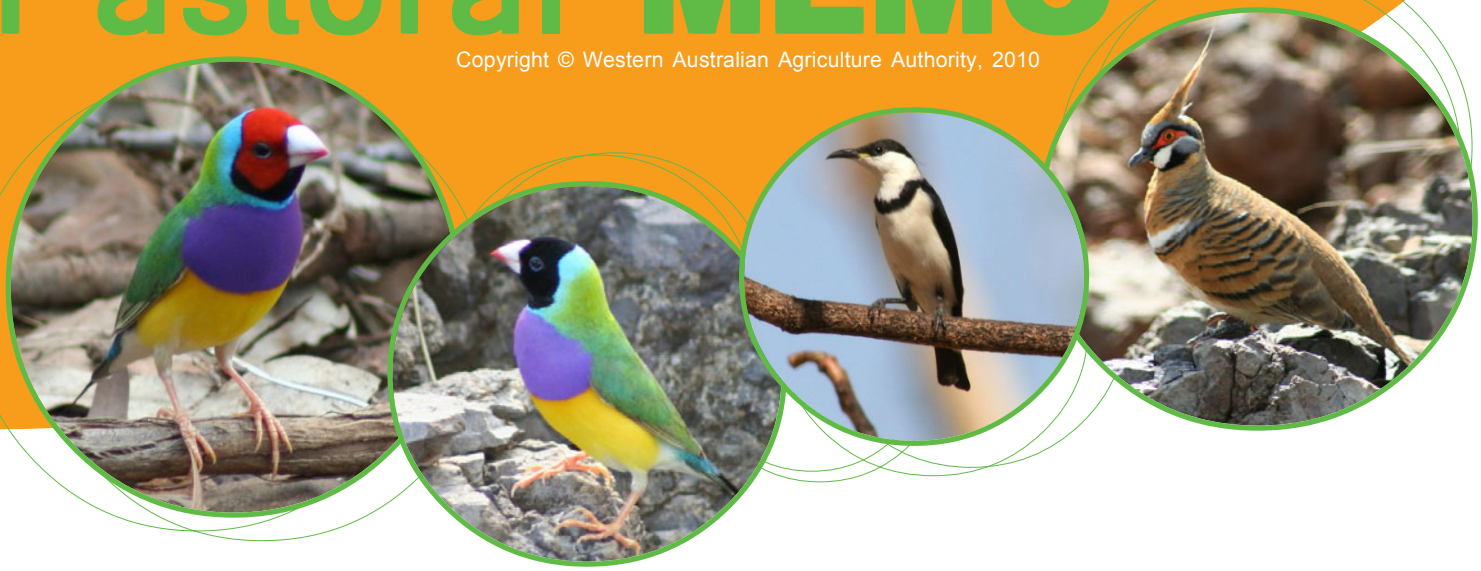
# Pastoral MEMO





# Southern Rangelands

PO Box 110, Geraldton WA 6530 Phone (08) 9956 8555 Facsimile (08) 9921 8016 Website www.agric.wa.gov.au

June 2010 ISSN 0726-9382 Vol. 16, No. 1

EDITOR: Greg Brennan

## Contents

A note from the editor ..... 2
Carbon Capture Project completed: The next step? ..... 3
WARMS monitoring and self-assessment monitoring methods ..... 6
Long-term destocking and recovery of pastoral rangelands ..... 7
Final survey for the heifer project ..... 11
National Arbovirus Monitoring Program (NAMP) improves market access ..... 12
Obstructive urolithiasis (bladder stones) in cattle ..... 14
Moving livestock off your property? Waybills are required ..... 16
Beef Up Forum – Port Hedland ..... 17
Cattle seminar for pastoralists and farmers at Bookara attracts a crowd ..... 18
The final countdown ..... 19
Improving the livestock supply chain between pastoralists and farmers ..... 20
Put your hand up if you like wasting money! ..... 23
WHPs/ESIs/GHPs/EAFIs/EGIs – what are livestock producers' legal requirements? ..... 25
Surprise greenhouse result for red meat ..... 27
Red and Grey kangaroos of the Southern Rangelands ..... 28
Is goat removal enough to allow ecosystem recovery in the Mid West rangelands? ..... 29
Climate change: a whole lot of hot air or…??? ..... 30
Southern Rangelands rainfall variability ..... 32
Recovering productive pasture capacity by soil rehydration ..... 33

GOVERNMENT OF WESTERN AUSTRALIA
Department of Agriculture and Food

# A note from the editor

*Greg Brennan, DAFWA, Geraldton (9956 8554)*

This is the last edition of the *Southern Rangelands Pastoral Memo*. In future there will be a single *Pastoral Memo* for the WA rangelands.

The pastoral industry is currently facing too many daunting challenges some of which are addressed in this issue. The Department of Agriculture and Food, WA is currently going through a period of restructure and all activities are being closely assessed on economic development merit. This scrutiny of return on investment is likely to continue into the future. In my experience, the return on government's investment is best when industry works closely with government. Such a joint venture approach requires strong industry leadership.

Industry leadership is demanding on the leaders and 'burn-out' can be the result unless carefully managed by peers and government. I am repeating the editorial I wrote in the December edition but I won't apologise. There is a big opportunity for the pastoral industry to deal with Biosecurity and Industry Development issues with a single leadership body. There are just not enough people to have two management groups and in many cases they are the same people. The Biosecurity and Agricultural Management legislation allows the Incorporated Bodies of the 'Recognised Biosecurity Groups' (RBG) to conduct activities in addition to Biosecurity.

RBGs taking on activities other than biosecurity, does not have to happen immediately. Managing the transition to an incorporated body and everything that entails is a big enough challenge in itself.

## REGISTER TO CONTINUE RECEIVING THE PASTORAL MEMO

If you wish to continue receiving the *Pastoral Memo*, please register your interest by completing the form below. Registration is **NOT** necessary if you are a Pastoral Leaseholder or a manager of a pastoral lease in WA.

First name or initials: ..... Surname: .....

Station name: .....

Postal address: ..... Postcode: ……..…..

Email address (optional): .....

***PLEASE FAX THIS FORM TO:*** (08) 9956 6354

***OR POST TO:*** Pastoral Memo, PO Box 110, GERALDTON WA 6531



*Front page photos courtesy of Mike Reed (Property Monitoring Services), Katherine.*
*Photos left to right: Gouldian Finch (male in red phase), Gouldian Finch, Banded Honeyeater and Spinifex Pigeon. Photos were taken on Lissadell Station.*

# Carbon Capture Project *completed: The next step?*

*Mark Alchin, Industry Development, Kununurra*

The *Carbon Capture Project* has now been completed and it has been successful in improving the present understanding of the opportunities and risks of carbon-based enterprises in the Kimberley–Pilbara region of WA. The study investigated the capacity of three pastoral businesses to create and trade carbon offsets.

The study made a number of key findings. These include:

1. Livestock methane and savanna burning are a major source of greenhouse gas emissions on the case study pastoral businesses (> 90% of the total). Emissions produced by the three case study businesses ranged from 0.02 to 2 t $CO_2$-e per ha per year or 2.2 to 10.9 t $CO_2$-e per cattle unit per year (inclusive of emissions from livestock methane, diesel and petrol consumption and savanna burning). As a 'yardstick' by which to compare these levels of emissions, a motor vehicle which travels 15 000 km a year emits approximately 3.1 t $CO_2$-e per year.
2. Carbon levels of the 12 land systems surveyed in this study ranged from 100 to 373.7 t $CO_2$-e per ha (inclusive of carbon stored in the trees, shrubs, coarse and fine roots, fallen logs and trees, standing grass, surface litter and the soil).
3. There was more carbon held in fallen logs and branches (coarse woody debris) and the soil (74% of the total) than in the woody vegetation on the Pilbara lease. In contrast, on the Kimberley leases more carbon was stored in the woody vegetation than in the fallen logs and branches and the soil.
4. The land systems which were highly productive and most suitable for cattle production had significantly more soil carbon.
5. The level of variability of the carbon estimates was considerable, but not unmanageable.
6. Stocking rate had no significant impact on the amount of carbon that was stored in the soil and vegetation at the survey sites.
7. Survey sites that were burnt every four to five years had more carbon stored in the woody vegetation compared to sites which were rarely burnt (one fire every 20 years) or regularly burnt (every second year).
8. There is a relatively strong relationship between groundcover and soil carbon for some land systems on the Pilbara pastoral lease (i.e. increased groundcover = increased soil carbon). However, the relationship is very weak to almost non-existent for land systems in the Kimberley region.
9. The carbon simulation model results suggested that full destocking and implementing a controlled savanna burning regime on the two Kimberley pastoral leases will biosequester the highest level of carbon. This is primarily because this management regime leads to a

substantial increase in the amount of carbon biosequestered in the woody vegetation and the reduced competition for soil nitrogen.

10. Based on the carbon simulation model output, we found that depending on the type of grazing and savanna burning regime that is adopted, at a whole lease scale, the gross income derived from the sale of carbon offsets could range from -$1.02 to $27.10 per ha per year (carbon price used was $10 t $CO_2$-e).
11. Much higher financial returns could be achieved if offset projects were conducted at much smaller spatial scales (< 10 000 ha) and on areas that are highly degraded with very low baseline carbon levels.
12. Managing landscapes principally for carbon offsets may have negative impacts on the socio-economic and environmental integrity of the pastoral businesses and the broader Kimberley–Pilbara region.

In summary, this study found evidence to suggest that a change in management practices on the case study businesses in the Kimberley–Pilbara region may increase the baseline levels of soil and woody plant carbon. We demonstrated that biosequestering carbon and livestock grazing are not mutually exclusive (i.e. they can both occur at the same time).

To assist the development of the WA Rangelands carbon industry the Final Report includes a number of recommendations to the WA State Government. These include:

1. Conduct a desk-top feasibility study to identify areas that would be suitable for plantation based carbon projects (Kyoto Protocol Article 3.3) in the WA Rangelands (with consideration of: tenure arrangements, water supply, agronomic issues, local employment and skills capacity, environment and conservation, indigenous heritage, synergies with other industries).
2. Develop a controlled savanna burning project in the North Kimberley, initially on lands held by the Department of Environment and Conservation (DEC), and then develop similar projects in areas which involve more complex tenure arrangements and cross-jurisdictional borders (i.e. partnerships across Northern Australia). This could be integrated with the current activities undertaken by the North Australian Indigenous Land and Sea Management Alliance (NAILSMA) and the Kimberley Land Council (KLC).
3. Develop effective business plans for controlled savanna burning projects which are applicable for the Kimberley Region and mutually satisfy the diverse interests of project participants.
4. Develop the existing partnerships with resource companies which are investigating the opportunities for Biofuel 1$^{st}$ generation and Bioenergy 2$^{nd}$ generation with the view of having a commercial scale project in operation within five years.
5. Identify management practices and technologies that reduce livestock GHG emissions and are applicable to the WA pastoral industry. This may require a targeted project or could be embedded in existing DAFWA rangeland extension projects (e.g. the co-funded Meat and Livestock Australia and DAFWA *Northern Grazing Systems Project*).
6. Undertake further carbon accounting field surveys in order to improve the accuracy of estimates of carbon pools in the WA Rangelands with a specific focus on areas which have the greatest capacity for change in the baseline level of carbon. These surveys should be undertaken in a way which will enhance the utility of remote sensing tools and other simulation modelling currently used for national carbon accounting purposes.
7. Provide institutional and technical support for commercial operators who may seek to commercialise the emission reductions from the removal of non-domestic grazers (e.g. emission reductions from the humane culling of feral camels).

8. Develop carbon project methodologies for reforestation and afforestation asset classes in the most 'deforested' areas of the state (e.g. more than 30% of the Gascoyne–Murchison region is degraded and therefore it is likely to have a very low carbon baseline).
9. Clarify the legal requirements necessary to trade carbon that is biosequestered in the native vegetation and the soil on leasehold land in the WA Rangelands. Identify any relevant changes that could be made to the Land Administration Act as a part of the DRDL Land Tenure Review process. Provide technical and policy advice in order to assist the private sector to secure the necessary Carbon Rights over the land area where these projects will occur.
10. Assist the WA Valuer General in determining the appropriate value of carbon credits that may be created under different carbon project methodologies on leasehold land to facilitate the application process for Carbon Rights on WA leasehold land.

