Rangelands MEMO




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Department of Agriculture and Food
GOVERNMENT OF WESTERN AUSTRALIA

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LETTER FROM THE EDITOR

September and October were very busy months in the southern rangelands with 19 rangeland condition monitoring workshops completed as part of the 'pastoralist self-reporting' system roll-out. As a follow-on from these workshops the December 2011 *Rangelands Memo* is spilling over with articles relating to the workshops on plant identification, site selection and how to make use of survey reports.

The feature article 'Learn your plants: **Bluebushes**' discusses the best method to distinguish bluebushes from other species with similar leaves and physical structure; and how to differentiate between the different species of bluebush. The article also identifies some of the bluebushes that are most relished by stock and those that are not considered to be very palatable at all.

Not getting too caught up in grass and shrub mechanics, there are also some interesting articles on bull scrotal circumference measurements, controlling coccidiosis (black scours) and the NLIS help guide. **Coccidiosis** is a problem across the WA rangelands, mainly occurring in weaner cattle when not looked after properly post-weaning, for example poor handling, nutritional stress and not enough room in the pen. The article discusses practical ways to prevent and treat coccidiosis during weaning.

Momentum is gathering for the development of the **Grazing Land Management** (GLM) package for the **Pilbara**. Having been a part of the Kimberley GLM package development, I encourage Pilbara producers to become involved in development of the Pilbara GLM package to make sure of its relevancy and usefulness to your area. The Larrawa station producer demonstration site (see page 29) is actually an on-ground case-study that came out of the Kimberley GLM workshops.

According to the Bureau of Meteorology the chance of receiving above median rainfall during the summer period is between 60 and 80% over most of WA—see maps on page 3. It looks like the southern rangelands and south-eastern Pilbara are in for a wetter summer than usual, specifically in the Murchison and Meekatharra areas. The remainder of the Pilbara and Kimberley are also set to receive above median rainfall. Using Karratha as an example, for every 10 years with similar ocean patterns to those currently observed, about eight years would be expected to be wetter than average, while about two years would be expected to be drier during this summer.

Summary of the tropical cyclone seasonal outlook for north-west Australia

- A 60% chance of an above average number (40% chance of a below average number) of tropical cyclones in waters off the north-west coast (average number is 5).
- Likelihood of around two coastal impacts.
- Significant risk of at least one severe tropical cyclone coastal impact during the season.

Matthew Fletcher

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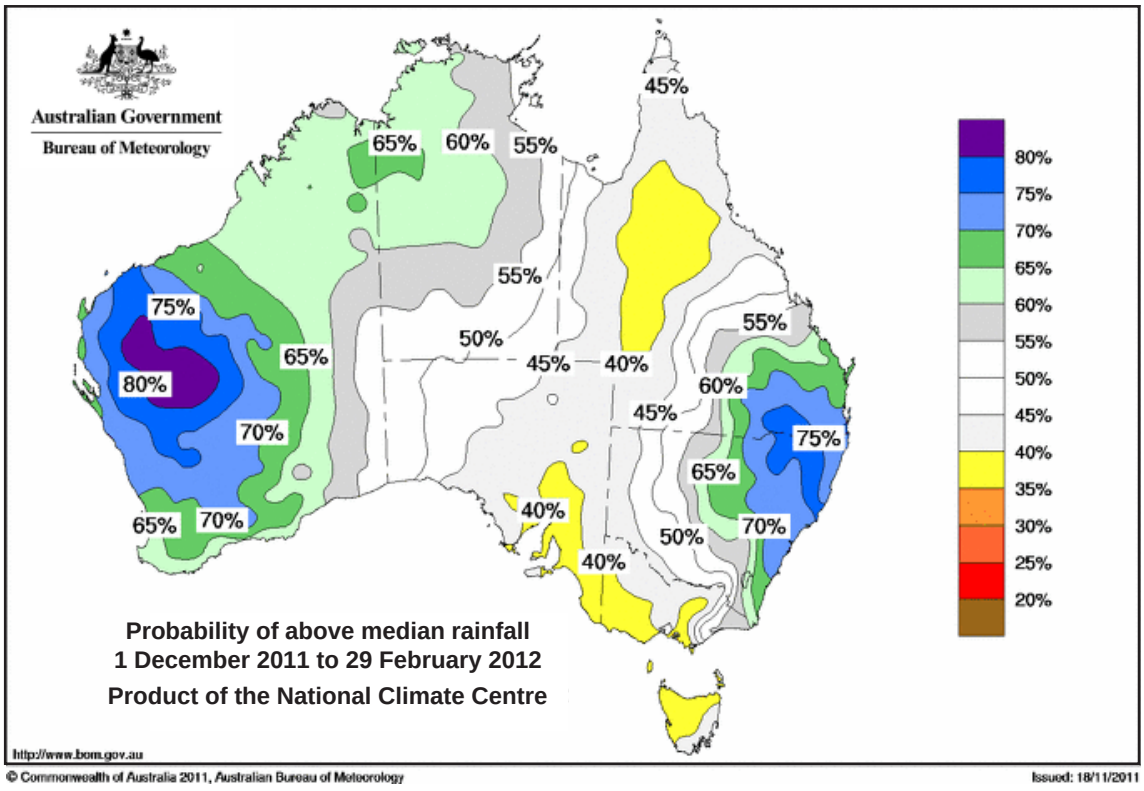
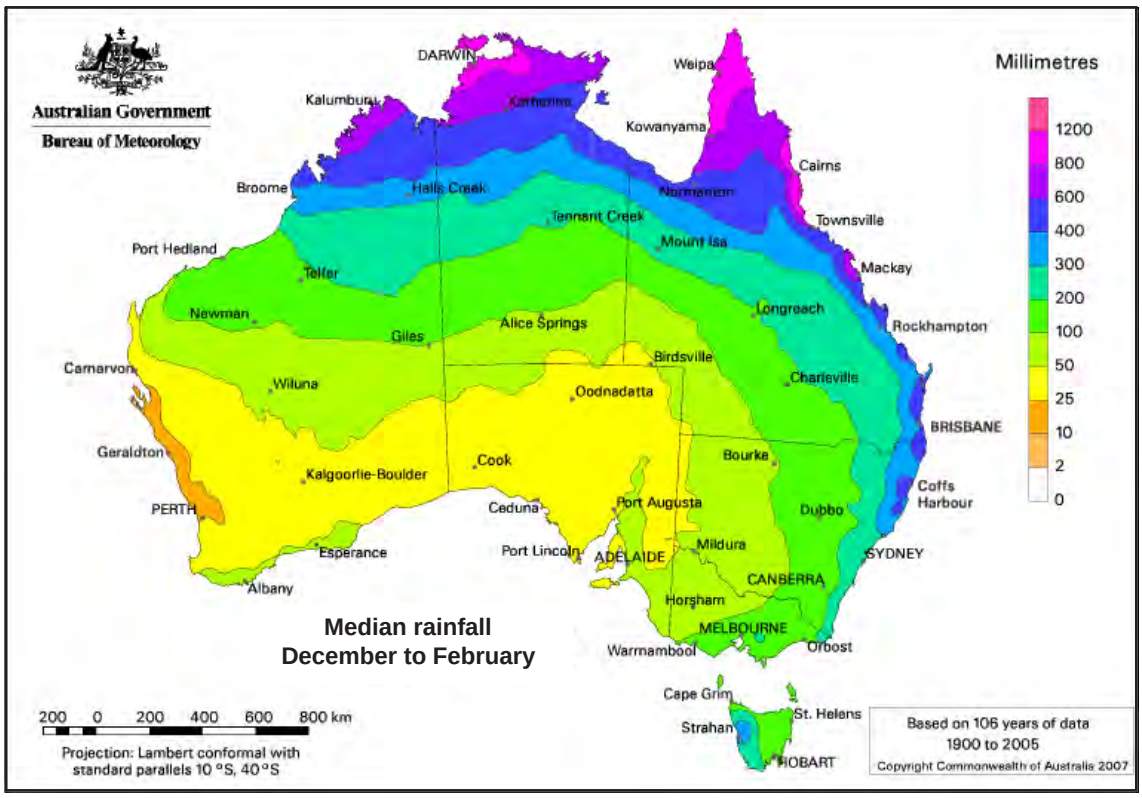
Front page photos courtesy of Bec Dray, Karratha (Droughtmaster steer), Ruby Plains station (blue dog), Samantha Van Wyngaarden, Kalgoorlie (Damara sheep), Wynyangoo station (billy goat).

CHANCE OF EXCEEDING MEDIAN RAINFALL DECEMBER 2011 TO FEBRUARY 2012





LEARN YOUR PLANTS: BLUEBUSHES

Wayne Fletcher, Northam

This article gives a basic introduction to the *Maireana* genus, commonly known as bluebushes. They are a variable group that form an important component of many pasture types in the Southern Rangelands. Usually they are palatable, with some exceptions. They range from annual species such as cottony bluebush (*M. carnosa*), that has small cotton bud type seeds that blow all over the place after a good season, to some larger (to a metre) hardy perennials that live many hundreds of years, for example sago bush (*M. pyramidata*), pearl bluebush (*M. sedifolia*) and Gascoyne bluebush (*M. polypterygia*).

The latter three examples are important in that they can form the ecological basis of a pasture being long-lived and resilient to grazing. They collect sand and silt, leaves and nutrients around their bases and provide shelter and fertility to other shorter-lived species. During droughts, these long-lived species provide a valuable drought reserve and can replenish themselves as long as they are not heavily grazed for too long. During better seasons, grazers tend to utilise more palatable species, providing the large persistent bluebushes with a rest.

