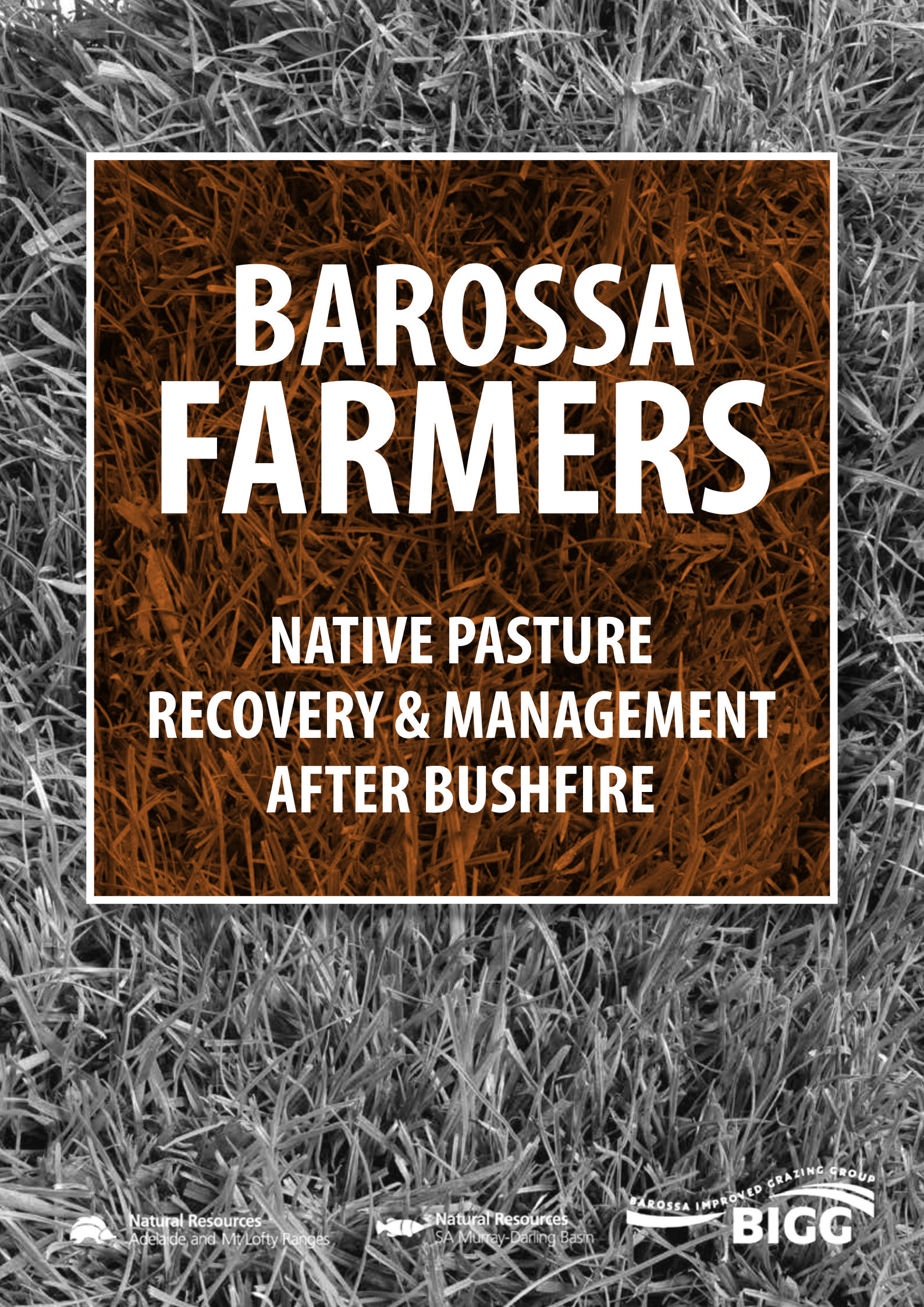

# BAROSSA FARMERS

## NATIVE PASTURE RECOVERY & MANAGEMENT AFTER BUSHFIRE

Natural Resources Adelaide and Mt Lofty Ranges
Natural Resources SA Murray-Darling Basin
Barossa Improved Grazing Group BIGG

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## Case Studies

# INTRODUCTION

In 2014, areas of the Eastern Mt Lofty Ranges, near the Barossa Valley, were burnt in two separate fires. The Eden Valley Fire occurred on 17 January and burnt over 24,000ha between Eden Valley and Truro. The following December, the Hutton Vale fire burnt 1,400ha east of Angaston. These fires caused unprecedented damage, damaging infrastructure, killing and maiming livestock, destroying pastures, remnant bush and habitat.

The vast majority of the areas burnt were native pastures, made up of a range of species including native perennials, legumes and other plants, which play a crucial role within the local livestock grazing system. Producers rely on these low input pastures to provide feed through the winter and spring, utilise summer rainfall, increase groundcover and enhance local biodiversity. However, returning native pastures back to their productive potential whilst ensuring NRM benefits takes time, careful management and help.

A community recovering from a major bushfire requires immediate and on-going support. This is particularly the case for livestock producers. After the immediate response which generally included destocking their pastures, producers needed to focus their attention on ensuring their native pastures returned to productive potential.