DAFWA intends to take a lead role in the continued development of carbon based enterprises in the WA Rangelands. A *Rangelands Carbon Program* is being prepared in partnership with industry and other R&D agencies in order to maintain the momentum that has been generated by this project.

**If you wish to become involved in this initiative contact:**

**Mark Alchin Tel: (08) 9166 4017; M: 0408 092 691; Email:** mark.alchin@agric.wa.gov.au

**To obtain a copy of the final report go to:** www.agric.wa.gov.au **and search 'carbon'.**

**The Carbon Capture Project was an initiative of DAFWA, ChemCentre and Rangelands NRM and funded by the *Caring for Our Country* Program.**

## *Tura New Music festival at Wogarno Station, Mt Magnet*

*Hollis Taylor and Jon Rose (fence fiddler extraordinaire) with Rob and Marlene Edhouse and Dino of Wogarno Station. Wogarno hosted the Tura New Music festival in April this year. Jon Rose is world renowned for his 'fence music' which he makes using a violin bow. Hollis Taylor is a fiddler and researches the songs of the Pied Butcher Bird. The musicians and participants at this festival were intensely interested in the efforts of Meekatharra Rangelands Biosecurity Assoc. to rebuild the productive capacity of the land (http:// www.tura.com.au/news/index.html)*

# WARMS monitoring and self-assessment monitoring methods

*This article was printed in the last issue of the Memo without the WARMS Shrublands information, which is now included.*

Several questions and some misconceptions about Western Australian Rangeland Monitoring System (WARMS) sites on pastoral leases were discussed at the Halls Creek PGA meeting last year, prompting the following comparison between WARMS and self-assessment monitoring.

## *Differences & Similarities*

| WARMS monitoring | Self-assessment monitoring |
|---|---|
| **Responsibility** | |
| On-going **WARMS monitoring** conducted **by DAFWA** is **continuing** for the foreseeable future. | A **self-assessment monitoring** system to be carried out **by the lessee** has been sought and approved by the Pastoral Lands Board. |
| **Assessment and reporting capability** | |
| **Regional** monitoring provides **'trend-over-time' reports** on a large spatial scale. | **Lease** monitoring will provide **'trend-over-time' reports** at the lease and paddock scale. |
| **Method complexity** | |
| The method includes assessment of range condition, perennial pasture composition (**100 repetitions** in Grasslands and counting the **density of all shrubs** in defined transects in the Shrublands), landscape function, and a photographic record. | The method will include assessment of range condition, perennial pasture composition (**~25 repetitions in Grasslands**, a count **of the number of selected shrub species** within the site **in Shrublands**) and a photographic record. |
| **Site size** | |
| Site size is **2500 sq m** | Site size will be **121.5 sq m** |
| **Sites per lease** | |
| There are 1**600 sites** spread across the rangelands of WA (between nil and **12 sites per lease**). | Numbers of sites per lease will vary, but in most instances there will be fewer than **30 sites** per lease. |
| **Site location protocols** | |
| Strict protocols on site location and selection have been **developed specifically for WARMS**. | Guidelines on site location, selection and installation **specifically designed for the self-assessment monitoring system** will be provided by DAFWA. |
| **Re-assessments** | |
| Grassland sites are **assessed every 3 years** (one-third of all sites in a region assessed each year) and Shrubland sites **every 5 years** (one-fifth per year). | Sites will all be assessed by the lessee **at installation, and every 3 years after that** (one-third of all sites assessed each year after initial set-up). |
| **Reporting** | |
| Copies of site information and photographs obtained on a lease are **provided to the lessee for their records on request**. | Copies of site information data and photographic records obtained by the lessee will **must be provided to the PLB**. |
| **Uses of assessed information** | |
| Information from WARMS monitoring is used to answer the question, '**Are WA's rangelands changing, and if so, are they improving or declining?**'. | Information from the monitoring sites **provides evidence (objective data) to support the lessee's assessment of change in range condition** on the lease. |
| **Comparison of information** | |
| Information from WARMS monitoring **gives the regional context for changes in range condition observed at lease scale**, e.g. is the regional trend positive, negative or stable? | Information from self-assessment monitoring **may be compared with regional information** (from WARMS) to see if regional changes are reflected locally. |
| | **Lastly…** |
| | **Audits** of self-reported information may be required by the PLB. |

**In summary:**

| **WARMS monitoring** | **vs.** | **Self-assessment monitoring** |
|---|---|---|
| Coverage: all of WA rangelands | vs. | coverage: one pastoral lease. |
| More detailed, slow and complex assessment | vs. | less detailed, quick and simple assessment. |
| Larger sites, fewer sites per lease | vs. | smaller sites, more sites per lease. |

# Long-term destocking and recovery of pastoral rangelands

*Richard Glover, Development Officer, Carnarvon*
*David Warburton, Development Officer, Northam*

**What does 'pristine' rangeland look like?**

**How have the rangelands been changed by 50–100 years of grazing by livestock?**

**How quickly can rangeland recover if totally destocked?**

These questions are very difficult to answer definitively—we can't go back in time, and scientific records are limited in scope and time. The last question is particularly relevant as it determines how viable destocking is as a management tool.

Pastoral leases acquired by the Department of Environment and Conservation (DEC) provide an opportunity to explore these questions:

- They have a known history of grazing and land condition.
- Since pastoralism their management has encouraged a return to a 'natural' state.

Of particular value also is the photo monitoring record established by the then owners of Earaheedy in 1991 which provide almost 20 years of visual records.

With permission from DEC, the authors and a local pastoralist visited Earaheedy Station to consider these questions. Our observations, while far from definitive, provided considerable 'food for thought' but also identified a range of related issues.

## Earaheedy Station: Country types

Earaheedy Station was approximately a 380 000 ha lease located 200 km north-east of Wiluna. It is comprised of a fairly typical mix of pasture types for the area; mulga hardpan with mixed shrubs, lake country and fringing plains with halophytic shrubs, and lesser areas of spinifex sandplain and rocky hills (Figure 1). The majority of the lease's carrying capacity was to be found in the lake country.

Rangeland assessments dating back to pastoral management had identified a significant area of mulga shrubland in poor condition from historic over-utilisation by livestock; it was this country that we were most interested in observing what recovery had occurred.

*Mulga hardpan*

*Lake country*

*Spinifex*

Figure 1 **Typical rangeland on Earaheedy Station**

## Climate and seasons

Median rainfall for Earaheedy is 225.2 mm. There has been an unusually good run of seasons since destocking with only two seasons since 1999 receiving less than median rainfall (Figure 2).

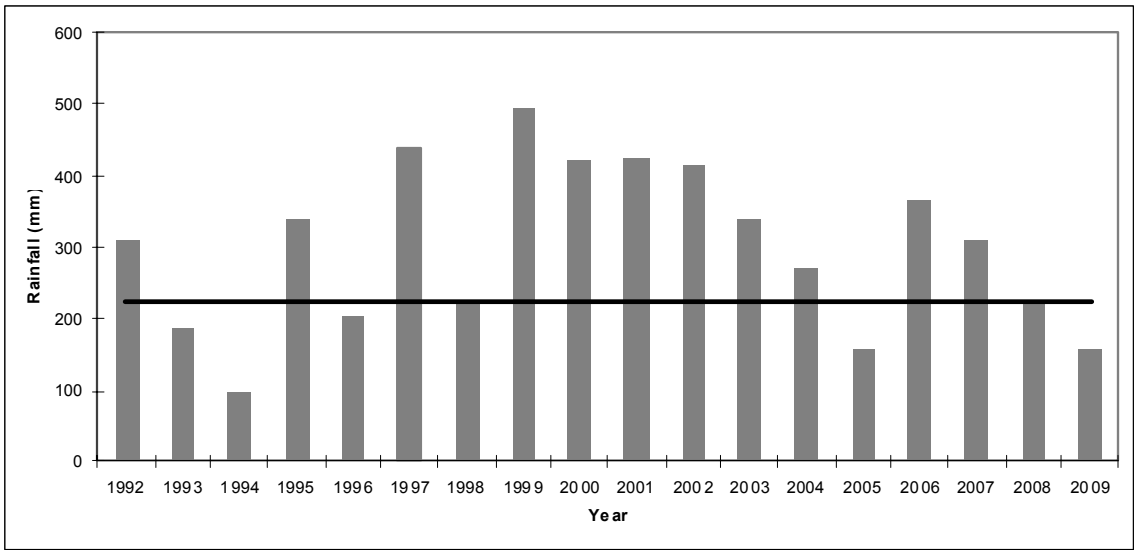



Figure 2 **Yearly rainfall recorded at Earaheedy from 1992–2009. The line represents 225.2 mm, the historical yearly median rainfall for Earaheedy.**

## Management history

Historically Earaheedy was primarily a sheep property running an average of 4700 dse under a continuous grazing regime. Pastoral development had focussed on the west of the lease, which is mostly mulga shrubland. Records suggest that a lack of potable groundwater had limited development of the lake country to the east, though some dams had been constructed in the early 1990s.

The property was acquired by DEC in 1999. DEC immediately destocked the lease and removed or filled in all artificial water points. A boundary fence has recently been constructed along the western boundary but all other boundaries are open.

*July 1991*

## Observations: Rangeland recovery

While the rangeland on Earaheedy has recovered, the degree of country recovery was less than and more variable than expected.

This was most apparent in country that would once have been mixed mulga and saltbush/bluebush but had been over-utilised by sheep. The area still appeared to be experiencing a degree of run-off and soil loss, and was dominated by needlebush (*Hakea pressii*), silver poverty bush (*Eremophila pterocarpa*) and saline poverty bush (*Eremophila linearis*). All shrubs had grown larger but recruitment of palatable shrubs was limited and perennial grasses had not extended from beneath protection.

*May 2010*

Figure 3 **Monitoring site in mixed halophyte pasture type; note the scalding in the site background**

The lake country to the east had always been in better condition and also appeared to have enjoyed more rain in a recent thunderstorm. Nevertheless the recent growth of the perennial grasses, particularly neverfail *(Eragrostis setafolia)*, claypan grass (*Eriachne flaccida)* and windmill grass (*Enterapogon acicularis)*, was exceptional. Palatable shrubs did not appear to have multiplied but had grown markedly in size and covered far more ground (Figure 4).

*July 1994* *May 2010*

Figure 4 **Monitoring site in lake country**

Normalised Difference Vegetation Index (NDVI) for Earaheedy from 1992–2008 shows that there has been an increased seasonal vegetation response (Figure 5). A reduction in grazing pressure, combined with a series of above average seasonal conditions, has resulted in an overall greater vegetation biomass during the 11 years that the property has been destocked.