Between the two extremes of longevity are a host of species, often palatable, growing in a range of pasture types that contribute significantly to animal production.

How to identify a bluebush

I don't know why they are called bluebushes, most are not blue coloured. Pearl bluebush is, but most are green. They tend to have a typical leaf form—elongated with a round section and succulent. Some are a little flattened (there are always exceptions in nature) but I find leaf form a bit of a hint. Of course there are a few plants that also have this leaf form, to confuse us.

The **seed or fruit body** of the bluebush is the key. The seed case tends to have a hard middle with a papery wing around the outside. Seeds vary greatly from one species to the next but the basic form is there. They can sometimes have small appendages sticking out of the top. Look out for these seeds and you will get the idea.

Hugh Pringle, when working for DAFWA, produced a Key to distinguishing different species of bluebush. It is excellent work and we have been handing out copies at RCM Workshops. The title is reproduced at the end of this article. Unfortunately it does not have colour photos but we may try to rectify that. If anyone does not have a copy and would like one, contact your local DAFWA office.

The same only different

The *Sclerolaenas* or bindiis have a similar leaf form to the bluebushes. They tend to be short-lived (with the odd exception) but have the distinctive two-pronged prickle of some forms.

Another trickster is the ruby saltbush (*Enchylaena tomentosa*) which is not a saltbush at all. You will probably know the distinctive fruit of the ruby saltbush—a small, sweet, yellow or red berry. They often grow under the protection of trees and bushes like snakewood (*Acacia xiphophylla*) and bowgada (*Acacia linophylla*), or may grow in the protection of the house yard; its seed is transported there by birds. While it is not a bluebush, it functions like one—a useful indicator. So if you were to confuse it as a bluebush in your monitoring sites, it would not be a big issue.

Palatability of bluebushes

The best of them are highly sought after—shy bluebush (*M. platycarpa*) is a very sensitive species confined to ungrazed areas or hidden away in the protection of larger shrubs. Finding this in your pasture is cause to rejoice.

The least palatable are still grazed to some extent. Three winged bluebush (*M. triptera*) is an 'increaser' species—as grazing level increases, this plant will increase in population. However it can be grazed out at high stocking levels such as holding paddocks.

Species such as Georges bluebush (*M. georgei*) and mulga bluebush (*M. convexa*) are reasonably sensitive 'decreaser' species and when you see these increasing in your pasture, you can be confident that this is a good reflection of your management. Likewise for many other species such as pussy bluebush (*M. melanocoma*), lax bluebush (*M. thesioides*) and some of the species found on lake frontages like ball leaf bluebush (*M. glomerifolia*) and five pin bluebush (*M. atkinsiana*).

Typical leaf form on a Gascoyne bluebush

Typical fruit of M. villosa

How can I learn more?

Get a copy of Pringle's Technical Report and start looking for the fruit on plants. *Arid Shrubland Plants of Western Australia* by Mitchell and Wilcox (if you are lucky enough to have one – keep it locked up) has some nice photos and descriptions of about 20 bluebush species. But mainly look out for them in the bush. Once you get to know them, you will find them fascinating and attractive plants that will even look good in the garden.

I will try for another genus in the next Memo.

A large Gascoyne bluebush will have greater soil fertility at its base than surrounding areas.

Further reading

Pringle, H & Cranfield, R 1995, *A Key to the Species of Bluebushes of the Arid Southern Shrublands of WA*, Department of Agriculture Western Australia, Technical Report No. 147.

Mitchell, A & Wilcox, D 1998, *Arid Shrubland Plants of Western Australia*, revised edition, University of Western Australia Press, Perth.

CONTROLLING COCCIDIOSIS

Russ Tyler, DEEDI, Queensland

Extract from *Beeftalk* magazine

Coccidiosis, also known as black scours, is a common problem in weaners. Coccidiosis causes damage to the wall of the intestine, resulting in reduced feed consumption, weight loss and, in severe cases, death. The black diarrhoea—the most obvious symptom of coccidiosis—is usually seen about a month after weaning. The scouring doesn't become evident until the coccidian numbers have been building for about four weeks, by which time most of the damage has been done.

With good husbandry and nutrition, the disease and associated production loss can be prevented.

Causes

Two coccidia protozoa cause most problems, *Eimeria zuernii* and *E. bovis*. These coccidia are common in the intestine of cattle. Calves contract them from herd mates within a day of birth. These protozoa rapidly multiply and cause coccidiosis when the immune system in the calf's gut is compromised.

The stress of weaning can compromise the immune system of calves because the immune system relies on a constant flow of food, and any interruption, even for a day, can allow the coccidia population to increase, leading to clinical signs of the disease.

Identification

The clinical signs of coccidiosis are:

- sudden onset of severe, foul-smelling diarrhoea, which may be blood-stained with either a dark tarry smear or fresh red clots, and which also may contain shreds of mucous
- straining
- dehydration
- anaemia
- decreased appetite.

The symptoms of coccidiosis are very similar to those of many other bowel problems, so the presence of black scour is not a sure sign of coccidiosis. It is most commonly confused with worm infestation.

Just as calves have coccidia, they usually also have a few worms that will often build up following weaning. When treatment for worms is given, in most cases the diarrhoea clears up. However, before treating for worms it is best to have a worm egg count done to determine the severity of the infestation.

Outbreaks

The main concern in outbreaks is the potential for coccidiosis to affect a large proportion of the mob.

The main risk factors for coccidiosis are poor nutrition immediately after calves are removed from their mothers and stress, which may be due to suboptimal handling practices or facilities, or severe weather conditions such as cold and/or rain at the time of weaning.

Prevention

Some simple steps can greatly reduce the incidence of coccidiosis:

- Provide weaners with good quality feed (usually hay) as soon as they are weaned. The feed should be in the weaner yard as soon as the calves are removed from their mothers. Feed hay and other supplements in troughs and racks. Keep water clean and practice good husbandry.
- Try to time weaning to avoid extreme weather conditions such as cold and wet.
- Include a coccidiostat in any ration fed to calves, particularly those under 150 kg liveweight. The two products most used are Bovatec and Rumensin, which contains monensin. Most commercial supplements, such as weaner pellets, contain a coccidiostat. The recommended feeding rate for monensin is 10–20 mg/head/day.

Note: Monensin is toxic to horses, dogs, pigs and humans.

Treatment

If a coccidiosis outbreak occurs, the mob, and especially affected animals, should be nursed and given a supplement that incorporates a coccidiostat. Nursing means segregating if needed, reducing overcrowding, providing good clean water and feed, and removing any other causes of stress.

Veterinary advice should be sought for severe cases.

Most animals recover once the cause has been removed but this may take some time. If stress continues, the diarrhoea will persist and long-term damage may occur.

Well fed and managed weaners are much less likely to have problems with coccidiosis.
Photo courtesy Robyn Richardson

DETERMINATION OF NORMAL TESTICULAR DEVELOPMENT IN TROPICALLY ADAPTED BEEF BULLS IN NORTHERN AUSTRALIA

T Muller[1], A Lisle[1], G Fordyce[2], R Holroyd[2], V Doogan[2], M McGowan[1]

[1] The University of Queensland; [2] Department of Primary Industries and Fisheries

The measurement of scrotal circumference (SC) has long been regarded as a simple and accurate indicator of the inherent fertility of beef bulls and as such is a major component of bull breeding soundness examinations (BBSEs). However, current SC recommendations (Entwistle & Fordyce 2003) are quite broad and concerns have been raised about their application to *Bos indicus* and *Bos indicus* derived bulls subject to the variable nutritional conditions of northern Australia. Recently Ms Tracy Muller, a final year BAgricSci student at The University of Queensland, completed a research project which focused on the relationships between age and body weight and SC in young, tropically adapted bulls.

The primary aims of her project were to collate SC data from three large projects conducted in northern Australia (the MLA funded Bullpower I and Bullpower II projects and the Beef CRC project 4.1.3) to:

(a) investigate differences in testicular development between breeds,

(b) examine the interaction and effects of weight and age on SC, and

(c) develop minimum SC thresholds that could be used to identify bulls with suboptimal testicular development (a measurement significantly below the population mean).

In total, 9300 SC measurements were recorded from 1958 bulls under three years of age, with many bulls having been measured numerous times. Breeds included Belmont Reds (n=239), Brahman (n=559), Droughtmaster (n=133), Santa Gertrudis (n=460) and Composites (n=567). The bulls were managed on either commercial studs or on research stations and grazed varying quality native or improved pastures, and received supplements commonly used in the industry. Some bulls were managed in feedlot conditions to achieve growth rates of approximately 1 kg/d.

Both weight (r=85.8%) and age (r=78.5%) were found to have significant positive correlations with SC. Regression analysis revealed that the Gompertz function, a relatively common non-linear model used to describe growth, best described testicular development in relation to weight in all breeds separately (Belmont Red R^2=80.9; Brahman R^2=83.9; Droughtmaster R^2=75.1; Santa Gertrudis R^2=69.9; Tropical Composite R^2=79.1) and combined (R^2=80.4). In all cases except the Belmont Reds, weight explained more of the variation in SC than age. Breed differences in testicular development were small, although it was evident that Belmont Red and Composite bulls matured at a slightly earlier age/weight than the other breeds studied.

Gompertz function modelling of SC against weight was used to predict 'normal' testicular development in all tropically adapted breeds and a graph illustrating population mean SC and the upper and lower 5th percentile was developed (Figure 1). This graph can be easily utilised by producers and veterinarians to identify bulls within defined weight categories which have suboptimal testicular development. Using this approach the plane of nutrition the bull has been raised on can be accurately taken into account when determining whether testicular development is normal or not.