The Barossa Improved Grazing Group (BIGG) received funding from Natural Resources Adelaide and Mount Lofty Ranges (AMLR), and Natural Resources SA Murray-Darling Basin (SAMDB) to investigate the recovery of native grasses following the fires and support producers in managing their pastures and grazing businesses.

This booklet presents the results of three monitoring sites established to observe the long term recovery of native pastures after the bushfires. They include soil testing results across the ranges, small fertiliser demonstration plots and native pasture feed analysis.

Case studies are coupled with this information to provide real examples of six producers whose businesses and production systems were impacted by the fires, highlighting their immediate and long term steps taken to native pasture recovery.

The opportunity to learn from others can be thought provoking and provide assistance to those who may be affected by bushfires in the future. It also provides information on how native pastures can be managed to achieve long term production benefits.

# BACKGROUND INFORMATION

Seasonal variation plays a huge role in any agricultural production system and will have an overall effect on any pasture recovery process.

Traditionally the Eden Valley to Truro area of the Eastern Mt Lofty Ranges receives 400mm rain annually with a cycle of wet winters and hot dry summers. The autumn break is generally considered to occur in April with the majority of rain falling during the winter and spring. The main growing season occurs through late winter/spring with pastures drying off in summer. Occasionally there may be summer rainfall as a result of thunderstorms.

## 2014

Three weeks after the Eden Valley Fire, there was unseasonal 100mm rain across the ranges which significantly helped with the immediate pasture recovery process. The long term recovery proved more difficult. The average annual rainfall was above average, however, the majority of this rain fell early in the year with below average monthly falls through the spring months leading to a hot, dry summer.

**Table 1. Keyneton 2014 Annual Rainfall – Total 520.4mm Average Annual 500mm**

| Month | Rainfall (mm) | Running Total | Month | Rainfall (mm) | Running Total |
|---|---|---|---|---|---|
| January | 6.6 | 6.6 | July | 73.6 | 447.6 |
| February | 126.4 | 133 | August | 9 | 456.6 |
| March | 21.6 | 154.6 | September | 15.6 | 472.2 |
| April | 63.4 | 218 | October | 6.8 | 479 |
| May | 60.8 | 278.8 | November | 30.4 | 509.4 |
| June | 95.2 | 374 | December | 11 | 520.4 |

## 2015

The average annual rainfall was still well below the total average annual rainfall.
The break occurred in late April, however with the dry spring in 2014 the summer was tough. The 2015 winter and spring have also been well below average which has made the second year of the pasture recovery process difficult, particularly for businesses who already reduced stocking rates one year after the fire. After the fire producers collectively thought it would take two years for the pastures to recover back to their pre-fire productive capacity. After the two dry springs, this recovery process is still not complete and will take at least one more year.

**Table 2. January- October Keyneton 2015 Rainfall – Total 338.6 Average Annual 500**

| Month | Rainfall (mm) | Running Total | Month | Rainfall (mm) | Running Total |
|---|---|---|---|---|---|
| January | 54.2 | 54.2 | June | 10.8 | 197.2 |
| February | 0.6 | 54.8 | July | 50.4 | 247.6 |
| March | 4.2 | 59 | August | 55 | 302.6 |
| April | 72.2 | 131.2 | September | 26.6 | 329.2 |
| May | 55.2 | 186.4 | October | 9.4 | 338.6 |

# ACKNOWLEDGEMENTS

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These case studies could not have occurred without the grant funding and the support of the following stakeholders:

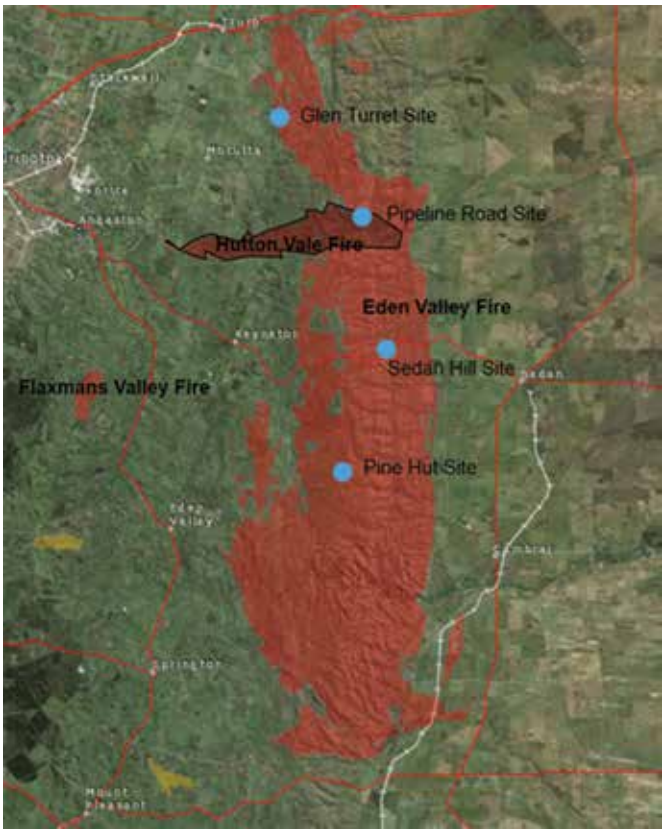
- Natural Resources Adelaide and Mt Lofty Ranges
- Natural Resources SA Murray Darling Basin
- Daniel Schuppan, Animal Production Specialist Landmark
- Nicola Barnes, Senior Project Officer Ranges to River, NR SAMDB

This booklet has been funded through the Natural Resources Adelaide Mt Lofty Ranges Sustainable Industry Grant and funding from Natural Resources SA Murray Darling Basin.