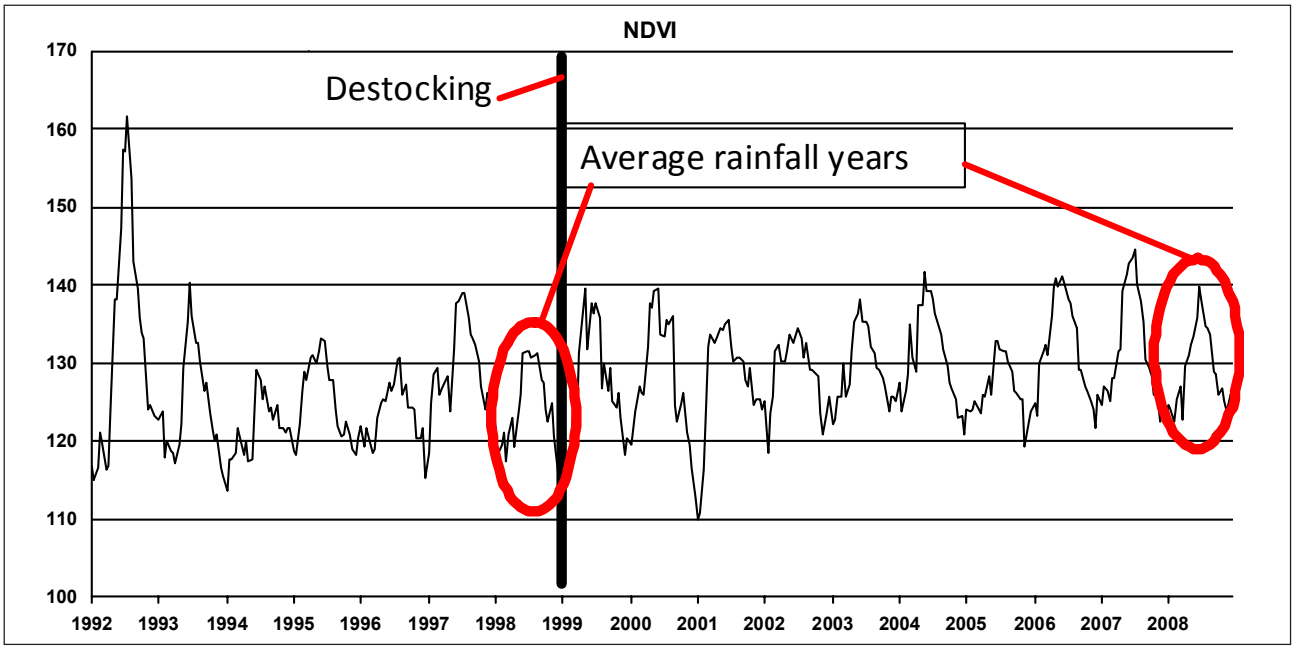



Figure 5 **The Normalised Difference Vegetation Index (NDVI) for Earaheedy station from 1992–2008. The two areas of the line circled in red demonstrate two years with average rainfall. 1998 was a year before destocking while 2008 was 10 years after destocking.**

## Grazing pressure

Despite having been nominally destocked for 11 years, there is still considerable grazing pressure present from livestock (cattle), feral and native animals. Fresh evidence of cattle and camels was observed throughout the lease. Several mobs of 15–20 camels were sighted, and small mobs of cattle were commonplace (Figure 6). Kangaroos and emus were the main native grazing animals,

although their numbers did not appear high. While the number of grazers on the property could not be determined it is conceivable that the current grazing pressure could ***exceed*** that of when the lease was being managed as a pastoral enterprise.

Figure 6 **Camels and cattle on Earaheedy Station. There is still grazing pressure on the property despite destocking.**

While all stock water points have been removed or filled in, the lease has a large number of moderate sized claypans (Figure 7) that would potentially hold water for some months after rainfall events. These would have the undesirable effect of sustaining and even attracting grazing animals after the more ephemeral surface water has dried up.

Figure 7 **Large claypan filled from recent thunderstorm**

## So what could our observations mean for pastoralists?

The observed changes in vegetation condition on Earaheedy do not support long-term destocking of areas of country that are otherwise viable. Further, it is apparent that areas that are historically degraded will require significant inputs of time and money to regenerate within a management timeframe. It is not sufficient to simply rest country that has lost its topsoil and its ability to retain and respond to rainfall.

Rangeland that is still functioning (i.e. in good condition) will respond better to rainfall if allowed rest. Recruitment of new plants, particularly shrubs, is a slower process and will require not only destocking but also control of native and feral grazers. Perennial grasses and annuals appear to be more responsive to rest than perennial shrubs.

Destocking must be accompanied by an ongoing program of controlled access to ***all*** water sources. The continued presence of surface water will diminish any benefits from destocking by attracting and sustaining unmanaged grazers.

Consider also that this was only a short trip done to one property in one area of the rangelands. As such, any management decisions should be made with individual circumstances and management objectives in mind.

# Final survey for the heifer project

*Rebecca Dray, Karratha*

As many of you would know the young breeder management project has been in its final stages in 2010. This included a final survey showing the pastoralists' perceptions of the performance of young breeders and their attitude to change. A similar questionnaire was undertaken at the beginning of the project to highlight barriers and potential areas of improvement in the performance of young breeders in the herd.

Around 40% of pastoralists in the Pilbara and 10% in the Kimberley participated in the initial survey. Due to change of managers and other factors, only about one-half of the original respondents were available for the second survey.

Producer estimates of calving percentages were compared with data obtained from the recording sites between the Kimberley and Pilbara (Tables 1 and 2). Expectations of reproductive performance among Pilbara producers were initially high for first calf heifers compared with collected data, but were more realistic in the 2007/08 survey.
A similar trend was noted amongst Kimberley producers for first calf heifers. Estimates by Kimberley producers of the weaning rate of heifers calving for the first time were initially underestimated but were closer to recorded levels in the second survey.

Survey respondents were asked if they had adopted any of a selected list of management strategies since 2004/05 (Table 3). Responses suggested significant uptake of some strategies (for example, running heifers as a separate group or providing heifers with a higher nutritional system). While the actual uptake of practices varied between the Kimberley and Pilbara regions, the relative uptake of most practices were quite similar. Reasons for not adopting many of these management practices revolved around cost of providing infrastructure to improve cattle control coupled with concerns over the cost/benefit of some of the practices.

Overall, the survey responses suggest some increased awareness and adoption of new techniques. Continuing to promote information and extension activities will shine the light on heifer and young breeder management with the aim of improving their productivity and your bottom line.

Table 1 **Producer estimates of reproductive data and those data recorded at benchmarking sites, Pilbara**

| Pilbara estimated weaning % – survey | | | Recorded % |
|---|---|---|---|
| | 2003/04 (n=20) | 2007/08 (n=14) | |
| Maiden heifers | 61 | 41 | 64 |
| 1st calf heifers | 67 | 54 | 48 |
| Breeders | 71 | 73 | |
| Old cows | 67 | 68 | |

Table 2 **Producer estimates of reproductive data and those data recorded at benchmarking sites, Kimberley**

| Kimberley estimated weaning % – survey | | | Recorded % |
|---|---|---|---|
| | 2003/04 (n=8) | 2007/08 (n=18) | |
| Maiden heifers | 41 | 57 | 68 |
| 1st calf heifers | 58 | 45 | 48 |
| Breeders | 69 | 60 | |
| Old cows | 68 | 48 | |

Table 3 **Percentage adoption of young breeder management strategies since 2004/05, Pilbara and Kimberley regions**

| Adopted strategies since 2004/2005 | Pilbara Yes % | Kimberley Yes % |
|---|---|---|
| Run heifers separate to breeders | 57 | 33 |
| Bull control | 21 | 6 |
| Improve joining weights with supplements | 21 | 44 |
| Improve joining weights with better paddocks | 57 | 39 |
| Vaccinate against disease (Botulism, Vibrio) | 29 | 33 |
| Time of year weaning occurs | 7 | 6 |
| Early weaning from heifers | 14 | 17 |
| Mating heifers as yearlings | 7 | 6 |
| Pregnancy test heifers | 36 | 28 |
| Bull fertility test | 7 | 6 |
| Bull percentage | 43 | 22 |
| Young bulls – for heifer mating | 43 | 28 |
| Selection for fertility | 29 | 17 |

# National Arbovirus Monitoring Program (NAMP) improves market access

*Marion Seymour, District Veterinary Officer, Moora*

The National Arbovirus Monitoring Program (NAMP) monitors herds of cattle for three economically important arboviruses: bluetongue, akabane and bovine ephemeral fever.

An arbovirus needs an insect host as part of its lifecycle. (The insect is called the intermediate host.) The virus can only spread from one animal to another via the insect and will only persist if the insect carrier is present. NAMP also monitors insect populations for the presence of the relevant host midges.

NAMP results show the zones within Australia that are free of the viruses. Without NAMP, it would be difficult for Australia to meet export requirements for some importing countries.

## Bluetongue virus

The arbovirus of most significance to the live export of cattle, sheep and goats from Western Australia is bluetongue.

A number of importing countries require that stock are not sent directly from areas of WA where bluetongue virus is present.

Bluetongue virus does not normally affect cattle. Australia has never had any cattle disease associated with bluetongue virus. However, cattle are the best type of stock to monitor to see if the virus is present in a region.

Bluetongue virus more commonly affects sheep but in Australia there are very few sheep in zones where the virus has been detected.

## Sentinel herds vital for NAMP

Producers who participate in NAMP by volunteering their herds as sentinel herds help to improve market access for all sheep, goat and cattle producers in Australia.

Currently there are 10 sentinel herds in the pastoral area and three in the agricultural area of Western Australia. When producers muster and yard younger cattle, the cattle are blood sampled for testing for the viruses. The same animals are sampled twice a year.

Midges are generally active between December and April if they are present in an area. Sampling young cows before this time allows department officers to check that they have not been exposed in another location before the spread period. If the same cows then test positive for one of the viruses after April, it can be assumed that spread is occurring on the property in that year.

## Insect monitoring

Many of these sentinel herd properties also collect insect samples at strategic times of the year to check for the presence of the biting midge.

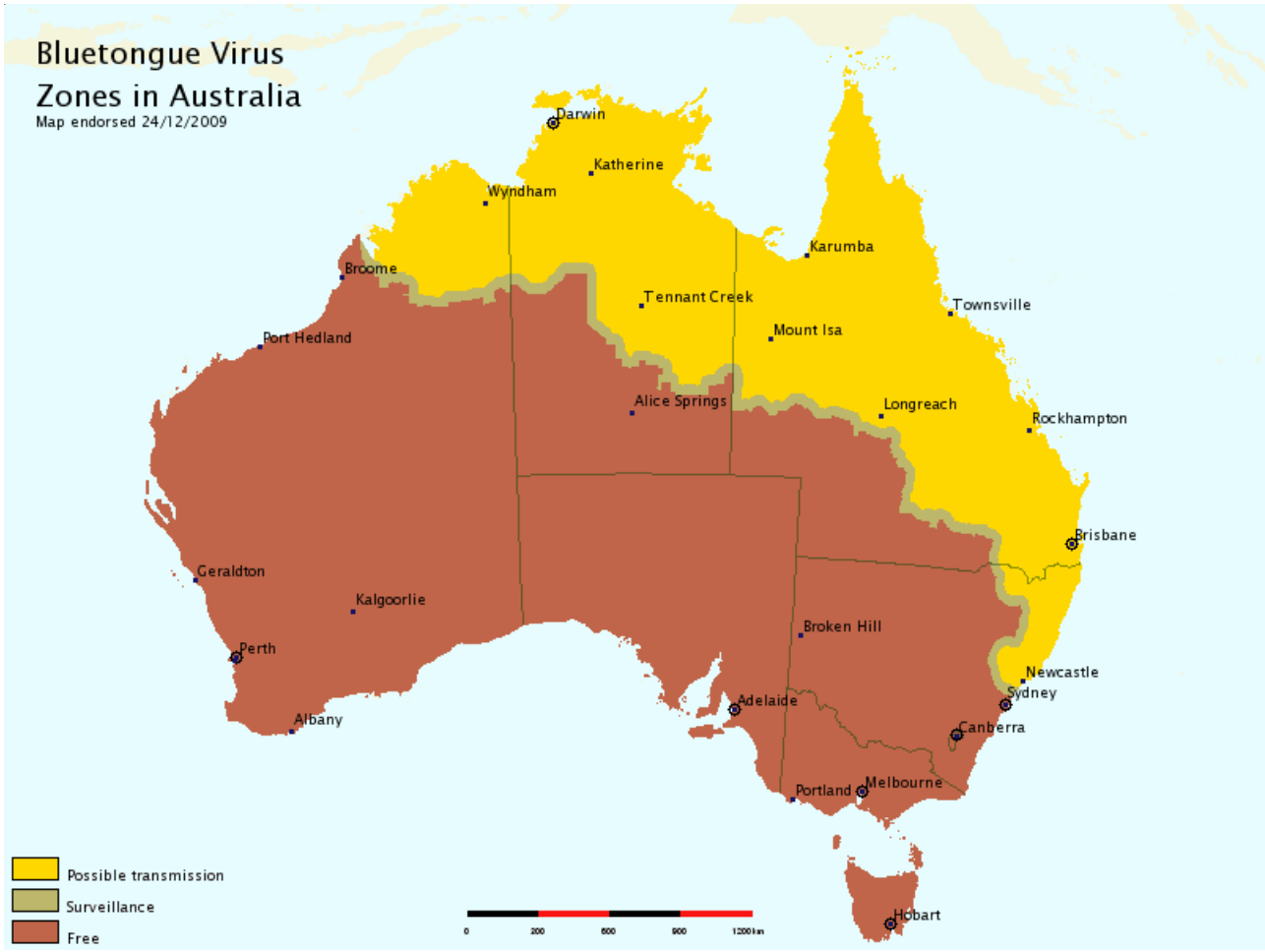
Insect traps are monitored at most of the major ports in WA. Presence of the intermediate host supports evidence that the virus could persist in an area. Lack of an intermediate host supports evidence for freedom from the virus in an area.