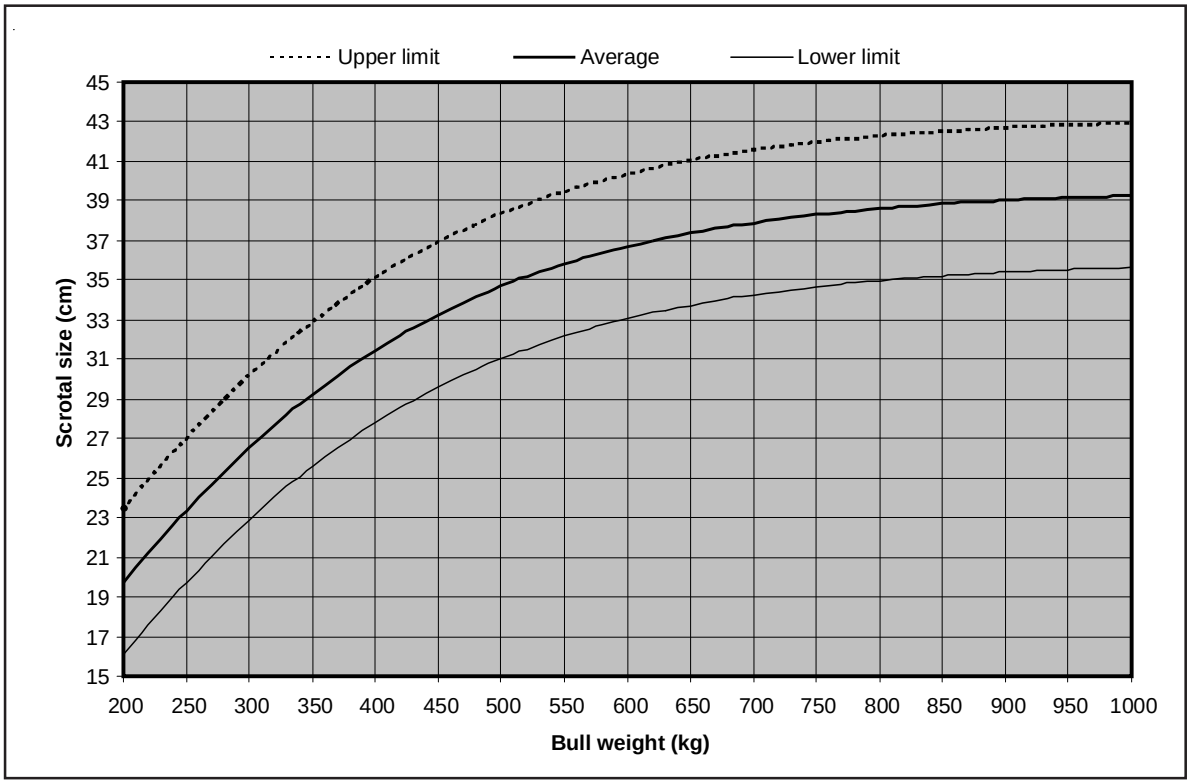


Figure 1 **Predicted scrotal circumference measurement for tropically adapted bulls according to their body weight.**

GRAZING LAND MANAGEMENT PACKAGE – PILBARA

Kath Ryan, Kununurra

There is a great opportunity for local input into the development of a Grazing Land Management (GLM) package that is relevant to Pilbara land managers. This package is part of MLA's EDGEnetwork®. The development of the Pilbara GLM package provides an opportunity to get locally relevant and up-to-date pasture growth tables to calculate the long-term carrying capacity for a defined management area. The package will incorporate local knowledge on fire, weeds and grazing management in the Pilbara.

An opportunity like this doesn't come along every day of the week, so here's a brief overview of the course:

The GLM workshop

This three-day workshop for land managers will assist you to:

- assess the condition of your paddocks and improve their carrying capacity
- understand the relationships between pasture, water, soils, woodlands, biodiversity, fire and weeds, and
- determine the financial impact of a range of grazing management options.

The workshop consists of seven modules, which are: understanding the grazing ecosystem; managing grazing; managing with fire; managing the tree-grass balance; pasture improvement and restoration; managing weeds; and developing a grazing management plan.

A locally-relevant case study property is used to explore different management options. You will help the owners of the case study property solve their management issues and develop a GLM plan. At the end of each session you will work on your own issues and begin developing your own GLM plans.

Where we are at in December 2011

The recent pastoral industry survey of Kimberley and Pilbara businesses indicated that around 30% of those surveyed were interested in attending training in grazing land management. Partial financial support for DAFWA to develop the Pilbara GLM package has been approved by Meat and Livestock Australia.

Information was provided to the Pilbara District Consultative Committee meeting in early November, and DAFWA has since been contacting businesses and managers who may be interested in providing their input as part of the steering committee. The steering committee will ensure that the content of the course remains relevant to local issues and businesses.

A representative of the committee may be sponsored to attend a GLM workshop in another region during development of the Pilbara package and asked to provide feedback. The steering committee as a whole will be asked to appraise the Pilbara package at a trial run before it is finalised and signed off by MLA. Development officer Kath Ryan and the Northern Beef Development team will be putting it all together.

Comments from Kimberley GLM workshop attendees

Former Kimberley steering committee chair, Keith Anderson from Jubilee Downs, said that the time commitment required for the Kimberley GLM package was manageable along with all of his other commitments, and that having the opportunity to attend the Katherine GLM course during the development phase was very valuable as he tries to take every opportunity available to exchange ideas with other people in the cattle industry and technical experts from other areas.

Kevin Brockhurst of Larrawa station attended the Kimberley GLM course in 2009 and said that the most beneficial outcome for his business has been the ongoing consultation with deliverers, resulting in the implementation of ideas generated as part of the grazing management planning process demonstrated through the course.

If you are interested in more information about the Pilbara GLM package development, please contact:

Kath Ryan on 0467 738 906 or at the Kununurra office 9166 4015; or

Rebecca Dray at the DAFWA Karratha office 9143 7000.

NLIS National Livestock Identification System

Department of Agriculture and Food

NLIS Help Guide

NLIS Cattle / Buffalo

NLIS Support in WA

Beth Green, Vasse
9753 0302; 0414 260 514

Jack Nixon, Bunbury
9780 6222; 0427 089 860

Evan Armstrong, Bunbury
9780 6227; 0427 988 497

Email: nlis@agric.wa.gov.au

DAFWA website
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Email: nlis.support@mla.com.au

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Livestock Production Assurance & National Vendor Declaration waybills
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Email: lpa@mla.com.au
Website: **www.mla.com.au**

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Farran Dixon, Bunbury 9780 6202
Local Stock Inspector ……
Email brands@agric.wa.gov.au

DAFWA website
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property or contact details update
cancellation
transfers

Farmnotes

Interstate & Overseas Movement

Inspector in Charge (stock)
Garry Hodgen, South Perth 9368 3370

DAFWA website
www.agric.wa.gov.au & search on *livestock movement*

→ **Livestock movement into, within and out of WA**

NLIS Sheep / Goats

Roy Butler, Merredin, 9081 3111
Kathy Saunders, Northam 9690 2000

DAFWA website
www.agric.wa.gov.au & search on *NLIS sheep*

→ **NLIS Sheep & Goats in WA:**
Online access to DVD and booklet –
Sheep and Goats – What you need to know

Fact sheets
Farmnotes

DAFWA CONTACTS FOLLOWING RANGE CONDITION MONITORING WORKSHOPS IN THE SOUTHERN RANGELANDS

The Department of Agriculture and Food (DAFWA) would like to thank all landholders who participated in the Range Condition Monitoring workshops during September and October in the southern rangelands. DAFWA staff particularly enjoyed the opportunity to work with producers in the field, sharing knowledge on plant identification, discussing what plants are desirable and undesirable and installing monitoring sites. There were 19 workshops completed and combined there were approximately 253 participants. A big thank you also goes to each respective host who did a fantastic job catering, preparing the venue and entertaining at each workshop—your cooperation was appreciated.

Below is a list of DAFWA officers who participated at the various workshops. Please give them a call regarding any queries you have on monitoring site selection, plant identification or data collection. Best of luck installing the required RMS sites on your lease in 2012—if you have not already done so!

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Workshops are planned for the Pilbara in April 2012 and Kimberley in May 2012. The Pastoral Lands Board will firm up dates and locations for respective workshops in your area in early 2012.

*Miles Williams (Innouendy station) at the Mt Narryer RCM workshop looking at a mulga broom bush (*Spartothamnella teucriiflora*)*

RANGELAND PLANT SPECIES IDENTIFICATION USING SURVEY REPORTS AS AN AID

Jim Addison, Kalgoorlie

Species identification is an important and sometimes challenging element of range condition monitoring. This article describes how to use local survey reports presented to participants at range condition monitoring workshops recently held in the southern rangelands, to help with species identification.

Step 1 Identify the land system where the plant is located using the station map supplied at the range condition monitoring workshop, e.g. Monk land system.

Step 2 Locate the page(s) in the survey report that describe the land system. In a majority of reports the land system descriptions are arranged in alphabetical order, usually in the latter part of the report.

Step 3 Using the schematic diagram of the land system to identify the land unit that best matches the location of the plant species in question, e.g. land unit 3 (see diagram 1 below).