For further information contact Georgie Keynes, BIGG Technical Facilitator, georgie.keynes@biggroup.org.au or visit www.biggroup.org.au.

# DISCLAIMER

This booklet is not a comprehensive guide to managing your land or your native pastures. It is intended to provide information and provoke thought. No legal liability is accepted for the information, errors or omissions contained in this booklet.



# MONITORING NATIVE PASTURE RECOVERY

To observe the long term recovery of native pastures, three monitoring sites were established 8 months after the fire, in September 2014, and monitored every 2 months until September 2015.

The sites were located across the burnt area of the Eastern Mt Lofty Ranges on Treloar's property on Pine Hut Road near Eden Valley, the Keynes' on Sedan Hill and Greg Koch's property near Moculta. After the Hutton Vale fire, another site was established at Pipeline Road near Moculta in March 2015.

One or two transects were set up at each site so monitoring could be comparable. The transects were 50 metres long with a steel post placed at each end (Figure 1). The aim of the sites were to observe the overall recovery of the pastures and compare different areas of the paddock in relation to pasture growth.

## Monitoring of the transect:

- A photo was taken of the transect.
- Every 10m a pasture composition count was taken (5 times) and averaged.
- Every 10m a pasture dry matter cut (kg/ha) was taken (5 times) and averaged. A sample was collected and dried in the microwave to establish the dry matter %.
- Samples were collected for feed analysis in September '14, November '14 and February '15.

## Pasture composition

A mesh sheet with 100 points (intersections), (Figure 2), was used to measure composition. The plant species, litter or bare ground under each point was recorded and a percentage calculated.

| Site | Number of monitoring transects | Comments |
|---|---|---|
| Treloar's – Pine Hut Road, Eden Valley | 1 | Paddock was completely burnt. Site located on top of a hill. |
| Keynes's – Sedan Hill, Keyneton | 2 | Paddock was completely burnt. The slope of a hill was monitored compared to the flat. |
| Koch's – Glen Turret Road, Moculta | 2 | Paddock was half burnt. The transects were set up so burnt pasture could be compared to unburnt. |
| Keynes's – Pipeline Road, Moculta (Established March 2015) | 2 | Paddock was burnt in the Eden Valley Fire and then half burnt in the Hutton Vale Fire. The transects were set up to compare pasture burnt once verse burnt twice. |

^ Figure 1: A 50m transect was established to enable repeatable pasture measurements

^ Figure 2: Mesh used to measure pasture composition

^ Daniel Schuppan (Landmark) and Nicola Barnes (Natural Resources SA Murray-Darling Basin) monitoring at Sedan Hill.

A variety of species were recorded at each site including native grasses, native herbs and shrubs, annual grasses and broad lead weeds (Table 1). All of the native species are endemic to the local area and annual grasses and weeds are common across the ranges.

Other native species that were not found in the transects but were noted near by the transects were:
*Boerhavia dominii* (Tar Vine)
*Chloris truncata* (Windmill Grass)
*Cymbopogon ambiguous* (Lemon Grass)
*Euphorbia drumondii* (Spurge)
*Ophioglossum lusitanicum* (Adders Tongue)
*Vittadinea* sp. (New Holland Daisy)
*Themeda triandra* (Kangaroo Grass)
(Figure 2)

| Plant species | Common name |
|---|---|
| ***Anthosachne scabra*** | Native Wheat-grass |
| ***Aristida behriana*** | Brush Wire-Grass |
| ***Arthropodium sp*** | Chocolate Lily |
| ***Austrostipa spp.*** | Spear Grass |
| ***Boerhavia dominii*** | Tar Vine |
| ***Cheilanthes australis*** | Rock Fern |
| ***Convolvulus angustissimus*** | Pink Bindweed |
| ***Crassula sp.*** | |
| ***Enneapogon nigricans*** | Black-heads |
| ***Euphorbia drummondii*** | Caustic Spurge |
| ***Goodenia pusilliflora*** | Small-flower Goodenia |
| ***Oxalis perenanns*** | Tall-fruit Oxalis |
| ***Panicum effusum*** | Hairy Panic |
| ***Leptorhynchos tetrachaetus*** | Little Buttons |
| ***Rytidosperma spp.*** | Wallaby Grass |
| ***Setaria sp.*** | Paspalidium |
| ***Vittadinia cuneata*** | New Holland Daisy |
| ***Wurmbia dioecia*** | Early Nancy |
| **Arctotheca calendula* | Capeweed |
| **Avena sp* | Oats |
| **Carthamus lanatus* | Saffron Thistle |
| **Centaurium erythraea* | Common Centaury |
| **Disa bracteata* | African Weed Orchid |
| **Echium plantagineum* | Salvation Jane |
| **Erodium botrys* | Geranium / Long Storks Bill |
| **Hypochaeris radicata* | Flat Weed/Catsear |
| **Medicago polymorpha* | Medic |
| **Neatostema apulum* | Hairy Sheepweed |
| **Petrorhagia dubia* | Velvet Pink |
| **Plantago bellardii* | Hairy Plaintain |
| **Poa bulbosa* | Bulbous Measow-grass |
| **Moraea setifolia* | Thread Iris |
| **Salvia verbenaca* | Wild Sage |
| **Trifolium spp.* | Clover |
| | Annual grasses# |

| Key |
|---|
| Native grasses |
| Native herbs & shrubs |
| Annual grasses |
| Broad-leaf weeds & Legumes |
| Thread Iris |