## More information

If you would like more information about the program or distribution of bluetongue virus in northern WA or are able to volunteer your herd as a sentinel herd, particularly in the Pilbara, in the future, please contact Marion Seymour at the Moora office of the Department of Agriculture and Food on 9651 0555.

For more information on NAMP visit the Animal Health Australia website at http://www.animalhealthaustralia.com.au/programs/adsp/namp/namp_home.cfm.

***To give feedback on this article or seek more information, contact Marion Seymour at the Moora Office 9651 0555.***




Map source: Animal Health Australia, National Arbovirus Monitoring Program

This map is based on bluetongue virus monitoring data which is collected regularly and reflects the currently available information on the distribution of bluetongue virus in Australia. State or Territory authorities should be consulted before taking any action on the basis of these zone boundaries.

# Obstructive urolithiasis (bladder stones) in cattle

*J Eccles, Senior Field Veterinary Officer, Department of Resources, Katherine, NT*

The obstruction of the urethra or, occasionally the ureter, by calculi or uroliths (bladder stones) produces the condition known as obstructive urolithiasis. Uroliths are usually mineral stones formed by the precipitation or crystallisation of mineral salts on an organic matrix.

Most reported cases occur in steers. The condition does occur in heifers and cows however, because of their short wide urethra, obstruction is rare. Bulls are also less affected because their urethras are more developed and wider than the urethra of steers.

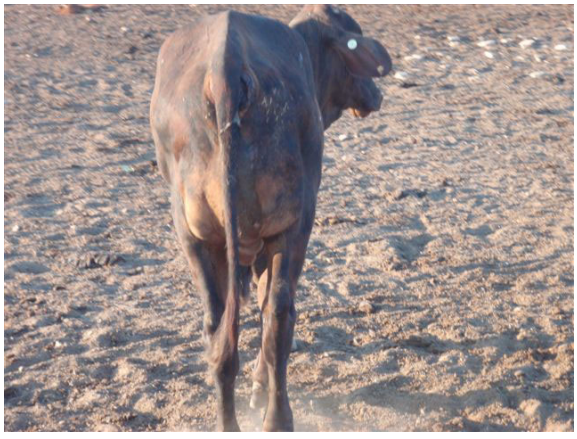
In general terms, the disease causes significant economic losses of steers as a result of urethral obstruction, rupture of the urethra or bladder and death resulting from the build-up of toxic substances that are usually removed via the urine. The morbidity is usually low but can be as high as 10% annually in exceptional circumstances.

## Cause

A number of different types of uroliths have been identified which relates to their mineral composition. A close relationship exists between the composition of uroliths and diet.

Possible predisposing factors include:

- excessive mineral intake; this can occur from highly mineralised artesian water or from high concentrate diets
- ingestion of certain plants containing high levels of oxalate, oestrogens or silica
- diets high in magnesium
- increased presence of mucoprotein in diet which is increased by feeding high-concentrate low-roughage rations, pelleted rations and rations high in phosphate
- concentrated urine which is produced when there is a lack of water available or if water is of poor quality. Water deprivation can be exacerbated by heavy fluid loss from sweating in arid environments
- imbalance in calcium phosphorus ratio of diet.



*Photos depicting the gross swelling of the perineal area of affected steers*

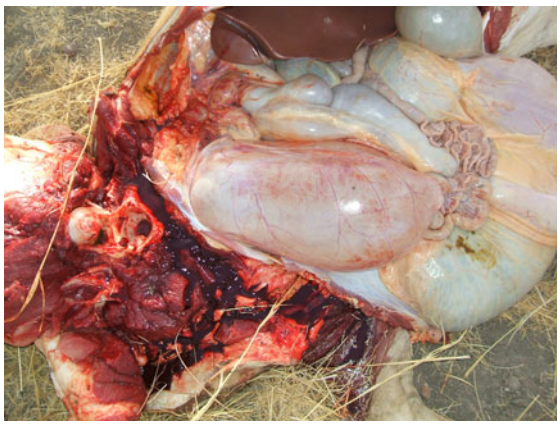
## Signs and symptoms

- *Partial obstruction*: off feed, straining to urinate but will still pass small amounts of urine or dribble urine, urine may be blood tinged, stretching.
- *Total obstruction*: off feed, colic, straining to urinate but not passing any, 'stretched out' stance or recumbent.
- *Rupture of urethra*: swelling of the subcutaneous tissues of the ventral abdominal wall, perineum and prepuce.
- *Rupture of bladder*: distension of the ventral abdomen one to two days after rupture, depressed, weak.

If obstruction occurs and is not relieved, bladder or urethral rupture occurs usually within 48 hours.

## Diagnosis

A presumptive diagnosis can be made based on history and physical examination. A definitive diagnosis is generally based on post-mortem findings where uroliths are found obstructing the urinary tract. In steers uroliths are typically lodged in the sigmoid flexure and frequently numerous additional uroliths are found in the bladder. Sometimes uroliths are not found and further samples are required to confirm the diagnosis. Uroliths need to be sent to a veterinary laboratory to determine the mineral composition of the urolith to assist with future prevention. If urolithiasis is diagnosed in one animal in a mob, all animals in that mob are at risk. Animals at risk should be managed appropriately to prevent further clinical cases.



*Showing grossly enlarged bladder*

*Showing kidney stones (uroliths)*

## Treatment

Treatment of urolithiasis in steers in the Northern Territory is not economically feasible as the only viable option is surgery. If diagnosed early before urinary tract rupture, the animal can be sent for immediate slaughter but, at the time of writing, such slaughtering facilities are not available in the Northern Territory.

## Prevention

- Ensure calcium to phosphorus ratio is balanced; the calcium to phosphorus ratio should be 1.5–2.0:1.0.
- Increase water intake by supplementing salt in the ration:
  - For a 300 kg steer, 50 g/day of salt will not prevent urolith formation, 200 g will significantly reduce formation while 300 g/day will almost eliminate some types of uroliths. This should increase water intake to above 200 g/kg BW per day.

- Ensure adequate intake of vitamin A especially during drought periods.
- Some types of uroliths can be prevented by acidifying the urine (i.e. decreasing urine pH) by adding ammonium chloride. Care needs to be taken when adding ammonium chloride to the diet as too much ammonium chloride will cause acidosis. In addition, other types of uroliths form in acidic urine thus the type of urolith present should be determined to assist with preventative management.
- If a particular plant is suspected to be involved, cattle, especially steers, should be removed from paddocks containing these plants.

Consultation with a veterinarian is advisable when dealing with urolithiasis to ensure the most appropriate preventative strategies for a given situation are reached.

# Moving livestock off your property? Waybills are required

In recent weeks police have been stopping livestock carriers and checking movement documentation and stock identification.

In Western Australia, legislation requires all livestock movements off a property, even just over the road, to be accompanied by a waybill or other approved movement document. Only horses are exempt.

The waybill must accompany every consignment of livestock (except horses) that moves off the property either by vehicle or droving/walking. The consignor, carrier and consignee must retain copies for three years.

A number of movement documents meet the waybill requirements:

1. A livestock waybill, which is issued by the Department of Agriculture and Food.
2. A national vendor declaration (NVD) (which incorporates a waybill) and is issued by Livestock Production Assurance (LPA).
3. A livestock movement permit and interstate livestock health certificate, issued by a stock inspector.
4. A special permit to move, issued by a stock inspector.

Any person who moves stock without the correct movement documents is committing an offence. Offenders may be prosecuted with a penalty of up to $5000 or 12 months jail.

### Livestock waybill

Waybills can be used for livestock movements between properties where an NVD is not needed.

Local Department of Agriculture and Food offices have waybill books for sale.

### National vendor declarations (NVDs)

NVDs for cattle, sheep and goats include a livestock waybill.

Producers use the NVD-waybill to declare valuable information about the food safety status of the livestock being sold. NVDs are a commercial requirement when selling stock. All producers registered with LPA are required to complete an NVD when selling or moving stock to another

property managed by another person. Livestock buyers should also obtain a copy of the NVD for their records.

Meat and Livestock Australia supplies NVD books. Producers can order books by telephoning 1800 683 111 or visiting MLA's website at www.mla.com.au.

### Livestock movement permits and interstate livestock health certificates

Contact your local stock inspector for a livestock movement permit if moving stock under quarantine. Stock inspectors must also sign the interstate health certificates needed to import or export stock.

### Special permit to move AD295

Livestock being moved for husbandry purposes repeatedly between neighbouring properties owned by the same person can apply for a special permit to move. This includes stock being moved across a road. This permit may also cover the movement of registered stock brands and earmarking equipment between the properties. A copy of the permit must accompany the stock being moved.

To apply for one of these special permits, contact your local department office or the brands office on (08) 9780 6207.

# Beef Up Forum – Port Hedland

*Manus Stockdale, Rangelands Development Officer, DAFWA*

MLA held a Beef Up Forum at Port Hedland on 3 June. Beef Up Forums have been developed by MLA to keep northern beef producers up-to-date with the latest information and research and development tools designed to give practical skills to improve the profitability and productivity of pastoral businesses. The theme of the Port Hedland Workshop was 'More Beef, More Profit' with a focus on increasing profitability through better management of the business, production and grazing management. A report for the recent benchmarking pilot study which DAFWA has undertaken in the Pilbara over the last 18 months was also launched at the event.

The DAFWA pilot study assessed the sustainability and profitability of rangeland cattle enterprises through benchmarking of financial, production and environmental performance. Benchmarking was used as a method of identifying the issues and risks the industry (and individual businesses) must address in order to be sustainable. Historical financial and herd records were analysed from three businesses and an environmental assessment of each property was carried out. The major issues and risks to sustainability in the Pilbara were identified by the study as:

- sub-optimal breeder productivity
- the high risk and impact of failed growing seasons, and
- high mustering costs.

As a result of this project an industry driven producer group will be formed which will expand and continue the process developed in this pilot study. The group will be charged with identifying the risks to sustainability that are the greatest to their businesses and developing strategies to manage these risks. This method will produce greater ownership of the solutions within the group and add credibility to the extension of these strategies to the wider Pilbara industry. The establishment of the group will be jointly funded by DAFWA and MLA.

Email: manus.stockdale@agric.wa.gov.au
Tel: (08) 9780 6270

# Cattle seminar for pastoralists and farmers at Bookara attracts a crowd

*Jane Bradley, CEO, Mingenew Irwin Group; Tony Gray, DAFWA, Geraldton and Alex Harper, Gascoyne Catchments Group*

Approximately 80 people, including pastoralists, Northern Agricultural Region (NAR) growers, as well as people from agribusiness, attended a cattle seminar at Bookara on 15 April 2010. The seminar, a joint activity between Bos Veterinary Services, DAFWA, the Mingenew–Irwin Group and Gascoyne Catchments Group, focussed on the potential for backgrounding cattle from the pastoral country on pastures in the NAR which allows the cattle to reach weights required by markets, prior to selling, primarily to the live export trade, between November and March.

Matt Carrick of Bos Veterinary Services spoke on the various health issues involved with bringing cattle down from the pastoral country, while Tony Gray from DAFWA spoke of the performance of two groups of pastoral cattle at Badgingarra and the implications for management of the cattle to ensure they gain sufficient weight to meet the specifications of the markets.

Craig Forsyth, MIG President, currently has an alliance with five stations in the pastoral zone and he spoke of his involvement in this alliance, some of the issues encountered and measures he and his partners in the alliance have taken to mitigate them. For alliances between pastoral breeders of cattle and NAR farmer backgrounders to be profitable, clear communication between the parties is essential. This communication is required so each party understands their commitment and responsibilities to ensure cattle reach the targeted weight. In the alliance, one key responsibility of the pastoralist is to supply cattle suitable for the targeted market, which considers breed, sex and treatments, while the NAR farmers' key responsibility is to manage the pastures efficiently to ensure maximum weight gain for the cattle is possible in the timeframe available.