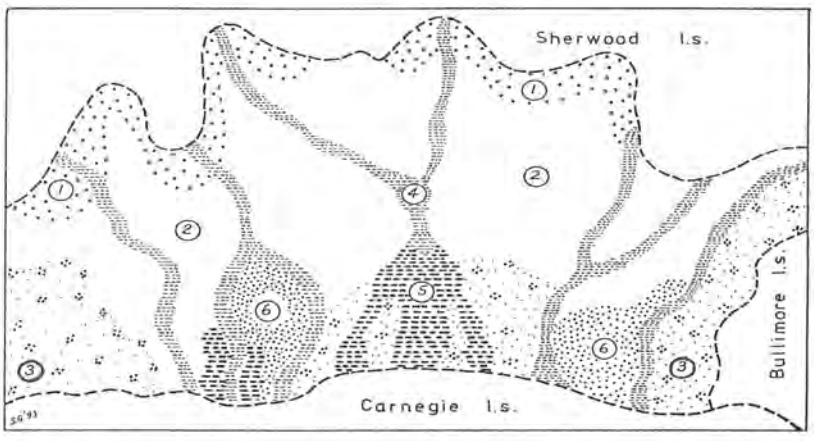
Landform: loamy tracts – level plains receiving diffuse run-on

Soil: red sand on hardpan or deep red earth

Vegetation: scattered *Acacia aneura* (mulga) shrublands with wanderrie grasses (MUWA).

MONK LAND SYSTEM (8162 km², 8.1% of the survey area)

Hardpan plains with occasional sandy banks, supporting mulga tall shrublands and wanderrie grasses.



Code Area (%)	Landform	Soil	Vegetation
1. PHG 3%	Stony hardpan plains - very gently inclined upper plains with quartz mantles; subject to sheet flow.	Shallow red earth with a stony mantle, on hardpan (4e).	Scattered to very scattered *Acacia aneura* (mulga) tall shrublands (HPMS, SAES).
2. PLH 45%	Hardpan plains - extensive, level to very gently inclined plains subject to sheet flow and with occasional contour-aligned arcuate drainage foci.	Red earth on hardpan at variable depth, (4d, 4g).	Generally scattered *A. aneura* tall shrublands, denser in groves (HPMS, GRMU).
3. PLO 40%	Loamy tracts - level plains receiving diffuse run-on.	Red sand on hardpan or deep red earth (1e, 4g).	Scattered *A. aneura* tall shrublands with wanderrie grasses (MUWA).
4. DRN 6%	Narrow drainage tracts - sparse to widely spaced, narrow (< 50 m wide) sub-parallel and unchannelled concentrated drainage zones on units 1 and 2.	Shallow red earth on hardpan or deep red earth (4d, 4g).	Scattered to moderately close *A. aneura* tall shrublands (DRMS, HPMS).
5. DRW 3%	Broad drainage tracts - drainage tracts up to 500 m wide.	Deep red earth (4g).	As for unit 3.
6. BAS 3%	Sandy banks - irregular low (typically < 30 cm relief) sandy banks usually found in lower sectors.	Deep sandy-surfaced red earth on hardpan (4f).	Scattered *A. aneura* tall shrublands with wanderrie grasses (WABS).

Diagram 1 **Schematic diagram of Monk land system and description of six land units within that land system. Source: North-Eastern Goldfields survey report pg. 248**

Step 4 In the survey reports are tables that identify 'site types' (see diagram 2 below). Site types in survey reports have variously been referred to as habitat, pasture or vegetation types. The site type for land unit 3 in the Monk land system is Mulga wanderrie grassy shrublands (MUWA, site type 3).

Table 1. Site type groups and their component site types

Site type group	Site type
1. Sandplain spinifex hummock grasslands	1. Sandplain spinifex hummock grasslands (SASP)
2. Acacia shrublands on deep sandy soils	2. Sandplain acacia shrublands (SACS)
	3. Mulga wanderrie grassy shrublands (MUWA)
	4. 'Lateritic' mulga wanderrie grassy shrublands (LMWS)
	5. Wanderrie bank mulga grassy shrublands (WABS)
	6. Calcareous plain eucalypt mallee/acacia woodlands/shrublands (CEAS)
3. Woodlands/shrublands on groundwater calcretes associated with ancient drainage valleys	7. Calcyphytic casuarina acacia woodlands/shrublands (CCAS)
	8. Calcrete platform woodlands/shrublands (CAPW)
4. Mixed halophytic low shrublands on depositional plains	9. Plain mixed halophyte low shrublands (PXHS)
	10. Eucalypt chenopod woodlands (PECW)
	11. Samphire low shrublands (SAMP)

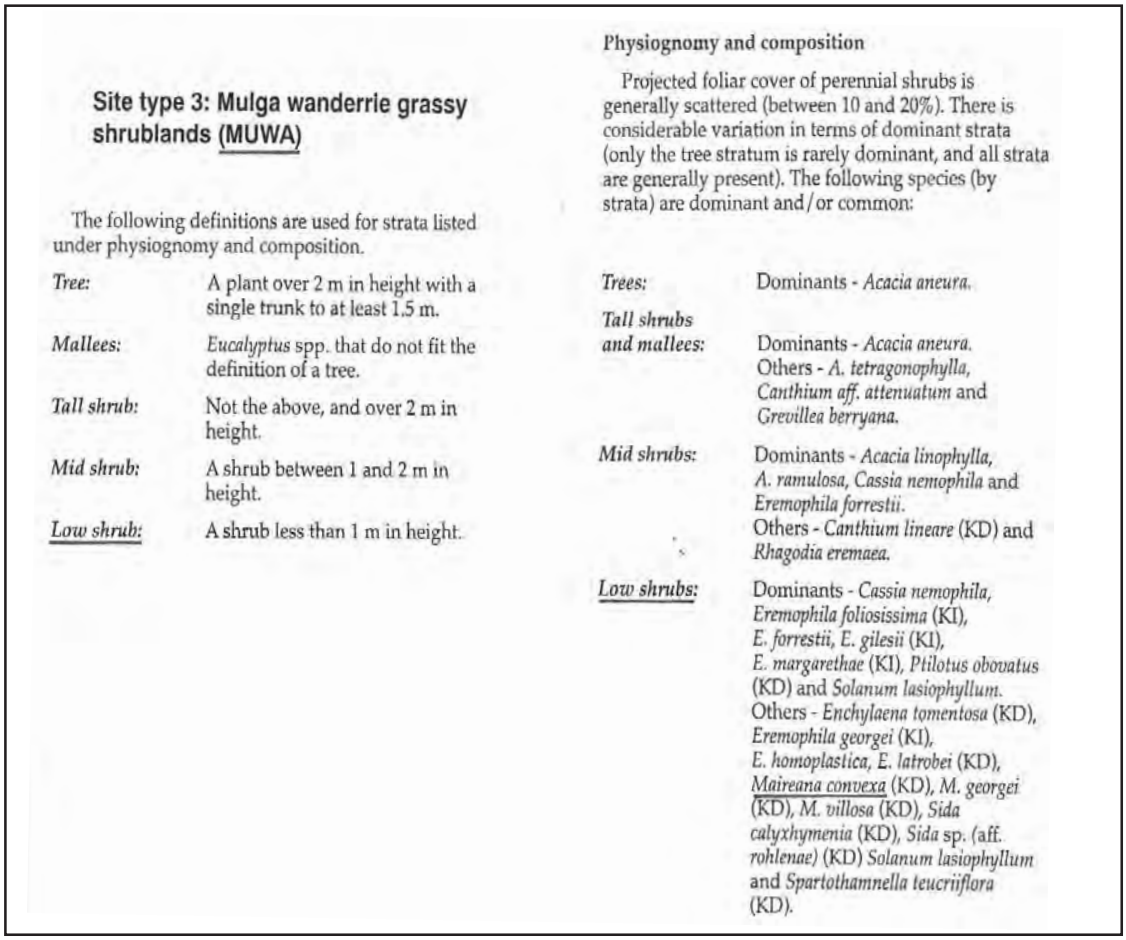
Diagram 2 **Site type groups and their component site types.**
Source: North Eastern Goldfields survey report pg. 129

Similar information on site types, habitat, pasture or vegetation types exists in other reports. Locations within various reports are shown below.

Survey report	Site type data	Location in report
North-Eastern Goldfields	Table 1. Site type groups and their component site types	Page 129
Murchison River catchment and surrounds	Table 15. Major vegetation types, Murchison River catchment	Page 287
Pilbara region	Table 1. Site type groups and their components site types	Page 127
Ashburton River catchment	Table 25. Carrying capacity of pasture lands at three condition levels	Page 49
Lower Murchison River area	Table 6. Vegetation groups and their component vegetation types	Page 48
Sandstone-Yalgoo-Paynes Find area	Table 1. Habitat groups and their component habitats	Page 133
The Western Australian part of the Nullarbor region	Table 18. Habitat type groups and their component habitat types	Page 142
Carnarvon Basin	Table 28. Summary of pasture types of the survey area	Page 264
Broome Shire	Table 12. Summary of pasture type areas	Page 50

Step 5 Within each site type dominant and/or common species by stratum type are listed. Determine which stratum the plant species in question occupies, e.g. trees, tall shrubs and mallees, mid shrubs, or low shrubs. For this example, we chose the low shrubs group. See diagram 3 below.

Step 6 Using a field reference book or other plant identification resource, e.g. 'Florabase', Rangelands Infonotes, look up the plants listed for the stratum. The chances are that the species in question will be amongst this group, e.g. mulga bluebush (*Maireana convexa*), a desirable 'decreaser' shrub species.