**Figure 1. Wallaby Grass**

**Figure 2. Kangaroo Grass**

**Figure 3. Spear Grass**

# *Bromus hordeaceus* (Soft Brome), *Bromus madridensis* (Compact Brome), *Aira* sp. (Hair Grass), *Brachypodium distachyon* (False Brome), *Vulpia* sp. (Silver Grass).

# SOIL SURVEY TO HELP RECOVERING PASTURES

Producers in this area rely on their native pastures within their production systems. Therefore special care is required after bushfires to ensure pastures return back to their productive capacity, with as little disruption to the system as possible.

Due to the inaccessible terrain, and limitations for fertiliser and liming programs these paddocks have very little soil information. Determining soil limitations is an effective method of assessing any issues holding back the recovery process.

In November 2014 twelve producers were involved in a soil survey across 20 paddocks in the 2014 Eden Valley bushfire zone (Map 1). The paddocks were unimproved native pastures in undulating to very steep hills.

Using the soil test results, two fertiliser application demonstrations were established to determine the recovery and production benefits related to the application of fertiliser. See page 10 for further information regarding the fertiliser demonstration.

Paddocks were sampled by stopping at six accessible sites in a paddock and taking five 0-10cm cores at each stop (Map 2).

The soil samples were analysed for 20 different nutrient and soil characteristics. The key nutrients are summarised in Table 1.

**Map 1. Locations of soil test. Points 3, 5, 6 & 9 are the native grass monitoring sites.**

**Map 2. Example soil sampling transect. Located on Hans Graetz's Property near Cambrai.**

| | I Koch | | G Koch | | Graham Keynes | Georgie Keynes | |
|---|---|---|---|---|---|---|---|
| Nutrient | 1 - Long Dam | 2 -Tennis Court | 3 - Monitoring Site | 4- East | 5 - Pipe Line | 6 - Sedan Hill | |
| pH (1:5 CaCl2) | 5.1 | 5 | 5.1 | 4.8 | 6.1 | 6 | Low |
| Phosphorus (Colwell) mg/kg | 11 | 6 | 5 | 5 | 6 | 4 | Marginal |
| Sulphur (KCI-40) mg/kg | 3.5 | 2.4 | 3 | 2.3 | 5.8 | 2.2 | Sufficient |
| Copper (DTPA ) mg/kg | 0.66 | 0.99 | 0.84 | 0.87 | 0.5 | 0.52 | High |
| Zinc (DTPA) mg/kg | 0.73 | 0.45 | 0.45 | 0.41 | 1.1 | 0.92 | |
| | | | | | | | |
| | H & R Graetz | Treloar | | Jaeske | | Saege | Evans |
| Nutrient | 7 - Quarry Road | 8 -Paddock 2 | 9 - Hill | 10 - Centre | 11 - Jamie's Pad | 12- B1 | 13 -North |
| pH (1:5 CaCl2) | 6.1 | 6 | 5.6 | 5.4 | 5.7 | 4.9 | 5.2 |
| Phosphorus (Colwell) mg/kg | 7 | 5 | 6 | 14 | 12 | 11 | 6 |
| Sulphur (KCI-40) mg/kg | 2.9 | 1.9 | 2.8 | 3.2 | 2.8 | 3.2 | 2.3 |
| Copper (DTPA ) mg/kg | 0.97 | 0.63 | 0.24 | 0.87 | 0.48 | 0.55 | 0.53 |
| Zinc (DTPA) mg/kg | 0.57 | 0.5 | 0.5 | 0.7 | 0.66 | 0.76 | 0.46 |
| | | | | | | | |
| | Evans | H Graetz | | Starkey | | Neumann | |
| Nutrient | 14 - Bottom | 15 - Top Hills | 16 - Lower Slopes | 17 -Fertiliser | 18 -No Fertil-iser | 19- Internal | 20 – Fence line |
| pH (1:5 CaCl2) | 6.1 | 5.2 | 5.6 | 7.2 | 7.2 | 7.1 | 7.6 |
| Phosphorus (Colwell) mg/kg | 7 | 9 | 8 | 16 | 8 | 9 | 5 |
| Sulphur (KCI-40) mg/kg | 2.5 | 3.4 | 3.1 | 4.5 | 3.6 | 2.6 | 3 |
| Copper (DTPA ) mg/kg | 0.54 | 0.49 | 0.76 | 0.58 | 0.62 | 0.4 | 3.56 |
| Zinc (DTPA) mg/kg | 0.48 | 2.72 | 0.59 | 0.53 | 0.33 | 0.33 | 0.23 |

Table 1. Soil Analysis Paddock Summary for Key Nutrients

# Summary

The soil tests indicate that:

- There were no major differences in the results along the ranges.
- Soil phosphorus and sulphur are low on all properties. These deficiencies are potentially the main pasture production limitation and fertiliser should be applied.
- In eight of the paddocks pH is moderately acidic and liming is recommended.
- Copper levels ranged from low to high but generally most paddocks were sufficient.
- Zinc also ranged from low to high but half of the paddocks had low levels. Pastures are generally responsive to zinc applications which could be utilised in these lower zinc paddocks.