Sean D'Arcy, Chair of the Gascoyne Catchments Group, is part of the alliance with Craig Forsyth and he expanded on his experiences in sending cattle to Craig's Dongara property for backgrounding, and how he saw the alliance working for him. Last year was the first year Sean had committed cattle for backgrounding in an alliance with Craig and he is pleased with the results. Sean sees a need to work with Craig to ensure the best cattle are delivered to Craig each year to maximise the profits for both parties. At the moment the best option appears to be sending down steers around 250 kg for backgrounding. He is conscious of the need to send down well bred cattle as any 'poor doers' will not meet the market specifications before the feed runs out in November and create a problem for everyone in the supply chain. Sean also sees a need to breed cattle with good temperament and without horns as these are of concern to everyone in the supply chain. Sean also spoke of the win-win situation for pastoral/backgrounder affiliations and the opportunities they provided in having quality cattle at boat specs available more consistently to exporters throughout the year.

Steve Meerwald from Wellard Rural Exports gave an insightful presentation on the potential of markets both in Indonesia and further afield, such as Saudi Arabia and Egypt. There appears to be good potential in the cattle trade into the future. Steve also pointed out the strategic importance of Geraldton to the livestock export companies. Cattle can be backgrounded in the NAR during the winter and spring months, so the finished cattle are ready for sale at a time when cattle are not normally mustered and shipped out of the northern ports.

Two of the stand out items that were raised by a number of the speakers were genetics and the need for improvement in order to maximise the return on cattle being brought down to the NAR for backgrounding, and the need for consistency of supply in order to keep alliances such as Craig Forsyth's going.

With the current state of grain markets, this year may provide an opportunity to expand your cattle enterprise by improving the productivity of your pastures through investing in perennial pasture establishment, improving annual pasture productivity or establishment of rotational grazing systems.

The day was topped off by a magnificent feed of steak (care of Craig Forsyth) and salads (care of Matt Carrick). Many thanks to all who were involved in the day—it was a great success.

As follow-up to the day, and to continue to develop the relationship between the Gascoyne Catchments Group and the Mingenew–Irwin Group, the development of a database is currently being investigated. This database could be an information sharing tool whereby information on pastoral cattle that are ready to be sent south, and growers who have feed available in the NAR, can be accessed. For further information contact Jane Bradley (MIG) on 9928 1645 or Alex Harper (GCG) on 9941 1776.

# *The final countdown*

## Australian Rangeland Society 16th Biennial Conference Bourke, 26–30 September 2010

It's now only a couple of months to the *Rain on the Rangelands* Australian Rangelands Conference being held in Bourke, New South Wales. This is a final call to encourage even more Rangeland people to attend what is shaping up to be a fantastic event!

No coastal talk or tree-planting sessions here, just informative and interactive discussions about the management of outback Australia and what it means to grazing enterprises, conservation and the many other land uses. The organisers of the 2010 Conference have put together an excellent program that will offer a mix of science and general interest information through Field Tours, oral presentations and poster sessions. Over 100 poster and paper proposals have been received.

Field tours on **Day One** will visit:

- **Bokhara Plains and Wirricanna Stations** to view innovative grazing management
- **Dijoe Station** to discuss invasive native scrub, water spreading and total grazing pressure management
- **Toorale Station** to see high value wetlands and historic sites and discuss the transition to National Park
- **Brewarrina Aboriginal Fish Traps** and cultural heritage museum, followed by a discussion of the demonstration reach river restoration projects
- **Bourke Irrigation properties** to discuss water management issues and an enterprise-based conservation project where conservation provides a diversified property income stream.

Another highlight for the 2010 Conference is the allocation of **Day Two** to landholder presentations. Expect to hear stories showcasing innovative property management and how these landholders embrace and manage the multiple values of their rangelands. **Day Three** will investigate broader rangeland issues including water resource management whilst **Day Four** presenters will talk about the challenges of balancing production and conservation, the dynamics of rangeland ecosystems and the concepts of ecological and social resilience.

Further details of the Conference Program are available from the Australian Rangeland Society website www.austrangesoc.com.au/site/. Registration is open right now so go to www.austrangesoc.com.au/site/.

# Improving the livestock supply chain between pastoralists and farmers

*Sean Darcy, Lyndon Station, Carnarvon*
*Chairman of the Gascoyne Catchments Committee*

The relationships developed between the pastoralists and farmers in backgrounding cattle can be one of those where both parties win.

The long held paradigm of cattle breeders is that there is not enough money in one animal to share around so the tendency is to avoid selling light, agisting and profit sharing.

However, having pastoral cattle backgrounded for a price per kilo on Northern Ag farms offers loads of benefits for both parties.

For the pastoralists the cattle are off the property, take little or no more marketing, and yet continue to make money. They almost become a lucrative off-farm investment. There is no further risk with these cattle because with an alliance agreement you only pay according to the weight gained on the farm.

There are obvious benefits in removing these animals from the station and it gives the breeder a world of opportunities. They can:

- run more breeders
- rest country
- opportunistically trade or agist
- grow out other lines of stock to higher weights.

These benefits become even more pronounced in drought when there is no feed and cattle urgently need to be moved.

There is less shrinkage on heavy cattle as they can go straight from farm to wharf.

There are many advantages for the backgrounder. These deals tend to be performance based. The more efficiently the farmer can feed the cattle the more they make.

The opportunity exists to make much more per animal than they could on an agistment basis. A deal with a pastoralist based on integrity and trust will offer a farmer reliable supply of cattle regardless of season in the rangelands. The farmer can build relationships to ensure that he only receives good quality cattle that do well.

Perhaps more important than the individual deals are the longer-term effects to the relationships between the industry as a whole, including exporters and agents. There is no doubt that things are improving in Western Australian live export industry with overall quality of cattle improving and transactions between exporters and producers taking place with more integrity. However, we are still a long way behind Darwin or Townsville.

The development of many pastoralist/backgrounder affiliations can only lead to more quality cattle within boat specs available more consistently throughout the year to exporters. This build-up of quality, numbers and reliability must lead to more boats and better business for the exporter. For the producer, higher prices and longer-term forward contracts would be reward for their efforts.

## Back to the paddock

We personally find the best situation is to send the cattle to the farm at about 250 kg and put 100 kg on them to get them right to the top of the best price range. Last year the cattle went to the farmer in early July and the top doers had achieved this target by late October and went out at 343 kg average. The last 10 went in February.

In a light year such as this, we will hope to send cattle down by the end of April as low as 200 kg and hopefully put on 150 kg by the end of the year but this depends on the early break.

These parameters will change if there is a market for heavier cattle as we may then send down heavier cattle but the basic concept of sending cattle down with 100–140 kg to go to reach optimum weight seems to work fairly well.

Inferior quality won't do. No matter how good the farmer's perennial or annual pastures are, they won't achieve the required weight gain with inferior quality cattle. Agisting these cattle just costs everyone money. The arrangement that we have with Craig Forsyth (Avoca, Dongara) depends on the right type of cattle coming down, otherwise they will seriously affect weight gain and therefore seriously affect Craig's bottom line. If that happens, he isn't going to want them next year. These types of cattle are best sold immediately to get them right out of the system. If they don't have the quality to be within live export specs they just become a headache to everyone.

Light cattle sent too late also aren't going to make the boats before the feed runs out. These cattle will also end up costing money as they may end up having to go to Midland or be carted elsewhere for the summer when the farmer runs out of feed. You have to have a realistic expectation for the cattle and aim for a target market, based on those expectations before the cattle leave the station or they could end up neither here nor there.

Heavily horned cattle and poor temperament cattle are also likely to cost both parties money and damage relationships between parties. Bad temperament cattle don't put on weight themselves and can put the rest of the mob off their game.

Personally I have had enough of dehorning and we are most of the way to completely breeding them out of our cow herd.

They cost too much time and money and are fast becoming a big animal welfare issue. I am aware that there is a strong—not totally unfounded—view that polled cattle are genetically not as strong as horned cattle and have more sheath problems. But there are a lot of very experienced stud breeders all over Australia fast breeding these issues out. We haven't noticed any loss in weight gain or muscle or soundness in our cattle from using all polled bulls and culling our horned cows.

Up to this point we have only had steers fed on at Avoca but the prospect of value adding cows would be a huge benefit. One of the main factors affecting pastoral beef enterprises is the inability to profitably sell excess cows. The problem with backgrounding cows of course, is the lower intrinsic value, however this may be offset by extra weight gain that could be achieved by fattening a lower condition empty cow. If there is enough money in this for both parties, it would be a big relief to pastoral businesses but the cows would have to be empty or spayed.

Continuity of supply to the backgrounder is vital. Pastoralists have to work out a system to guarantee certain numbers regardless of seasons. The challenge in good seasons is to find other ways to utilise the opportunity presented by plenty of feed but still honour agreements. There will often be options to place more cattle in poor seasons as long as the agreed number are supplied year-in year-out.

We have found it very beneficial to keep our agent and exporters involved in the whole process. From the time my cattle went south last year, the agent knew they were there and as the boats come up they rang Craig or I to see how many of the cattle were ready. As such, every transaction ran smoothly and took very little organising on my part.

## Role of regional groups

The Gascoyne Catchments Group hopes to develop a database system over the coming months and would like to work with the Mingenew Irwin group and others to see if they too would be interested in producing a database for their region (*see Editor's note below*).

The development of a livestock database would be an avenue of information sharing between the agricultural and pastoral sectors, enabling them to promote when and where they had livestock that needed agistment or finishing. This database system could also provide the farmers in the Northern Ag region to promote what they had available in terms of land and stock capabilities. By utilising this database, pastoralists could effectively manage their stocking rates during dry times by having the options available to them to finish cattle off down south and agist when required.

The market supply options that could come from this database might involve the agents and live exporters knowing what cattle were ready, when and how many. This could provide the regional groups with better access to markets as buyers would be able to target the database to purchase cattle when they required it.

Communication in such relationships is the key to a win-win situation.

## Conclusion

To conclude, I believe that all these initiatives that build relationships and develop interdependence in our industry is the only way we will move out of the depressed state of beef in WA. There is greater good in all these individual arrangements to our industry as a whole. I think in the live export industry this is already happening.

We have always tended to be each producer for themselves while blaming everyone else for the demise of our industry. We have to move past this mindset if we are to give prospective businesses the confidence to invest in beef in WA. Obviously Wellards have done this in a big way but there are still large lines of cattle that don't suit live export and need extra processing facilities.

The current possibilities of the development of a northern abattoir may open up further opportunities for regional producer groups to work together. It is therefore vital that we build on the existing relationships and develop new ones to create a cohesive approach and thus become a 'solutions orientated' industry.

Interdependence within the industry, trust and relationship building is the only way we will climb out of the mire we have worked our way into. For those in the north, the GCG hopes to be able to play a role at bringing people together to help form the relationships. I am sure that the very active farmer groups that exist in the Northern Agricultural Region can only help work towards building these relationships.

**Editor's note:** *Until a database is established or agents provide the service, Jane Bradley, EO of the Mingenew Irwin Group, has offered to take details of pastoralists and the cattle they'd like to place on farms for backgrounding. Jane will facilitate linking the pastoralists with the interested farmers.*

***Jane's contacts:*** Tel: (08) 9928 1645 Fax: (08) 9928 1540 Mobile: 0427 281 007
Email: jane@mig.org.au

# Put your hand up if you like wasting money!

## The importance of hygiene and correct implantation techniques in HGP use

*Trisha Cowley – Department of Resources, Katherine*

I bet that no-one put their hand up just then, but I hope that I caught your attention!! This is the second article in a three-part series looking at hormone growth promotant (HGP) use in northern Australia. In this article we will look at correct implantation methods and the implications of poor hygiene and technique.

A single dose of 400-day Compudose costs around $8. If this is implanted incorrectly or poor hygiene is used, not only will it be a waste of $8, but you will have also lost the additional 10 kg it could have supplied—which is potentially $17 per beast (NB: 10 kg is a conservative estimate, based on CSIRO research in northern Australia). This is an opportunity cost of $25. Below are some tips for correct implantation procedures which can help ensure you don't waste money!

### Implanting technique:

- Insert the HGP in the middle third of the back of the ear (see Figure 1 below). This is important to ensure adequate blood flow across the implant which is important for hormone absorption.
- While holding the point of the ear, slide the needle under the skin towards the base of the ear, being careful to remain above the cartilage.
- Withdraw the implanter slowly while squeezing the trigger—this is particularly important for compressed pellet HGPs as it prevents crushing of the pellets which negatively affects the hormone release.
- Ensure you leave at least 1 cm of skin between the HGP and the wound entry.
- Pinch the injection site closed and check a HGP has been inserted.