Site type 3: Mulga wanderrie grassy shrublands (MUWA)

The following definitions are used for strata listed under physiognomy and composition.

Tree:	A plant over 2 m in height with a single trunk to at least 1.5 m.
Mallees:	*Eucalyptus* spp. that do not fit the definition of a tree.
Tall shrub:	Not the above, and over 2 m in height.
Mid shrub:	A shrub between 1 and 2 m in height.
Low shrub:	A shrub less than 1 m in height.

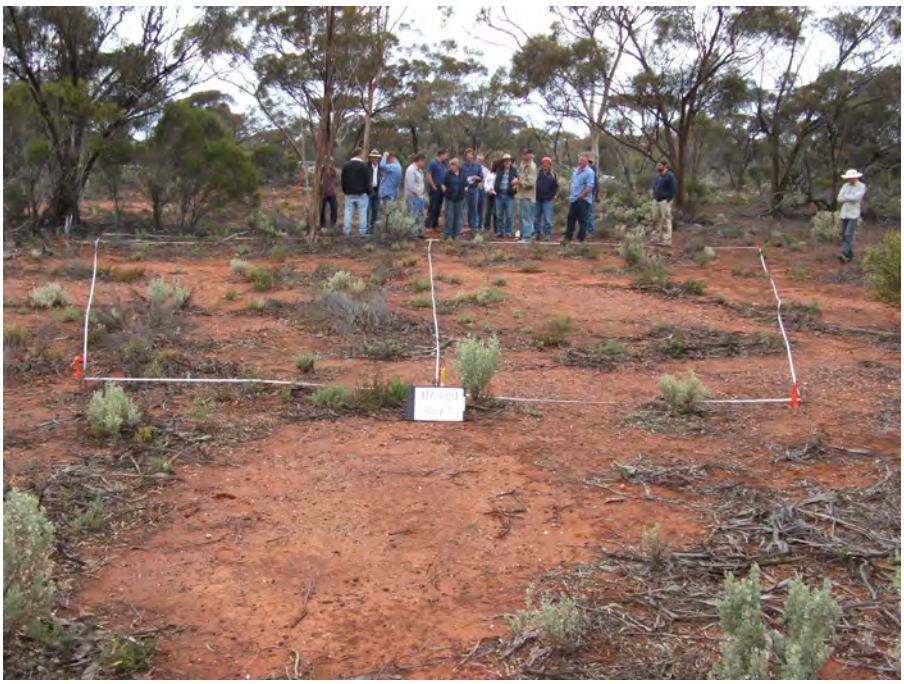
Physiognomy and composition

Projected foliar cover of perennial shrubs is generally scattered (between 10 and 20%). There is considerable variation in terms of dominant strata (only the tree stratum is rarely dominant, and all strata are generally present). The following species (by strata) are dominant and/or common:

Trees:	Dominants - *Acacia aneura.*
Tall shrubs and mallees:	Dominants - *Acacia aneura.* Others - *A. tetragonophylla, Canthium aff. attenuatum* and *Grevillea berryana.*
Mid shrubs:	Dominants - *Acacia linophylla, A. ramulosa, Cassia nemophila* and *Eremophila forrestii.* Others - *Canthium lineare* (KD) and *Rhagodia eremaea.*
Low shrubs:	Dominants - *Cassia nemophila, Eremophila foliosissima* (KI), *E. forrestii, E. gilesii* (KI), *E. margarethae* (KI), *Ptilotus obovatus* (KD) and *Solanum lasiophyllum.* Others - *Enchylaena tomentosa* (KD), *Eremophila georgei* (KI), *E. homoplastica, E. latrobei* (KD), *Maireana convexa* (KD), *M. georgei* (KD), *M. villosa* (KD), *Sida calyxhymenia* (KD), *Sida* sp. (aff. *rohlenae)* (KD) *Solanum lasiophyllum* and *Spartothamnella teucriiflora* (KD).

Diagram 3 **Dominant and/or common plant species for mulga wanderrie grassy shrubland (MUWA).**

If no information can be found regarding a plant species documented in a survey report, please contact your DAFWA office for assistance.



Hampton Hill RCM workshop participants standing behind their recently installed site.

RANGE CONDITION MONITORING – SITE SELECTION

John Stretch, Carnarvon

Whilst it is preferable that range condition monitoring sites be installed in fair condition locations, sites must first and foremost be broadly representative of the surrounding pasture situation. If desirable and undesirable plants are absent or rare in the pasture at your chosen site, intermediate value indicator plants can still be used in conjunction with other indicators of rangeland condition trend to 'tell the story' of what is happening on the ground in response to your management decisions.

It may be tempting to install sites in poor condition areas because at first glance it could seem that things can only improve from there; but note that these areas can and do decline to very poor condition. Poor condition pastures may be very slow (e.g. decades or longer) to respond to changes brought about by improved management.

The photograph below is an example of a poor condition stony-chenopod pasture where desirable and undesirable perennial vegetation is absent. The perennial vegetation present is wait-a-while (*Acacia cuspidifolia*), royal poverty bush (*Eremophila cuneifolia*) and Gascoyne mulla mulla (*Ptilotus polakii*). These plants have limited value as indicators of rangeland condition trend as their population can be expected to remain stable when subjected to sustained excessive grazing. All species are intermediate value plants—'cannot be used with any confidence as an indicator of the health of rangeland vegetation'. However, it is acknowledged that in some circumstances as range condition trend declines, these species can increase in density when there is reduced competition for water and nutrients from competing desirable plants.

Poor condition stony-chenopod pasture, Gascoyne mulla mulla in the foreground, wait-a-while (large tree in the background) and royal poverty bush at the tree base.

Changes in soil surface condition such as evidence of soil erosion (e.g. plant pedestalling, soil surface rilling and soil deposition) constitute another set of site attributes associated with range condition trend. The soil condition trend is likely to be of most importance at monitoring sites where desirable and undesirable condition indicator plants are absent.

Sites selected on fair condition pasture will tend to be more responsive over shorter periods of time, to changes made in stocking, grazing management practice and in response to seasonal flux. Consequently, RCM sites initially placed in areas of fair condition pasture (rather than on poor condition pasture) will be likely to make the task of explaining the trend a simple one.

PERENNIAL, SHORT LIVED AND ANNUAL PLANTS

John Stretch, Carnarvon

Perennial plants, whether grasses or shrubs, generally contribute more effectively to ecosystem sustainability than do annuals. Relatively short-lived plants such as cotton bush (*Ptilotus obovatus*) rapidly respond to seasonal flux and hence their decrease in drier times. These plants have a much more limited indicator value when compared with long-lived species such as rhagodia (*Rhagodia drummondii*).

Similarly with grasses; monitoring the density of wind grass (*Aristida contorta*) and limestone grass (*Enneapogon caerulescens*) would show plant density changes resulting from seasonal conditions and not management. Better choices of grasses to monitor would be silver speargrass (*Stipa elegantissima*) and neverfail (*Eragrostis setifolia*). Both species are long-lived (perennial) and an increase in their density would be desirable and reflect an improving trend in range condition.

The presence and number of perennial grasses in your pastures is a result of grazing management decisions, particularly the palatable perennial grasses which are keenly and preferentially sought by grazing animals, as these most readily deliver energy to the herbivore diet. In stony chenopod pasture, curly windmill grass (*Enteropogon acicularis*) recruitment is often an early positive sign of an improving trend in range condition. In general, any grass is good grass in the shrublands because it holds the soil together, reduces runoff and can improve the condition of the existing soil surface by trapping litter and improving infiltration.

The desirability and density of perennial grasses present on a range condition monitoring site, along with your other site data, is a most useful set of information and should be acknowledged in the site recording sheet.

As part of the RCM methodology, producers are not required to discriminate between perennial grass species; there is only a requirement to record the 'number of live perennial grass butts present'. However, producers are encouraged to identify the different grass species growing and record the number of butts within each species on their site sheets for future reference.

*Windmill grass (top right) and bardi bush (*Acacia victoriae*) growing in the refuge of a needlebush (*Hakea preissii*).*

DESIRABLES AND UNDESIRABLES

John Stretch, Carnarvon

Two classes of pasture plant are particularly helpful in the determination of range condition trend at a range condition monitoring site. Namely those plants that are most preferred by the grazing animals (desirable) and those that are least palatable (undesirable).