These results indicate that there are some limiting factors to pasture recovery which can be rectified, however it is always recommended to speak to your local adviser in regards to the best method of applying the nutrients that your soils require to improve pasture production.

It is also important to consider the cost/benefit and method of application, which in these rugged slopes can often be difficult. Further information on interpreting soil test results can be found in Appendix 1.

# NATIVE PASTURES FERTILISER DEMONSTRATION

The productivity of pastures is influenced by a number of factors including soil fertility. However different pasture species have different nutrient requirements with native pastures generally considered to require less nutrition than introduced species.

The aim of this demonstration was to investigate the response of native pastures to single superphosphate (0:8.8:0:11) (SSP) at various rates and to determine the effect on pasture growth in an effort to improve pasture recovery and identify ways of boosting pasture production.

## Method

Soil tests were completed at 20 properties in the bushfire affected area. These results indicated low phosphate and sulphur levels across the majority of the properties tested. Therefore, two sites which displayed relatively common soil limitations, were selected to set up a replicated single superphosphate fertiliser demonstration. One located on Treloar's at Pine Hut and the other at Keynes' on Sedan Hill (Table 1).

**Table 1: Soil Test Results from Monitoring Paddocks where demonstrations were located**

| Nutrient | Pine Hut | Sedan Hill |
|---|---|---|
| pH (1:5 $CaCl_2$) | 5.6 | 6 |
| Phosphorus (Colwell) mg/kg | 6 | 4 |
| Sulphur (KCI-40) mg/kg | 2.8 | 2.2 |
| Copper (DTPA ) mg/kg | 0.24 | 0.52 |
| Zinc (DTPA) mg/kg | 0.5 | 0.92 |

The demonstration had three different applications of single superphosphate (50kg, 100kg and 150kg per ha) replicated three times (Map 1). No single superphosphate was added to the control.

Plots were 10 metres by two metres with a two metre buffer between plots. The plots were fenced off to exclude all stock, including kangaroos, to enable a complete analysis of pasture response.

The single superphosphate was spread on the 7th May 2015 using a hand spreader, prior to receiving 14mm rain. Over the growing period from May to September, the plots received less than 200mm rain.

On the 15th of September 2015 half of each treatment area was mowed and the dry matter collected and weighed. A sample was taken and dried in a microwave to establish the dry matter percentage of each treatment.

**Map 1 – Kg of Single Superphosphate Applied per Hectare**

| | | | |
|---|---|---|---|
| 100 | 50 | Control | 150 |
| Control | 150 | 100 | 50 |
| 50 | 100 | 150 | Control |

## Results

The average results of the plots (Table 3) indicate that the addition of 150kg/Ha of single superphosphate increases the dry matter production by 200kg/Ha, however there is no response from 100kg and only a small response from 50kg/Ha.

When these results are combined with the actual plot results (Table 2) it is clear that the results are very variable. This is due to the nature of the country which includes areas of rock, where no plants grow, and soil variability. Also there was old dead native grass in the plot which would variably increase the amount of dry matter in the mowed sample.

A visual assessment of the plot showed that the plant size of haresfoot clover in the fertiliser treated plots had increased compared to the control. The haresfoot clover was 15-20cm in height compared to 5-7cm. The extra dry matter grown was estimated to be between 50-100 kg DM/ha. This is good quality feed and would help improve livestock production from the paddock.

Also there was no visual difference between the growth of the native plants between the treated plots and the control.

The cost of dry matter grown is variable (Table 5 & 6) as a result of the inconsistent values. This demonstrates that further information on the response of the pastures is required to ensure reliable cost/benefit analysis which is an important consideration as the inaccessible terrain provides difficulties for fertiliser application.

**Figure 1: Pine Hut Site- September 15 2015**

150kg SSP /ha

**Table 2. Dry Matter for Each Treatment (kg/ha in italics). Single Superphosphate Rate (kg/ha in bold). Pine Hut Site (Orange), Sedan Hill Site (Blue)**

| | | | |
|---|---|---|---|
| 100<br>*860*<br>*1650* | 50<br>*1170*<br>*1890* | Control<br>*980*<br>*1660* | 150<br>*970*<br>*2150* |
| Control<br>*1340*<br>*1900* | 150<br>*1440*<br>*2100* | 100<br>*1080*<br>*1860* | 50<br>*1250*<br>*1780* |
| 50<br>*1420*<br>*1620* | 100<br>*1160*<br>*1610* | 150<br>*1530*<br>*1640* | Control<br>*1080*<br>*1620* |

Table 3. Average Dry Matter per Hectare for Treatments

| Treatment kg/ha | Average dry matter kg/ha | |
|---|---|---|
| | Pine Hut | Sedan Hill |
| Control | 1140 | 1730 |
| 50 | 1280 | 1760 |
| 100 | 1030 | 1707 |
| 150 | 1320 | 1960 |