*The last two points are most important to help prevent HGPs falling out.*

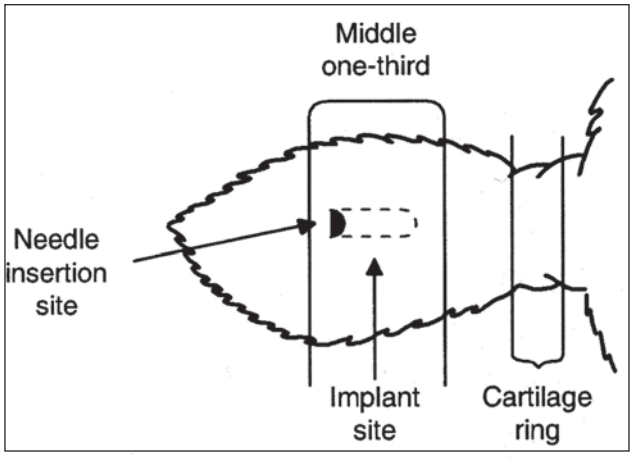



Figure 1 **Correct placement of HGPs**

*NB: This site ensures adequate blood flow over the implant for efficient absorption.*

While correct insertion technique is important for a functional implant, good hygiene techniques are extremely important to ensure the implant remains in place. An infection at the implant site can lead to an abscess and subsequent expelling of the HGP. Alternatively, it could lead to scarring which impacts blood flow to the implant and so affects absorption.

Local research has found a significant difference between stations in HGP retention rates which confirms the importance of correct implantation techniques. The NT Liveweight Gain Project funded by MLA, has been noting hygiene during HGP implantation and recording infection and loss two weeks later.

Table 1 shows loss rates for two stations in the NT. While it is difficult to say what has led to the large differences between these two properties, we do know that Property B dipped the applicator into an antiseptic solution between each animal, while Property A did not.

If this is indicative of HGP loss and infection rates across the entire property, Property A stands to lose a significant amount of income due to poor technique. It is likely that the infected implants will fall out (we will know the true loss rate when we sample the steers again after the wet), so 35% of implants will be ineffective. If property A implants 1000 steers a year, they stand to lose close to $6000 in weight gain (350 steers x 10 kg of additional weight x $1.70/kg = $5950), with a total opportunity cost loss of $8750. Good hygiene practices are easy and they are worth it!

Table 1 **HGP infection and loss at two weeks after implantation on two NT properties**

| Status of HGP | Property A | | Property B | |
|---|---|---|---|---|
| | Number | Per cent | Number | Per cent |
| Good | 145 | 65 | 112 | 96 |
| Infected | 61 | 27 | 2 | 2 |
| Fallen out | 18 | 8 | 3 | 2 |
| Total | 224 | 100 | 117 | 100 |

Good hygiene involves the following:

- ensure the needle is sharp (rough edges catch and spread dirt and animal matter)
- disinfect the needle of the applicator in between each animal (simply dip into a hibitane solution)
- regularly clean the applicator with an antiseptic solution
- take great care not to drop HGPs onto the ground, touch, etc.—this adds dirt contamination which greatly increases the likelihood of infection and loss
- if the HGP is dropped, rinse it thoroughly in a strong antiseptic solution before implanting
- keep the crush area as clean as possible to minimise the risk of dirt contamination during implantation.

## Legal requirements

It should also be noted that there are legal requirements related to the use of HGPs.

Producers must:

- complete and retain a copy of a signed declaration from point of sale of HGP
- use HGPs only on property listed on declaration
- identify implanted animals with triangle notch in offside ear
- keep records of HGP use including batch number and any wastage
- keep record of treated stock purchased and sold.

# WHPs/ESIs/GHPs/EAFIs/EGIs – what are livestock producers' legal requirements?

*Anna Erickson, Veterinary Officer, Narrogin (9881 0211)*

Every time you send sheep or cattle to a sale or abattoir, you tick the box 'yes' or 'no' on the National Vendor Declaration (NVD)/Waybill which says: 'Are any of the sheep or lambs (or cattle) in this consignment still within a **withholding period (WHP)** or **export slaughter interval (ESI)** following treatment with any veterinary drug or chemical?'.

Most farmers are familiar with the concept of a withholding period when it involves a chemical applied directly to the animal—lice treatments, drenches, antibiotics and so on. The term **export slaughter interval** may be less familiar. The ESI is the minimum time between application of the chemical and the animal's slaughter (or harvest of wool etc.) for export markets. It is not a legal requirement, but an industry standard set by Meat and Livestock Australia. ESIs are often longer than WHPs. (For example the WHP for diazinon used for struck sheep is 14 days, but the ESI is 21 days.) Both the WHP and the ESI should be stated on the product label.

Any time you sell animals which could go for export (any saleyard), you need to be sure both WHPs and ESIs have expired before you tick that 'yes' box. The buyer at the saleyard enters into a contract with you based on the information given in that NVD.

You can sell livestock that are still within withholding periods but you MUST declare the information to ensure the purchaser is aware of the withholding periods.

## Chemicals used on crops or pastures

When it comes to chemicals applied to crops or pastures on which animals may then graze, withholding periods also apply. There are three major restrictions: the grazing withholding period (GHP); export animal feed interval (EAFI); and export grazing interval (EGI).

The **grazing withholding period (GHP)** is the minimum time between chemical application and harvest for feed or grazing to ensure maximum residue levels are not exceeded. It is a legal requirement to observe the GHP.

The **export animal feed interval (EAFI)** is the minimum time between application of a chemical and grazing or harvesting the crop or pasture for animal feed for export animals. It is not a legal requirement, but again that NVD covers the EAFI and ticking the 'yes' box states that none of those animals have grazed pasture or been fed grain that was within an EAFI.

The **export grazing interval (EGI)** is the minimum time between the application of a chemical and the slaughter of the animal which has fed on the treated crop or pasture. It is not a legal requirement but an export market requirement. If the slaughtered animal product is destined for an export market, did the animal have access to a crop or pasture that was sprayed with a product that has an EGI?

All of these restrictions are designed to make sure that animal products sold domestically or for export do not exceed maximum residue limits. Maximum residue levels are safe limits for human health. The time periods that apply to export animals are often different to those in Australia,

because overseas countries have set different maximum residue limits. It is important to ensure you supply correct ESI information on your NVD to allow the buyer to determine if your animals are appropriate for export markets. Failure to comply with the importing country's requirements may mean they reject the product and refuse further product from Australia.

If animals graze a crop or pasture that has been sprayed with a chemical and the grazing withholding period has not elapsed, seek advice from your District Veterinary Officer as to when the animals are safe to sell for human consumption. Failure to observe GHPs and EAFIs can often result in lengthy quarantine periods for animals until they are considered fit for human consumption. Because the chemicals are designed for application to pastures and crops, it is often not clearly defined how quickly levels decline in the animal.

When you buy feed, ask for a commodity vendor declaration to provide you with evidence that the feed has not been treated with a spray, or is suitable as feed for livestock.

## Record animal treatments

Even if your animal treatments are minimal, and you sell animals well outside any withholding period, you are still legally required to maintain written or computer records of animal treatments. These records should include any crop or pasture treatments on paddocks intended for feeding animals.

Legally you must record and keep the following information:

- the identity of the animal treated (for flock treatments the mob identity is sufficient for routine treatments but must include sufficient detail to identify the mob including the number of animals treated)
- the date of treatment
- the chemical used
- the dose rate.

Additional useful information may include the animal weight, the method of application and batch numbers of chemical used.

The level of record keeping required for a quality assurance system or a food safety system such as Livestock Production Assurance (LPA) is sufficient to cover the legal requirements.

Whatever level of detail of records you keep, they must be sufficient to allow you to identify treated animals and ensure animals are either not sold within a WHP or ESI, or if they are that this is clearly stated on the NVD. Relying on your memory is not legally sufficient.

## More information

DAFWA Bulletin 4648 *Code of Practice – Agricultural and veterinary chemicals use*

DAFWA Farmnote 50/2005 *Chemical use and residues in livestock for export*

DAFWA Farmnote 39/2002 *Legislation for use of agricultural chemicals*

# Surprise greenhouse result for red meat

Beef produced in feedlots has a smaller carbon footprint than meat raised exclusively on pastures, according to the surprise results of a study of the environmental impacts of red meat production by the University of New South Wales.

The study, published in the journal *Environmental Science and Technology*, has also found that the greenhouse gas impact of Australian beef and sheepmeat production is equal to or lower than that of many countries.

In a surprising result, the life cycle analysis of Australian meat production by the Sustainability Assessment Program at the UNSW Water Research Centre (WRC), found that feedlot beef production generated slightly less greenhouse gas per kilogram of meat than grass-fed beef. Results from one NSW supply chain studied showed feedlot production had a carbon footprint of 9.9 kg of carbon dioxide equivalent ($CO_2e$) per kilo of 'hot standard carcass weight' (HSCW)—the unit of measure used in the industry. Grass-finished beef produced 12 kg $CO_2e$ per kg/HSCW.

The study, commissioned by Meat and Livestock Australia, looked at three operations: a beef producer in NSW, a sheepmeat producer in WA and a Victorian organic beef producer. It found sheepmeat had a carbon footprint ranging from 7 kg to 8 kg $CO_2e$ per kg/HSCW.

Feedlot beef production, in which cattle are 'finished' by being fed a diet of grain for the few months preceding slaughter, is often criticised for the resources and energy it consumes. However, study co-author Matthias Schulz said feedlots had been found to produce meat more efficiently, effectively offsetting the greenhouse impact of the additional transport and feed production needed.

'Grain-finished cattle have a more efficient weight gain which completely offsets their higher individual carbon footprint,' he said.

'The other main reason for the better greenhouse performance of grain-fed beef is the superior digestibility of the feed and the associated reduction in methane emissions, and these digestion-related methane emissions are the main source of greenhouse gas from the livestock industry.'

The study also compared data from Australian beef and sheepmeat operations to studies conducted in Europe, the UK, the US, Africa and Japan, and found Australian operations compared favourably.

The researchers found Australian beef production's greenhouse gas emissions were lower than those recorded by studies in Japan and Canada, and approximately the same as results from the UK.

**Contact:**

Matthias Schulz, Tel: (02) 9385 1933, Email: m.schulz@unsw.edu.au
Hazel Rowley, Tel: (02) 9385 5778, Email: h.rowley@unsw.edu.au

# Red and Grey kangaroos of the Southern Rangelands

*Jim Addison, Senior Technical Officer, Kalgoorlie*

The two most common kangaroo species in the Southern Rangelands are the Red kangaroo (*Macropus rufus*) and the Western Grey kangaroo (*Macropus fuliginosus*). Reds dominate in the north and Greys in the south, with some overlap in range. Both species graze primarily on grasses but also consume forbs and shrub browse when grass availability is limited. Both species predominantly graze at night but may also graze during the cooler periods of daylight.

The body weight of mature Red males varies from 25 to 90 kg and females from 17 to 35 kg. Greys are lighter, with mature males making 20–54 kg and females 15–28 kg. In general, kangaroos have metabolic rates approximately 30% lower than livestock of an equal body weight—resulting in slower growth rates, but better equipping them to survive nutritional deficiencies.

These figures mean that a 40 kg kangaroo (at maintenance) has a Dry Sheep Equivalent (DSE) of 0.65. As kangaroos target the most nutritious components of the rangelands vegetation (particularly the 'high energy' grasses), this results in them being a significant component of total grazing pressure. In 1990 AD Wilson studied the effect of competition between sheep and kangaroos near Cobar NSW. He concluded *'that there is direct competition between sheep and kangaroos for the main forage species. There are also long-term effects of high kangaroo populations on sheep production because the movement of kangaroos to rested paddocks negates any pasture management practice that requires periodic resting of pastures from grazing'*.

Western Greys are 'obligate seasonal breeders' in so much that most or all mature females give birth during a single restricted period each year. Because of the short window of breeding opportunity, the maximum reproductive rate for them is 1.0 per year. Reds however are 'continuous breeders' and may produce young at any time of the year. The ability of Reds to exploit resources year-round allows them to achieve reproductive rates of 1.8 young per year, provided available forage is plentiful. Extended dry periods may result in high joey mortality rates.