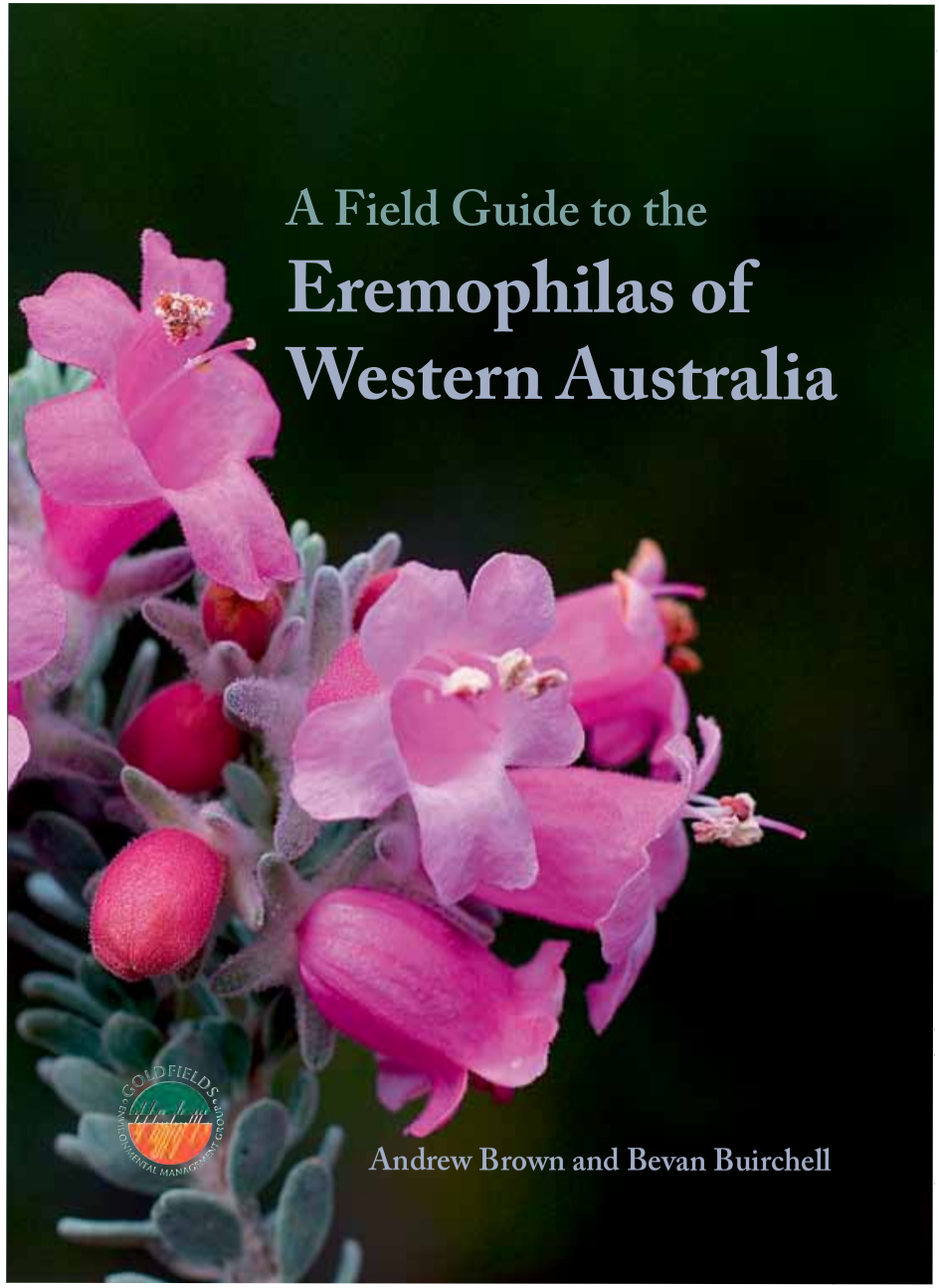
The photograph below shows a riparian association pasture community in the Gascoyne River delta in poor condition. The four perennial indicator plants in order of palatability from high to low are:

1. climbing mulla mulla (*Ptilotus divaricatus*) [photo insert]
2. broom bush (*Exocarpus aphyllus*) in the foreground
3. curara (*Acacia tetragonophylla*) in the background, and
4. cotton bush (*Ptilotus obovatus*) at the base of broom bush and cuara plants.

The climbing mulla mulla persists only at the base of the curara—in a protected niche location. The cotton bush population is a variable one, highly responsive to seasonal change. Nevertheless, the relative high abundance of cotton bush has been brought about and is sustained by a high level of grazing pressure. This lessens the competition cotton bush would otherwise face for light and nutrient resource from other desirable shrubs, for example climbing mulla mulla. A local rabbit population has contributed to the absence of perennial grasses.

Close-up picture of climbing mulla mulla

Typical riparian association pasture community



A Field Guide to the Eremophilas of Western Australia

Andrew Brown and Bevan Buirchell

Written by two of Western Australia's most knowledgeable enthusiasts and featuring over 800 colour photographs, this comprehensive guide covers all 186 formally described *Eremophila* species and 46 subspecies found in Western Australia. It also includes 33 currently undescribed species and 24 subspecies that are considered distinct, many of these discovered by the authors during their extensive travels into the outback.

A Field Guide to the Eremophilas Western Australia is a comprehensive resource for botanists, hardened enthusiasts and initiates alike and contains everything they need, including:

- A detailed introduction to the genus *Eremophila*.
- Species placed in alphabetical order to make it easier to find those that are being identified.
- Up to three photos for each species showing important diagnostic features.
- Information on each species, including who named them and where they were first collected, habitat, distribution, flowering period, size, and distinguishing features.
- Maps showing where each species is found.

Eremophila fraseri F.Muell. subsp. *fraseri* Burra

Derivation of name: Named in honour of Sir Malcolm Fraser, a former Western Australian surveyor general and colonial secretary.

Flowering: March–November.

Description: A resinous shrub or small tree 1 to 5 m high with green to yellowish-green leaves 25 to 48 mm long by 18 to 28 mm wide, dull brownish-green to colourful pinkish-red sepals 15 to 35 mm long by 11 to 22 mm wide and a white, cream, pink and fawn corolla 20 to 35 mm long. It is distinguished from the subspecies *parva* by its larger leaves and from the related *Eremophila galeata* by its glabrous branches, dull new leaves, thin dorsal sepal and a generally more north-westerly range of distribution.

Distribution & habitat: Found between Leonora, Newman and Shark Bay, growing in rocky soils on flats and the sides of rocky hills.

Notes: A very common *Eremophila* named by Ferdinand von Mueller in 1878 from specimens collected in the Hamersley Range by Sir John Forrest.

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RANGE CONDITION MONITORING – MANAGING RANGE CONDITION TREND

Jim Addison, Kalgoorlie

Range Condition Monitoring is an objective process whereby range condition trend is assessed. A major driver of trend is the level of total grazing pressure over time. Managing grazing pressure so that negative condition trend is minimised requires an understanding of:

1. the carrying capacity of the lease
2. stocking rate
3. how to measure both, and
4. how to manipulate the stocking rate to remain within carrying capacity.

Carrying capacity

Carrying capacity is best discussed in terms of long and short-term carrying capacity. The long-term carrying capacity is the average number of animals that a paddock can be expected to support over a planning horizon (10–15 years) and the short-term carrying capacity is the number of animals that a paddock can support for a set period of time—a week, month, season or year.

This article will focus on the short-term carrying capacity (STCC). The STCC changes from year to year in response to vegetative growth or decline as a result of consumption by grazing animals. Managing STCC requires the land manager to balance the amount of forage on offer against the forage demand.

Stocking rate

Stocking rate is expressed in grazing area (ha) per dry sheep equivalent (DSE) or cattle unit (CU) for a nominated period of time. It is common to use 12 months as the time period. An example would be 30 ha/CU/12 months. A paddock's stocking rate will change with seasonal conditions and stock reproduction, death, transfers in/out, and impact of non-domestic grazers. For mathematical simplicity one CU is equivalent to seven DSE.

Forage budgeting

A desirable livestock production and land management aim is to align the short-term carrying capacity of a paddock or water with the stocking rate. This can be achieved by completing a forage budget (also known as a feed budget).

Forage budgeting is used to calculate the balance between forage demand and supply. Forage budgeting denotes available forage (quantity/quality) per unit area, e.g. kilograms of forage per hectare (kg/ha). Once the amount of available forage is calculated then the DSE or CU grazing days/ha can be calculated.

In open range cattle operations the short-term carrying capacity expressed as CU days/water point is often used. CU days/water point/100 mm rainfall is also a useful carrying capacity descriptor as it allows management to review yearly pasture performance over variable seasonal conditions.

Reconciliation between a paddock's short-term carrying capacity and stocking rate can be achieved by manipulating the stocking rate, for example adjusting DSE or CU numbers in the paddock, or by manipulating the length of time stock spend in the paddock, and/or both. For example: 200 DSE for 150 days is the same stocking rate as 140 DSE for 214 days.

For further information on forage supply and demand assessment/calculation, together with feed budgeting and stocking rate manipulation strategies, contact your DAFWA office.

GASCOYNE SPURGE

John Stretch, Carnarvon

Gascoyne spurge (*Euphorbia boophthona*) is an annual or potentially biennial upright grey-green plant that branches repeatedly in its upper parts. Mature plants are umbrella-shaped or rounded in form, occasionally reaching as much as a metre in height where growing conditions are optimal but no more than 30 cm at other times. The leaves are arranged oppositely and are narrow with toothed margins. The freshly broken stems exude a sticky, white, milky sap that is irritant and corrosive to body membranes, particularly the eyes and mouth.

There is a heavy build-up of this potentially toxic plant in parts of the west Pilbara, Gascoyne and Murchison; responsive to the exceptional late 2010 and early 2011 summer rainfall. The plant represents a poison threat for inexperienced weaner stock and for mobs of recently purchased cattle; whereas settled and resident cattle may occasionally consume the plant to a limited extent, without danger. However, the stress associated with the mustering and movement of stock places all classes of stock at risk.

Gascoyne spurge is most commonly found on red sands or sandy loams, particularly adjacent to established shrub and tree mounds. It is present from the Murchison and Gascoyne, through much of the Northern Territory and in western Queensland and north-western New South Wales.

The plant's common name serves as a reminder that for many years this plant was the cause of serious mortalities in sheep and cattle that travelled the Gascoyne Stock Route. The 1981 edition of Everist's *Poisonous Plants of Australia* advises symptoms are strongly suggestive of HCN (prussic acid) poisoning: accelerated and deepened breathing, irregular and weak pulse, salivation, frothing at the mouth, spasm and twitching, staggering gait, dilation of the pupils and pronounced bloat. The heart usually continues to beat for some time after breathing has ceased.