Table 5. Cost of Extra Dry Matter Grown- Pine Hut Site

| Treatment SSP kg/ha | Kg P /ha | Extra dry matter grown above control kg/ha | Approximate cost of fertiliser including spreading/ha | Cost of extra DM grown Cents/kg DM |
|---|---|---|---|---|
| 50 | 4.4 | 140 | $18.50 | 13 |
| 100 | 8.8 | 0 | $37 | 0 |
| 150 | 13.2 | 180 | $55.50 | 31 |

Table 6. Cost of Extra Dry Matter Grown- Sedan Hill

| Treatment SSP kg/ha | Kg P/ha | Extra dry matter grown above control kg/ha | Approximate cost of fertiliser including spreading /ha | Cost of extra DM grown Cents /kg DM |
|---|---|---|---|---|
| 50 | 4.4 | 30 | $18.50 | 62 |
| 100 | 8.8 | 0 | $37 | 0 |
| 150 | 13.2 | 230 | $55.50 | 24 |

# Summary

It was established that superphosphate does provide some response within native pastures and most importantly does not hinder the production of the native species.

It appears that the added legume growth from the application would have beneficial production results adding extra protein into the lower quality grass component of the diet for the livestock eating this pasture. Therefore the cost of the extra dry matter grown would be reduced further as it is improving not only the quantity of the pasture but also the quality.

**Figure 2: Sedan Hill Site- September 15 2015.**

**150 kg SSP/ha**

The added long term benefit for pasture growth also needs to be considered as not all of the phosphorus and sulphur would be removed by livestock in the first year, but recycled in the paddock for future use.

As a result of the variability, and the long term benefits gained from fertiliser application, these treatments will be replicated in 2016 and the results and cost/benefit analysis reassessed.

# FEED VALUE OF NATIVE PASTURES

Native pastures play a critical role in sheep and beef production systems in the local region. Determining the nutritional value of these pastures provides valuable information to help in their management and for assessing their productive potential.

Feed tests were conducted at regular intervals across the monitoring sites to understand the nutritional value of the native grass pastures, which can be related to the nutritional requirements for livestock (Table 1).

Native grasses can be classified as C3 and C4 plants. C3 plants are considered as winter active plants with their main production during autumn, winter and spring, although they can respond to rain at all times of the year. Generally they will set seed in spring and early summer. C3 plants include wallaby grass and spear grass. C4 plants are summer active plants and include brush wire grass and windmill grass. C4 plants generally grow in late spring and summer and their production will depend on spring and summer rainfall. Generally they will set seed in late summer and autumn.

The nutritional value of native grasses varies between species but generally the feed value for C3 native grasses follows the same pattern as an annual pasture across a season.

Wallaby grass and spear grass have the highest nutritional value of the native grasses tested. Brush wire grass, which is a C4 plant, provides moderate feed value but as it grows in summer livestock will graze it because it is better feed quality than the surrounding dry dead material.

## Metabolisable Energy (ME) and Protein

Native grass tests (not performed in this project) have shown when the native grass is green and vegetative through late winter and spring, it can reach levels of 10-11 ME and have high protein levels of 20 to 30 percent. These levels are above maintenance levels for ewes and cattle.

As the plants mature and put energy into seed production, the feed quality declines and reaches its lowest level when the plants are dead. This is shown in the November 2014 tests where the plants have set seed and provide below livestock maintenance levels for energy and protein.

Native grasses are perennials so can respond to out of season rainfall by producing new leaves. This growth, while green, is higher in energy and protein than the dead leaf so can improve the quality of the pasture. The February 2015 tests show how after a summer rain the native grasses had metabolisable energy at livestock maintenance levels and protein above maintenance requirements.

## Fibre Percentage

Generally native grasses are high in fibre which restricts feed intake. The Neutral Detergent Fibre Percentage (NDF) is commonly around 60 to 85 percent, although species such as wallaby grass have shown to have NDFs of around 40 percent and spear grass 50 percent when short and green (1cm to 2cm in height). The NDF of a native grass will be lowest when it is short and actively growing and highest when the plant has set seed and died off.

After the fire the short fresh green native grasses were very palatable as there was no old dead material in the plant, such as shown in the spear grass component of the Koch analysis in November 2014. This can result in reduced persistence as plants are preferentially grazed, particularly in paddocks which are only partially burnt.

**Table 1. Nutrient requirement of ruminants (adapted from National Research Council)**

| Sheep Requirements | DMI % of LW | (ME) MJ/kg/DM | Protein % | NDF % | NDF % Range |
|---|---|---|---|---|---|
| Ewe/wether: maintenance | 2.0% | 8 | 8% | 30% | 30-55% |
| Ewe: 4 weeks pre-lambing | 2.8% | 10 | 14% | 30% | 30-43% |
| Ewe: lactating | 4.2% | 11 | 15% | 30% | 30-40% |
| Weaner lambs | 4.0% | 11 | 16% | 30% | 30-35% |
| Beef Cattle Requirements | | | | | |
| Cow: maintenance | 1.8% | 8.0 | 8% | 30% | 30-60% |
| Cow: lactating | 2.5% | 10.5 | 15% | 30% | 30-35% |
| Calf: 4 months | 3.5% | 10.8 | 16% | 30% | 30-40% |
| Calf: 8 months | 3.0% | 10.8 | 14% | 30% | 30-40% |

*DM – Dry Matter, DMI – Dry Matter Intake, LW – Live Weight, ME – Metabolisable Energy, MJ-Mega Joules, NDF – Neutral Detergent Fibre*

Comparing the pictures below with the feed test information provides good examples of the nutritional content of the pasture, taking into account the different varieties of species.

