- Foster the control of declared pests throughout the Pilbara, via the formulation, implementation and review of appropriate management plans and programs;
- Encourage integration, coordination, and general collaboration of Pilbara stakeholders in pest management matters; and
- Promote the adoption of best practice invasive species control throughout the area.

PRBG Contact

Email: bill@billcurrans.com

Mob: 0488 383 449

GREENING AUSTRALIA

Greening Australia (GA) is an environmental non-for-profit organisation that works to return life to landscapes and restore balance to the natural environment in ways that work for communities, economies and nature. GA works collaboratively across catchments and regions in the highest priority locations to achieve impact at scale. GA's work is science-led and is committed to converting the latest technical plans into practical action on-the-ground in partnership with local communities and landholders. In the Pilbara, GA plans, guides, implements and monitors environmental management projects such as ecological restoration, threatened species conservation, and weed, fire and predator management. GA also partners with pastoralists and Aboriginal groups and local communities to develop strategies, build skills and increase employment opportunities associated with on-ground environmental management.

GA Contact

<https://www.greeningaustralia.org.au/>

info@greeningaustralia.org.au

GASCOYNE CATCHMENTS GROUP

Gascoyne Catchments Group (GCG) mission is to develop an ecologically sustainable, profitable and respected pastoral industry that supports an adaptive and vibrant community. The GCG is working towards improving rangeland condition and increasing profitability within the Gascoyne catchments. We are doing this through strategic regional planning, developing industry and regional leadership, delivering projects to test ideas and innovations, and by working with individual landholders. The GCG is made up of members from the Lyndon, Upper Gascoyne and Gascoyne Wooramel Land Conservation District Committees. GCG's current projects include:

- The Rangelands Monitoring tool which is an iPhone/iPad app, self-assessment tool developed to collect specific and consistent information at property and regional scale to document the historic and presently occurring change in the rangeland condition throughout the Gascoyne and Pilbara regions;
- The Bullseye Project which aims to help pastoral businesses and those further along the supply chain to collaborate to better deliver the specific beef and cattle products required by current and emerging markets; and
- The Diet ID Project which test the DNA barcoding of dung samples to identify the plants selected in the diet of rangelands cattle.

GCG Contact

<http://www.gascoynecatchments.com.au/>

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PASTURE IDENTIFICATION

A field guide for the Pilbara

Mary-Anne Clunies-Ross & Andrew Mitchell