Close-up view of Gascoyne spurge leaf and fruit; note the opposite leaves and their toothed margins.

Gascoyne spurge in background and selection of branches in foreground.

WoNS MANAGEMENT IN THE PILBARA

Linda Anderson, Pilbara Mesquite Management Committee Inc.

The Pilbara Mesquite Management Committee (PMMC) has been feverishly working away in the region, delivering a number of projects on behalf of groups including Rangelands NRM, Caring for Our Country and the Western Australian Government's State NRM Program.

Since our inception, the core business of the PMMC has been to provide regional support and coordination for research, strategic management and control of mesquite. The recent changes in investment priorities by state and federal governments has allowed us to evolve into a broader weed reference group, taking on the challenge of incorporating parkinsonia and calotropis management in the Pilbara.

Current projects

Most recently, the PMMC has been supported and funded by Rangelands NRM and the Western Australian Government's State NRM program, with parallel projects that looked at:

- aerially surveying the Pilbara for mesquite and parkinsonia
- developing Weed Action Plans with pastoral station managers
- increasing the skills of local workforces with one-on-one weed control training programs, and
- providing temporary employment opportunities to further these skills with on-station work.

These projects are due for completion at the end of 2011, with the key achievements to date being:

- 70% of stations with mesquite and/or parkinsonia developed Weed Action Plans
- 70% of stations with mesquite and/or parkinsonia undertook on-ground control of these weeds, with herbicide or machinery treatment
- four mining companies undertook weed control on active and exploration tenements – Fortescue Metals Group, Citic Pacific Mining, Onslow Salt and BHP Petroleum
- a total area of 60 000 hectares and 600 km of river was controlled of mesquite and parkinsonia.

Future activities

To ensure that regional coordination of mesquite and parkinsonia programs in the Pilbara continue, the PMMC is set to investigate formal partnerships with local industry groups to fund core activities. We have a combined secured funding base of almost $700 000 to spend on project activities between November 2011 and June 2013. Partnerships with Rangelands NRM, the Western Australian Government's State NRM Program and Royalties for Regions have provided this funding.

The PMMC will continue to work with land managers, to increase participation in on-ground control projects to 95% of all pastoral stations. We will be finalising the remaining 30% of Weed Action Plans to ensure that all mesquite and parkinsonia infested pastoral stations have current, up-to-date action plans. Training and temporary employment opportunities will form a focal point of our projects.

To ensure a sustainable future and longer term positive outcomes, a need for regional strategies for WoNS management is paramount. These will guide any public or private investment available to weed management programs into key areas and with clear outcomes. Through these projects the PMMC will update the Pilbara Mesquite Management Strategy, and develop a regional parkinsonia strategy.

FITZROY RIVER CATCHMENT EROSION CONTROL WORKSHOPS

Melanie McDonald, Northern Rangelands Landcare Facilitator, Broome

During the second week of August, 20 station owners, managers, staff and contractors representing nearly 2.5 million hectares attended a series of Erosion Control Workshops across the Fitzroy River Catchment. DAFWA and Rangelands NRM were pleased to bring Darryl Hill from Soil Save across from the Northern Territory to share his experience in reducing erosion along graded roads and fencelines. Darryl's methods not only reduce the incidence of erosion but also save time and money.

After a short theory session in the morning, most of the day was spent out on site. An erosion problem was looked at and solutions discussed. Usually the washout (effect) was left and it was up to the top of the hill to work on what was actually causing the problem. All participants learned how to use a dumpy and laser level to peg out a diversion bank. Diversion banks were constructed to intercept overland flow and divert water to a pegged level sill that would overflow into a vegetated area. After Darryl demonstrated the construction of one bank the grader was handed over to one of the attendees to try their hand and learn how easy it is to use his methods, providing you are a competent grader operator!

Feedback received by those who attended the workshops was overwhelmingly positive and we hope to run further workshops within the WA Rangelands next year.

Everyone who attended the workshop received a copy of *Erosion in The Savannah Rangelands*, a three-part DVD series which covers techniques used at the workshop and producer experiences.

Erosion in the Savannah Rangelands:

- Part 1: Rehabilitation Techniques
- Part 2: Drain and Bank Installation
- Part 3: Erosion on Formed Roads

If you are interested in attending an erosion workshop in the future or receiving a copy of the DVD, please contact Mel McDonald, Northern Rangelands Landcare Facilitator on 9192 5212 or melaniem@rangelandswa.com.au.

Rangelands NRM
Western Australia

Examining a completed diversion bank at Liveringa station.

AUSTRALIAN RANGELAND SOCIETY CONFERENCE TO BE HELD IN KUNUNURRA, WESTERN AUSTRALIA 23–27 SEPTEMBER 2012

The 17th Biennial Conference of the Australian Rangeland Society (ARS) is to be held in Kununurra from Sunday 23 to Thursday 27 September 2012.

The ARS is an independent and non-aligned association of people interested in the management and sustainable use of resources in natural or semi-natural landscapes. The Society provides a forum for the free exchange of ideas and information amongst people who live remotely or are concerned about rangeland issues. The Society has a membership of around 350 scientists, extension officers, consultants, land administrators, pastoralists and other people with an involvement in, affinity for and/or interest in the rangeland. The Society is active in promoting the science and art of rangeland management, and publishes an international journal, a newsletter, and maintains a website (www.austrangesoc.com.au).

The conference hopes to attract a broad and lively mix of natural resource professionals, those who manage rangeland for pastoral, tourism, conservation and cultural purposes, scientists and students to discuss rangeland use and management. The conference theme is *Celebrating diversity – people, place and purpose*, and Kununurra provides a fitting location for this. The theme recognises the huge variety of landscapes and habitats in the rangelands, the rapidly changing environment for pastoral, agricultural, tourism and mineral development in northern Australia, and the increasing role of Indigenous people in rangeland management and development. While some of the drivers for change in rangeland relate to the domestic economic and regulatory environment, global trends and forces are playing an increasing role. For this reason it is interesting to note that the keynote speaker for the conference will be Dr Jerry Holechek from the USA. He will be discussing how global trends in population, energy use, water use and climate impact on rangeland and rangeland users, and what the implications are for policy development, land use and management, conservation and production.

A feature of the conference will be a land users Q&A forum, where the focus will be on the practical issues facing pastoralists and other rangeland managers. The conference program will also cover topics such as: fire and grazing pressure on innovative livestock production systems; impacts of climate; land use planning for multiple users and uses; understanding and assessing ecosystems and impacts; and rangeland policy development. Conference tours are planned to reflect the range of interests and activities. Therefore, the conference represents an ideal opportunity for rangeland managers to learn about the latest ideas/trends/issues/solutions in the rangelands.

The conference will include spoken presentations, case studies and structured poster viewing. Expressions of interest for the presentation of a paper, case study or a poster should be prepared by mid March 2012 (details are in the brochure). Abstracts should be sent to enquiry@meetingmasters.com.au. Authors will be advised of acceptance shortly after this date. Completed papers and abstracts will be due in May 2012. The organising committee encourages and will assist landholders and tertiary students to participate.

All bookings for accommodation at the conference should be made through our conference partner, the Kununurra Visitor Centre (freecall 1800 586 868, or email info@visitkununurra.com.au), with delegate registration available online at www.austrangesoc.com.au from May 2012.

For any enquiries on the conference, contact Paul Novelly at pnovelly@agric.wa.gov.au.

DEVELOPING A STANDARD OPERATING PROCEDURE FOR THE FIELD IMMOBILISATION OF LARGE FERAL HERBIVORES IN JUDAS CONTROL PROGRAMS

Andrew Woolnough and Ken Rose, Vertebrate Pest Research Section, DAFWA

Introduced large herbivores, such as feral donkeys and feral camels, cause significant and undesirable impacts on the Australian landscape. These impacts can be economic, environmental and/or social. The challenge is to reduce these impacts where possible.

For these large herbivores, the optimum method of removing them from the landscape is by aerial shooting. This has been successfully applied to rapidly reduce populations (e.g. the Bovine Tuberculosis Eradication Campaign 1970–1992). The effort associated with aerial control increases as animal density declines. Consequently, the Judas technique was initially developed to improve the efficiency of feral goat control efforts at low density populations. In Western Australia, a successful Judas program has been undertaken since 1994 for feral donkeys, following the pioneering work of Mick Everett and Andrew Johnson (DAFWA Derby).

The premise behind the Judas technique is that a marked animal (e.g. fitted with a radio collar) betrays the location of other animals. Fitting a radio collar to a donkey requires that the animal is immobilised and this is achieved by darting it from a helicopter. Current attitudes to animal welfare dictate that all animals are treated and handled humanely, in accordance with Codes of Practice and Standard Operating Procedures appropriate to the class of animal. Moreover, modern practice requires that animals are sedated and anaesthetised against trauma where possible, rather than just immobilised to facilitate the procedure. With financial support from the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), the Department of Agriculture and Food (DAFWA) and the Flinders University set about developing new Standard Operating Procedures for the capture and restraint of feral donkeys (DAFWA) and feral camels (Flinders University).

Dr Jordan Hampton (a consultant veterinarian) and Neville McInerney (biosecurity officer, Port Hedland) tested a new drug regime for feral donkeys in the Pilbara. Their work developed a new protocol to safely and efficiently capture feral donkeys then attach collars to them. As an added bonus, 14 more Judas donkeys are now in operation in the Pilbara.