## 23rd September 2014

| Analysis<br>Koch Mix – Brush Wire Grass, Spear Grass, Wallaby Grass | |
|---|---|
| 39 | Dry Matter % |
| 6.7 | Metabolisable Energy MJ/kg |
| 14 | Protein % |
| 87 | Neutral Detergent Fibre % |

| Analysis<br>Sedan Hill - Spear Grass | |
|---|---|
| 39 | Dry Matter % |
| 6.7 | Metabolisable Energy MJ/kg |
| 14 | Protein % |
| 87 | Neutral Detergent Fibre % |

| Analysis<br>Treloar Mix – Brush Wire Grass, Spear Grass, Wallaby Grass | |
|---|---|
| 37 | Dry Matter % |
| 6.8 | Metabolisable Energy MJ/kg |
| 13 | Protein % |
| 86 | Neutral Detergent Fibre % |

# 21st November 2014

| Analysis<br>Koch - Spear Grass - Unburnt | |
|---|---|
| 68 | Dry Matter % |
| 6.7 | Metabolisable Energy MJ/kg |
| 5.4 | Protein % |
| 86 | Neutral Detergent Fibre % |

| Analysis<br>Sedan Hill - Spear Grass | |
|---|---|
| 60 | Dry Matter % |
| 6.5 | Metabolisable Energy MJ/kg |
| 4.5 | Protein % |
| 87 | Neutral Detergent Fibre % |

| Analysis<br>Treloar Mix –Spear Grass, Wallaby Grass, Brush Wire Grass | |
|---|---|
| 55 | Dry Matter % |
| 6.9 | Metabolisable Energy MJ/kg |
| 7.1 | Protein % |
| 84 | Neutral Detergent Fibre % |

# 4th February 2015


| Analysis<br>Sedan Hill - Mix –Spear Grass, Wallaby Grass, Brush Wire Grass | |
|---|---|
| 41 | Dry Matter % |
| 8 | Metabolisable Energy MJ/kg |
| 12.1 | Protein % |
| 70 | Neutral Detergent Fibre % |


| Analysis<br>Koch - Mix – Brush Wire Grass, Spear Grass, Wallaby Grass | |
|---|---|
| 42 | Dry Matter % |
| 8.4 | Metabolisable Energy MJ/kg |
| 14.8 | Protein % |
| 66 | Neutral Detergent Fibre % |


| Analysis<br>Treloar - Mix – Brush Wire Grass, Spear Grass, Wallaby Grass | |
|---|---|
| 45 | Dry Matter % |
| 8.5 | Metabolisable Energy MJ/kg |
| 14.8 | Protein % |
| 65 | Neutral Detergent Fibre % |

## Summary

Native grasses vary in their feed value throughout the year. Ideally native grasses should be grazed when their nutritional value is the highest, which is when they are actively growing, as this will result in the most feed for livestock production. When the plants have dried off the feed quality is poor and the livestock production is reduced. Therefore the best time to graze the native pastures is in autumn, winter and spring although if summer rains occur the C4 plants can provide some maintenance feed for livestock.

To ensure long term recovery, native plants should be rested to allow seed set, which generally occurs in October and November. Another consideration is that native grasses, especially spear grass, produces seeds which can have negative effects, including carcass damage and wool contamination.

Although it is best to graze the plant while actively growing to maximise livestock production, the most important part of grazing is to allow the plants to rest to recover after grazing and this will vary depending on rainfall. If the plants are continuously grazed they become weak and eventually die. Good grazing management is important for the persistence of native grasses and the key is finding the balance between what is best for the animal and the plant.

# SHORT TERM PAIN FOR LONG TERM GAIN

Name: Jason and Kirsty Treloar
Location: Eden Valley
Annual Rainfall: 450mm
Farm size: 640 Ha
Enterprise: Wool, lamb

Jason Treloar lost 95 percent of his Eden Valley property in January 2014, including 24km of fencing and more than 500 sheep. He organised agistment for the remaining sheep the next day.

"There was no time to waste. I had lost more than half of my flock, but I needed to look after the remaining 200 sheep. I was on the phone the Saturday morning, and organised agistment for the sheep straight away at a few different properties. " he said.

Jason juggled agistment for 11 months allowing the native grasses on his property time to grow and set seed, only returning a small number of sheep to the land in November 2014.

"Before the fire I grazed at one DSE per hectare, which was a low stocking rate, but when I re-stocked I put only 150 sheep on, at a grazing pressure of 0.25 DSE/Ha. It was really important to us to ensure we didn't overgraze, so we were thinking of resting the pasture even longer given the spring was really dry, but we needed to think about finances so we decided 11 months was long enough."