With large kangaroos, a single joey is carried in the pouch for an extended period (Reds about 8 months and Greys about 10 months). The joey will then progressively venture out until weaned some four or so months later. As soon as the young starts to venture out from the pouch of a Red mother she will often give birth to another young that has been in an inactive state in her body. (This does not apply to Western Greys.) The Red mother is able to suckle both offspring, simultaneously delivering milk of differing composition from her two nipples to reflect the individual nutritional requirements of each joey. Lactating female kangaroos also have the ability to adjust the composition of their milk according to the stage of growth of the joey.

Studies of Red kangaroos by Norbury et al. in the Gascoyne district during 1989/90 identified that the home range of individuals is elastic—with area reflecting forage availability. During good seasonal conditions the home ranges averaged 6.5 $km^2$ but over the whole study (which also included dry times) home range averaged 69.6 $km^2$. Sub-adult males were significantly more mobile than adult and sub-adult females. Kangaroo densities during the study were estimated to be in the order of 4 to 5 kangaroos/$km^2$. This equates to a background grazing pressure of 1 DSE per 30 ha.

Cost-effective management methods (that conform to broader community expectations) of such an environmentally adapted species remains a very significant challenge to Australia's grazing industries.

*Information sourced largely from '*A Fragile Balance: The Extraordinary Story of Australian Marsupials*' by Christopher Dickman, illustrated by Rosemary Woodford Ganf, published by Craftsman House 2007, ISBN 9780980354010.*

# Is goat removal enough to allow ecosystem recovery in the Mid West rangelands?

A new research project just beginning, a collaboration between the Geraldton Iron Ore Alliance (GOIA), DEC, and researchers from Curtin and Murdoch universities, will attempt to answer this question to determine if goat management alone is sufficient restoration action or are other management actions required.

Feral goats now occur in all Australian states and on many offshore islands, but are most common in the rocky or hilly semi-arid areas like the Mid West region of Western Australia. They are highly versatile generalist herbivores and will browse shrubs and trees, graze forbs and grass, and eat fallen fruit capsules, bark and other dead plant material, including species normally unpalatable to other herbivores. It is clear, through previous research nationwide, that feral goats can have a major effect on native ecosystems through overgrazing and through trampling and destruction of the soil biotic crust.

Control of feral goats is a complex issue. While they are seen by some as a major environmental and agricultural pest, they are seen by others as a valuable income source. Feral goat control programs also need to be coordinated with other activities that may be taking place, including the on-ground protection of threatened plants and animals and control of native species such as kangaroos and other invasive species such as rabbits and feral pigs. Key questions in the management of goats are: 'How responsive is the vegetation to goat removal?'; 'Do all goats need to be removed?'; and 'If goats are managed, do other herbivores remaining in the rangeland maintain its degraded state?'.

The Department of Environment and Conservation have established 27 enclosure plots in Mid West (from Muggon to Burnerbinmah stations with matching open plots to investigate perennial vegetation recovery on stations where destocking is occurring. Our project will build upon the DEC experiment through establishment of additional paired plots in sites where relatively high goat numbers will remain, including on banded iron formations (BIF), a focus of mining exploration and extraction. As well as additional plots, additional baseline measures will be added to all plots to allow future measurement of ecosystem changes. These will include monitoring of herbivore densities, documenting biomass changes of selected palatable and relatively unpalatable species, and quantifying surface soil erosion, chemistry, and cryptogram coverage.

Dr Richard Harris
Department of Environment and Agriculture
Curtin University of Technology

Tel: +61 8 9266 3029
Email: R.Harris@curtin.edu.au
Mobile: 0438943758

# Climate change: a whole lot of hot air or...???

*Kaz Johnson, ESRM, Carnarvon*

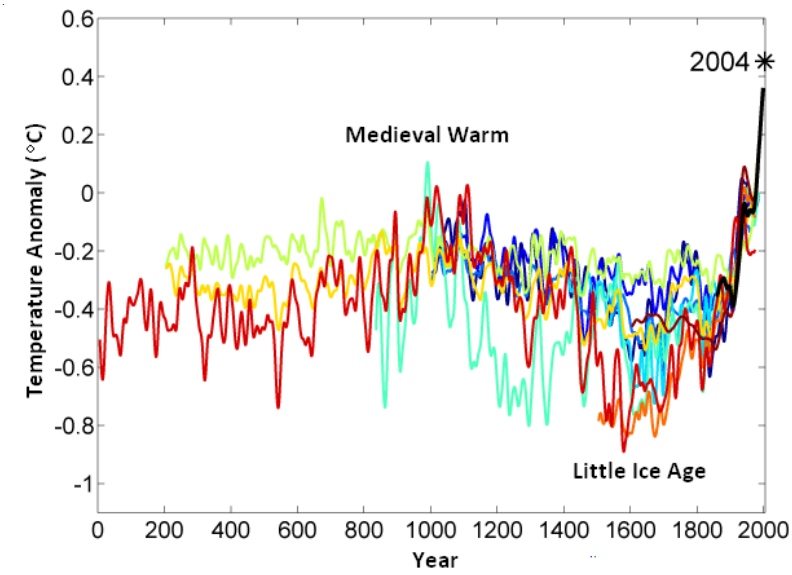
One of the most vigorously debated topics on Earth is climate change. There are facts, figures, graphs and statements relating to climate change flying all around us on a daily basis, and depending on the agenda of the author, the 'evidence' used can be manipulated to sell a particular school of thought. So, instead of feeling kicked in the guts about climate change, a recent workshop organised by the *Rangelands BestPrac WA* group at Shark Bay had some very interesting discussions. Here are some interesting points to consider on this monster of a topic.

In a nutshell, climate change is the result of changes in our weather patterns because of an increase in the Earth's average temperature. This is caused by increases in greenhouse gases in the Earth's atmosphere. These gases soak up heat from the sun but instead of the heat leaving the Earth's atmosphere, some of it is trapped, making the Earth warmer. Greenhouse gases have always been a natural part of the atmosphere. They absorb and re-radiate the sun's warmth and maintain the Earth's temperature at a level necessary to support life. According to science, the problem we now face is that some of our actions are increasing the amount of the gases that trap that heat. This enhanced greenhouse effect is contributing to a warming of the Earth's surface.

During the past 100 years, global average surface temperatures have increased by an average of 0.7°C. Since 1910 the temperature of Australia has risen by about 1°C. Although these increases sound small, they have a big impact on the world's climates, with Australia's climate being one of the most likely to be affected.

*Hasn't climate change always happened? In the past we've had 'ice ages' and 'big melts'. How are they any different to what we are going though now?*

The history of the Earth has been constantly marked by significant fluctuations in global temperatures (according to records of pollen, carbon and volcanic ash in ice cores and tree rings and coral). As time goes forward, more accurate temperature records are assembled; with that comes a greater understanding of the complicated mechanisms of our variable weather patterns. At this moment in time it is pretty much agreed that: Global surface temperatures have risen in recent centuries.

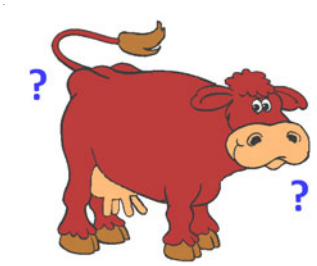



Some say that the Earth's climate was in a cool period from 1400 AD to about 1860 AD called the 'Little Ice Age'. This period saw harsh winters, short growing seasons and a much drier climate. The decline in total global temperatures was only about 0.5°C, but the effects of this global cooling cycle were very pronounced (particularly in higher latitudes). The Little Ice Age was responsible for a host of suffering,

including crop failures (like the 'Irish Potato Famine'). Today, we enjoy global temperatures which have warmed to higher levels on par with the 'Medieval Warm' period, which existed from approximately 1000 AD–1350 AD and we are currently looking at temperatures far higher than they have been previously recognised—and rising. *(Lyn Beazley, Chief Scientist of Western Australia.)*

Australia generates 1.5% of the total global greenhouse gas emissions, so our actions alone cannot avert the worst consequences of climate change. However, per capita, Australia is one of the world's biggest polluters. The global effects of climate change are impacting Australia's rainfall, temperatures, bushfire frequency, health, heritage and biodiversity for current and future generations. So while our impact on the global scale remains smaller than most, it is still essential we play our part in the global effort and look towards ideas which will help us better protect our businesses and regional communities. Some of the topics discussed at the workshop included tapping into the carbon market, and utilising algae growth as a 'bio-fuel producing carbon dioxide absorber' and using the high protein bi-product as a stock feed.

*'The cow fart issue—how much truth is really in that!?'*




We hear an increasing amount about methane emissions from cattle as a factor in climate change. One of the most common arguments for this was based on a study done in the US on the extreme amounts of methane coming from cows. This study has often been waved about in the world political arenas when any discussion of '*where to point the finger of blame for climate change*' was brought up. What wasn't (and still isn't in some groups) taken into consideration was that the 'study cows' were feedlot grain fed cattle; their rich diet of grains and grasses alone would be on par with us eating a dozen tins of baked beans per day—need I explain more?? Another misconception of these arguments lies in the fact that a majority of methane expelled from a rumen is actually in the form of burps, not just farts.

Ruminants worldwide are said to be directly responsible for approximately 6% of methane related global warming. Cattle and sheep will be a percentage of that but the actual figure is incredibly difficult to calculate precisely (one would imagine that it would be tricky to catch a fart in a bottle to measure what it was made of!). Putting the actual measuring difficulties aside, it is unknown exactly how many ruminants we have wandering around the planet. We also have to consider a huge number of unmanaged animals munching on a variety of diets outside of the world's production paddocks (in Australia's case camels and goats, followed by deer, bison, elk and antelope elsewhere). So, although our cows and sheep are contributing to this blanket of gas in the atmosphere, the diets of rangelands stock and the numbers we carry don't necessarily expel as much of a gassy problem as some other more intensive practices in the industry.

Our livestock industry is the only production industry in Australia to have reduced greenhouse gas emissions since 1990. Emissions declined by 7.5% between 1990 and 2007 (due to improvements in nutrition, introduction of rumen bacteria modifiers and genetics) compared to increases in industries such as transport (up 26.9%) and electricity generation (up 54.1%). For more information on this, see the Meat & Livestock Australia's (MLA) *Red Meat: Green Facts* website www.redmeatgreenfacts.com.au.

# Southern Rangelands rainfall variability

In recent issues of the *Pastoral Memo* the matter of reduced rainfall effectiveness in many rangeland landscapes was highlighted. In conjunction with this reduced rainfall effectiveness, pastoral enterprises also have to manage for rainfall variability.

Rainfall in the Southern Rangelands is often described as being highly variable or unreliable on both a month to month and year to year basis. The degree of variability from year to year may be mathematically described using percentiles. For example, annual rainfall totals less than the 10th percentile and greater than the 90th percentile are each likely, on average, to occur one year in ten. The 50th percentile (median) represents the annual rainfall total that is exceeded in half of the years. The median is used to generate the variability figure because, unlike an average, it takes out the effect of extremely wet and extremely dry years.

Annual rainfall variability can be mathematically represented by the spread of the 10th and 90th percentiles relative to the median value:

$$\text{Variability} = \frac{(90^{th}\text{ percentile} - 10^{th}\text{ percentile})}{50^{th}\text{ percentile}}$$

The far north-west and the upper Ashburton, Gascoyne, and Murchison catchments experience the highest annual variability. The far north-west is exposed to sporadic heavy cyclonic summer rains and May–June rains associated with north-west cloud bands.

The table below indicates the range of annual variability throughout the Southern Rangelands.

| Location | 90th percentile (mm) 1 year in 10 chance | 10th percentile (mm) 1 year in 10 chance | 50th percentile (mm) Median | Annual variability | Variability descriptor* |
|---|---|---|---|---|---|
| **Learmonth** | 463 | 112 | 210 | **1.67** | High |
| **Three Rivers** | 409 | 77 | 199 | **1.66** | High |
| **Errabiddy** | 380 | 77 | 185 | **1.64** | High |
| **Carnegie** | 367 | 68 | 189 | **1.58** | High |
| **Meekatharra** | 371 | 112 | 184 | **1.41** | High |
| **Carnarvon** | 371 | 106 | 205 | **1.29** | High |
| **Menzies** | 392 | 124 | 234 | **1.15** | Mod.–High |
| **Rawlinna** | 310 | 93 | 188 | **1.15** | Mod.–High |
| **Denham** | 349 | 119 | 205 | **1.12** | Mod.–High |
| **Yalgoo** | 395 | 148 | 240 | **1.03** | Mod.–High |
| **Eucla** | 367 | 171 | 259 | **0.76** | Moderate |
| **For comparison** | | | | | |
| **Northam** | 576 | 301 | 428 | **0.64** | Low–Mod. |
| **Pemberton** | 1410 | 963 | 1205 | **0.37** | Low |

* Variability descriptors:
Low 0.00–0.50, low to moderate 0.51–0.75, moderate 0.76–1.00, moderate to high 1.01–1.25, and high >1.25.