The general conclusion of the work was that a combination of medetomidine, ketamine and atipamezole proved to be suitable for the remote capture of feral donkeys. The use of these sedative drugs with analgesic properties represents a considerable improvement in animal welfare over the previous use of neuromuscular blockers as the sole capture drug. This new method allows a rapid, safe, cost-effective approach to the immobilisation of feral donkeys for use as Judas animals. Our next challenge is to get the new protocol into routine operation.

Jordan Hampton with a feral donkey being fitted with a Judas collar.

PLAN, PREPARE AND PROSPER WITH FARM PLANNING

The Farm Planning program, delivered by the Department of Agriculture and Food, provides workshops for farm businesses to build their skills in business planning. You don't have to be experiencing drought to apply.

This program is part of the Pilot of Drought Reform, a state and federal government initiative designed to move farm businesses from crisis management to a risk management approach. The aim is to better support farmers, farm businesses, their families and rural communities in preparing for the future.

The series of free workshops helps you update or develop a strategic business plan for your farm business. Learn how to prepare your farm business to better manage challenges including:

- variable seasons
- biosecurity threats
- regulation changes, commodity and financial market instability, and
- your personal and family wellbeing.

After completion of the Farm Planning Workshops, you can apply for up to $30 000 of funding under the Building Farm Business program, to plan for the future and manage challenges affecting your farm business. Funding is capped and limited grants are available on a first-come, first-served basis. Not all eligible farmers will be guaranteed a grant. For more information on grants visit http://droughtpilot.agric.wa.gov.au.

Participants from the 2010–2011 workshops say:

'The commitment is only five days and, if you are committed, will generate more discussion that will benefit the business for years to come.'

– Wendy McWhirter-Brooks and Grant Brooks, Dandaragan

'The workshop gave us a better idea of what we wanted to do and the costs involved. This allowed us to make more informed decisions about when and how to implement change.'

– Roger Tonkin, Coomberdale

Don't wait for it to happen – prepare and prosper. Register now for a free workshop near you, by logging on to http://droughtpilot.agric.wa.gov.au or Freecall 1800 198 231.

UPDATE: WILD DOG DNA STUDY

The Wild Dog DNA Study started in mid-2008 to contribute to the management of wild dogs in Western Australia. After collecting and analysing over 3500 samples of wild dog DNA, University of Western Australia PhD student, Danielle Stephens has recently submitted her PhD thesis. The April 2012 *Rangelands Memo* will include a report on the work she has completed and its relevance to wild dog management in Western Australia.

RISKS OF FEEDING MOULDY HAY TO LIVESTOCK

The Department of Agriculture and Food has received widespread reports of rain-damaged hay contaminated with black mould.

Department principal veterinary toxicologist Jeremy Allen said the fungi were likely to be 'sooty moulds' that reduced the nutritional value and palatability of the hay but did not cause the hay to become toxic through the production of mycotoxins.

'The department does not recommend feeding mouldy hay to livestock, however this year there is so much of it around that livestock are likely to be exposed to it,' Dr Allen said. 'The key to minimising potential health issues for stock is to ensure that damp hay is raked and dried effectively before baling.'

He said animals should be able to eat the black mould-affected hay safely, although dust from the mould will often reduce its palatability.

'It is best not to feed this material to horses or pregnant or breeding livestock, and when provided to other livestock, it should be as a supplement where there is some choice of feed,' Dr Allen said.

'If the fodder isn't dried sufficiently before baling, other fungi or bacteria may grow that could make the animals sick. Animals being fed this material should be observed for signs of ill health.

'If producers are considering feeding mouldy hay to livestock, it is worthwhile conducting a mould test to check for fungal load and unsafe fungi. Additional tests for toxins produced by fungi are available but are expensive and can be of limited value because of the uneven distribution of these toxins throughout the hay.

'There are also human health risks associated with baling and handling mouldy hay, including respiratory infection from the dust. There is also a fire risk associated with mouldy hay that is baled too soon. Anyone handling mouldy hay is reminded to wear protective clothing and a dust mask.'

Representative mouldy hay samples can be sent to the AGWEST Plant Laboratories in South Perth. Details are available by calling AGWEST Plant Laboratories on (08) 9368 3721 or emailing agwestplantlabs@agric.wa.gov.au.

Sooty moulds have established on these bales of hay – reducing their nutritional value and palatability.

LARRAWA STATION PRODUCER DEMONSTRATION SITE – UPDATE

Matthew Fletcher, Kununurra

In November 2011 the final round of field work on Larrawa station was completed as part of a producer demonstration site (PDS) to *investigate the practicality of regenerating degraded pastoral land.* Works completed in 2011 focussed on comparing the costs of using a 16G versus 12G grader to construct open ponds (to pond water to 10 and 15 cm depth respectively), and 250 m long water spreading banks. The difference in earthmoving capacity between the two machines is that the 16G has a 16 ft blade and the 12G has a 12 ft blade; and the 16G also has 86 kilowatts more power.

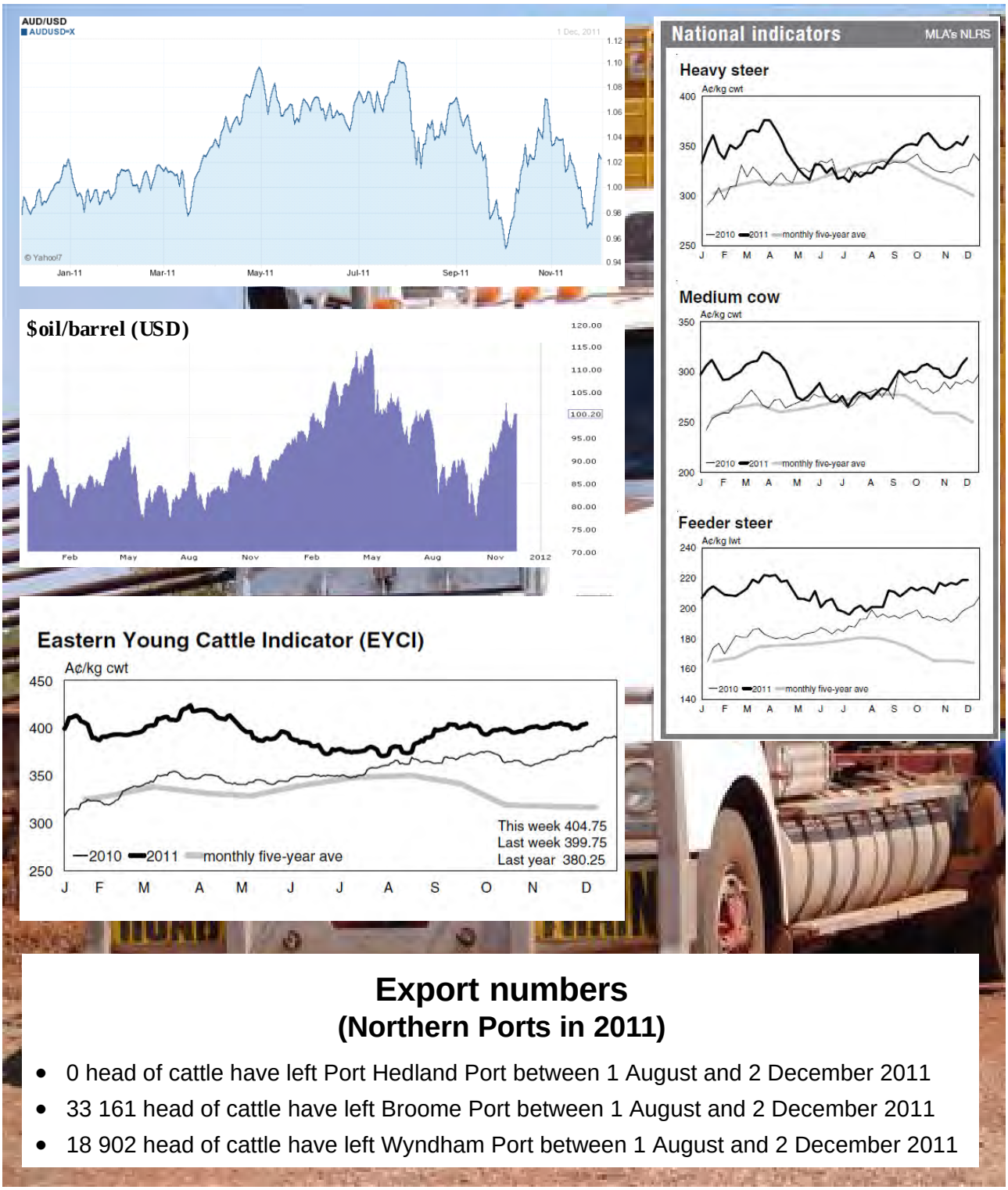
The PDS on Larrawa station is jointly funded by Meat and Livestock Australia, Rangelands NRM and the Department of Agriculture and Food. A field day at Larrawa station is planned for early 2012.

Larrawa regeneration monitoring site No.4 (pre-works) – photo taken 7 November 2011.

Larrawa regeneration monitoring site No.4 (post-works) – photo taken 10 November 2011.

Aerial view of a section of works in Collins and Lumbar paddocks on Larrawa station.

CATTLE MARKET UPDATE – 2 DECEMBER 2011



Export numbers
(Northern Ports in 2011)

- 0 head of cattle have left Port Hedland Port between 1 August and 2 December 2011
- 33 161 head of cattle have left Broome Port between 1 August and 2 December 2011
- 18 902 head of cattle have left Wyndham Port between 1 August and 2 December 2011

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