The table indicates that annual rainfall variability is significant throughout the region, implying that sophisticated risk management is required to steer pastoral enterprises through this variability. This means being able to take advantage of those years of good rainfall and minimise the negative impacts of poor ones.

# Recovering productive pasture capacity by soil rehydration

*Dr Ken Tinley, Landscape Ecologist - Email: ken.tinley@optusnet.com.au*

There are two far-reaching threats to pasture productivity and carrying capacity. These are soil dehydration, and scrub encroachment as a consequence of excessive run-off loss through erosion gutters.

As grasses use only the topsoil and upper subsoil horizons of textured soils, it is only under grassland that a high field capacity can be attained. Field capacity refers to the amount of water remaining in the soil after the excess has drained off. In addition it is only with a dense grass cover that effective infiltration can occur. This enables the soil profile to be to adequately wet for maintenance of the pure grassland habitat on textured soils. Sandy soils of course absorb all rainfall whether bare or vegetated.

The single unrealised fact across arid rangelands worldwide is that widespread and continuous depletion of soil moisture is the ultimate cause of pasture degradation and the hobbling of grazing enterprises. On land with little slope this is initially a subtle and insidious process where the slightest drainage incision, such as a cattle pad, can initiate the unplugging of a catchment and the loss of soil moisture. Being subtle and insidious, this process is easily overlooked.

The greatest risk areas on a pastoral station can be the areas of highest density of natural and artificial water points. These are often on the most productive land ('Best Country'). The areas with the highest overlap of 3 km grazing and trampling radii around water points require extra close monitoring for signs of reduced grass cover density and topsoil stripping. If these signs are present a strategy needs to be planned for spelling the areas and closure of water points to maintain land health.

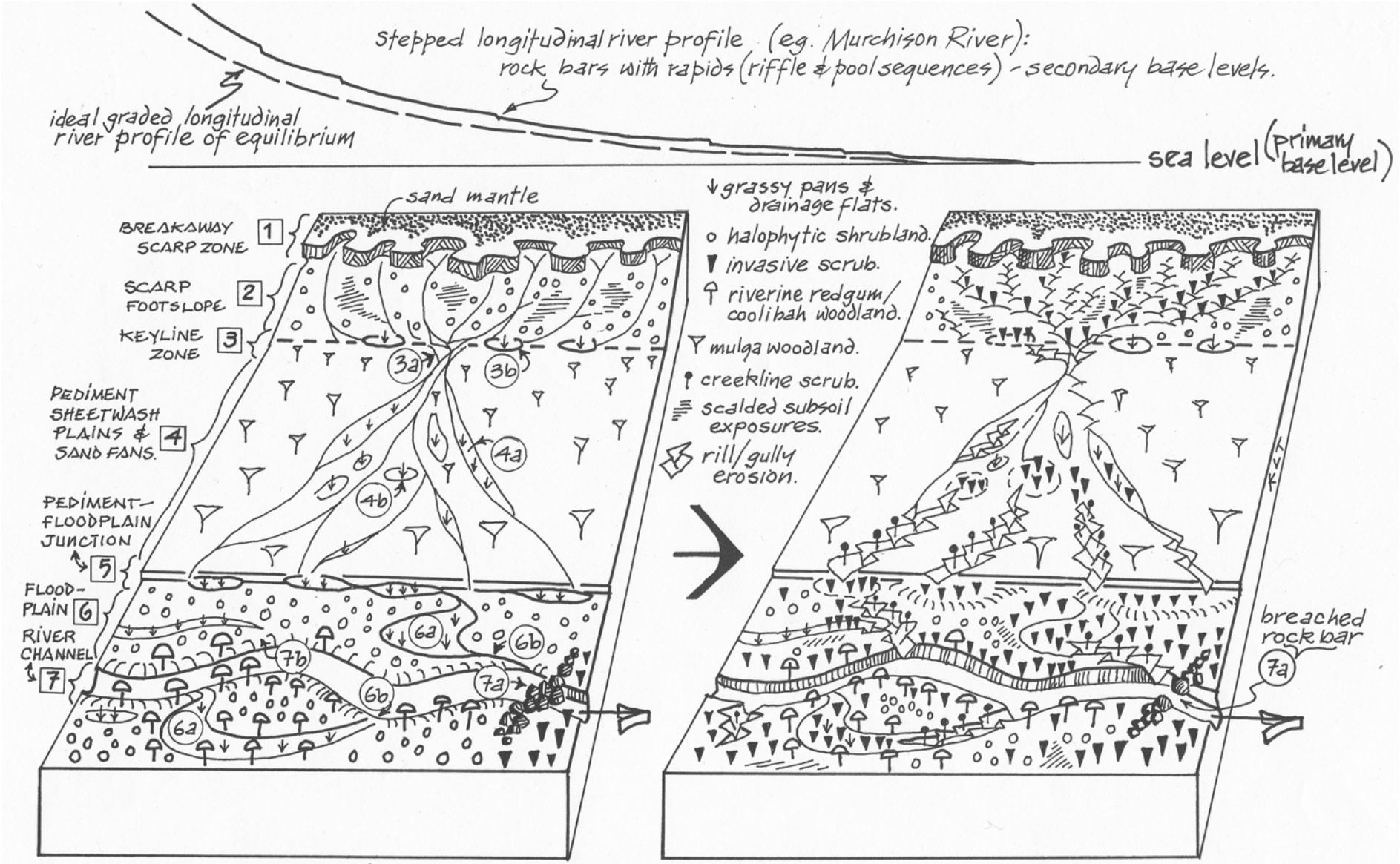
In dry regions the quantity of rain is only of partial importance to plants. The amount of available moisture remaining in the soil is of far greater importance. The amount of water that gets into the soil is related to slope and run-off, porosity of the topsoil and density of grass cover. Loss of a porous topsoil results in grasses becoming sparse, and worse, exposes the subsoil at the surface that becomes sealed and water-shedding. Rainwater will then run off and no longer replenish the soil profile. Increasing desiccation ensues.

Due to the natural processes of water moving across the land under the force of gravity, coupled with disturbances to the land by humans and livestock, drainage down-cutting increases run-off and gully erosion. This guttering not only drains the land of water but also leaves it perched out of reach of effective flooding, starved of the floodwater that has escaped down the eroded channels into the salt lakes or the ocean.

Reduced grass cover and stripping of porous topsoils multiplied across a station can mean that formerly flooded areas which once produced most of the fodder, now produce much less. Multiplied across the region, it provides the answer to why the country is capable of running far fewer livestock than it did in the early 1900s.

The wearing down of land surfaces is a natural long-term geomorphic process. The fundamental focus of land management therefore should be to slow these processes down by retaining soil moisture through maintaining porous topsoils by a healthy grass cover, and by rainwater harvesting and spreading.

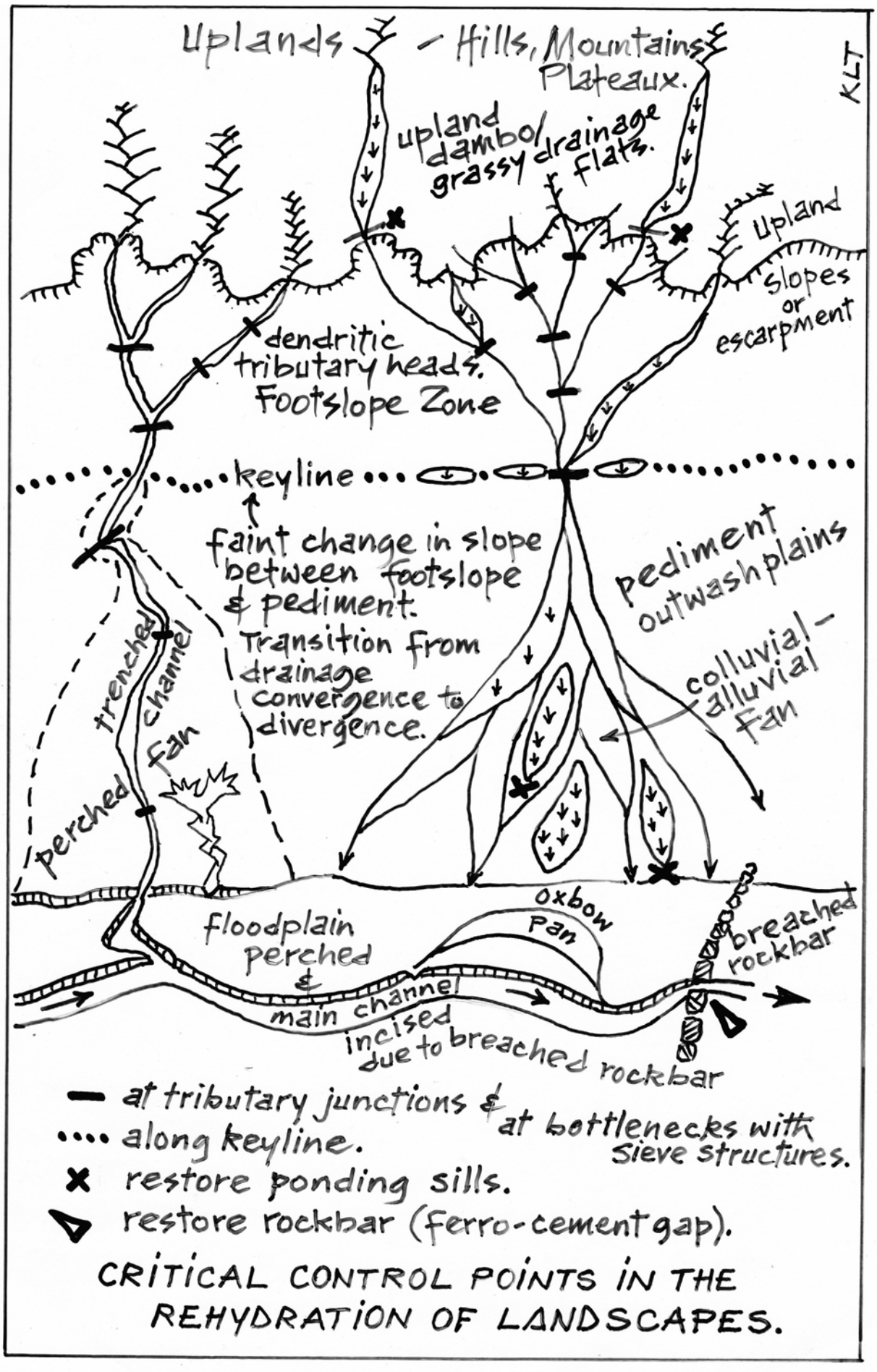
For a pastoralist, this means identifying where the main run-off losses are occurring in the core grazing areas, the land surface processes that are causing the run-off, and what can be done about it. In the final count, stemming the haemorrhaging of soil moisture is the crux to successful and sustainable pastoralism.




**SEGMENT OF MAJOR RIVER & ITS FLOODPLAIN WITH ADJOINING VALLEY-SIDE CATCHMENT.**

ⓐ landscape in dynamic equilibrium (minimal erosion).

ⓑ same landscape in active, erosion driven transformation.


Uplands - Hills, Mountains & Plateaux.
KLT
upland dambo/ grassy drainage flats.
upland slopes or escarpment
dendritic tributary heads. Footslope Zone
keyline
faint change in slope between footslope & pediment. Transition from drainage convergence to divergence.
pediment outwash plains
colluvial - alluvial fan
trenched channel
perched fan
floodplain perched & main channel incised due to breached rockbar
oxbow pan
breached rockbar
— at tributary junctions & at bottlenecks with sieve structures.
.... along keyline.
✕ restore ponding sills.
restore rockbar (ferro-cement gap).
CRITICAL CONTROL POINTS IN THE REHYDRATION OF LANDSCAPES.