Jason and Kirsty both obtained off-farm employment after the fire, so that they could afford to give the pastures an extended rest.

"Having to work off-farm isn't ideal, but that, plus selling quite a few sheep, gave us the financial security we needed. We did the maths and decided that leaving the pastures bare to recover made more sense than bringing sheep back on earlier; the cost and effort of supplementary feeding just didn't add up for us."

Jason increased his stocking rate in March 2015 to a rate of about 0.6 DSE/ha after some good rain improved growth and groundcover.

"I try to maintain at least 80 percent groundcover, so when the pastures were doing well in March and groundcover was high, I bought 250 sheep, and have been grazing at 0.6 DSE/Ha since then. If we had a good spring this year I would have probably increased the stocking rate again, but because we didn't, I will leave it until Spring 2016."

Figure 1 shows the dry matter on offer at the monitoring site. Before stock returned the dry matter reached 1050 kg/ha. This has slowly decline over the monitoring period due to grazing and a dry spring in

**Figure 1: Dry matter at the Treloar's monitoring site from September 2014 to September 2015**

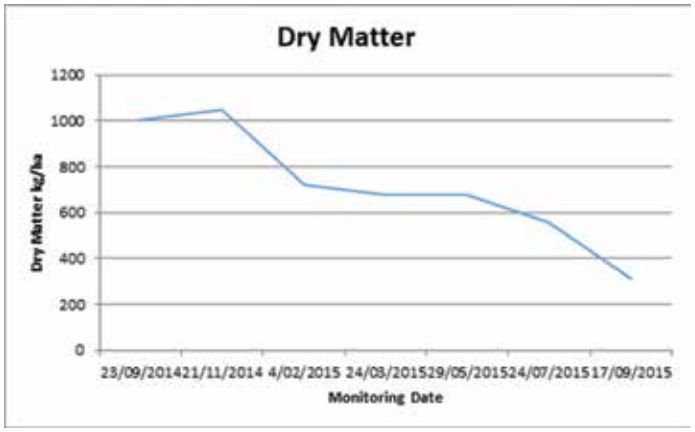
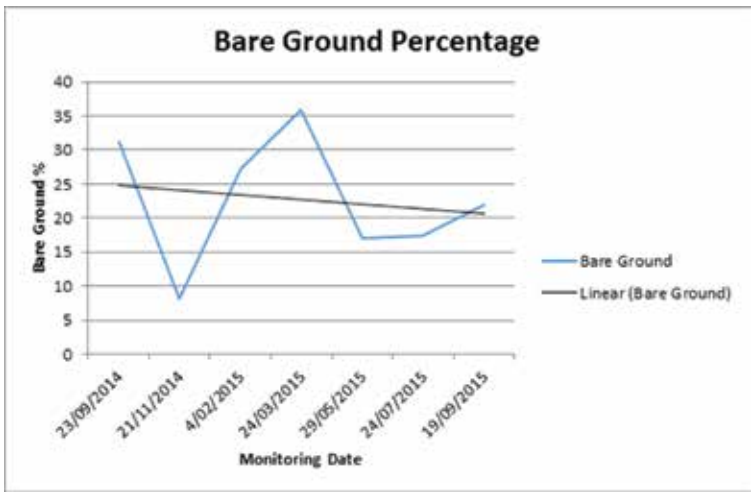
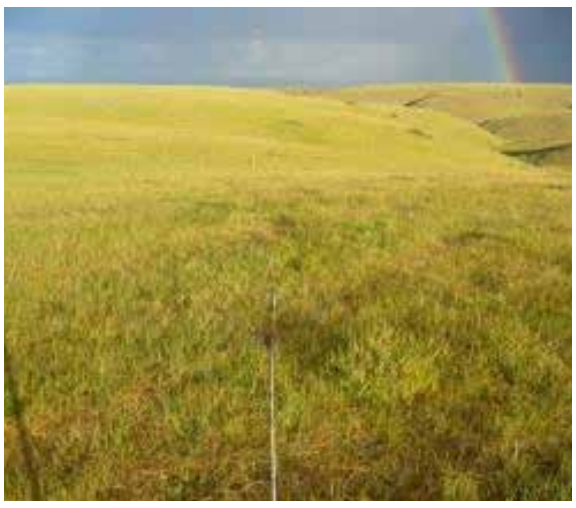



**Figure 2: Bare ground percentage at Jason and Kirsty Treloar's property. Note that the groundcover percentage is 100 percent minus the bare ground percentage.**




**September 2014**
**1000 Kg/DM/Ha**



**September 2015**
**500 Kg/DM/Ha**

2015. This site is also situated on top of a hill which tend to be overgrazed as sheep preferentially camp and graze there.

Figure 2 shows the percentage of bare ground at the monitoring site over the monitoring period. The bare ground varies from a low of 10 percent (groundcover of 90 percent) in November 2014 up to 35 percent (groundcover of 65 percent) in March 2015. The trend shows that the bare ground is close to 20 percent bare ground on average, corresponding to Jason's 80 percent groundcover target. Maintaining 80 percent groundcover reduces the risk of erosion and helps to ensure organic matter is retained in the soil.

Some paddocks are still empty of stock because of low groundcover, though Jason is finding that does not mean there isn't any grazing occurring.

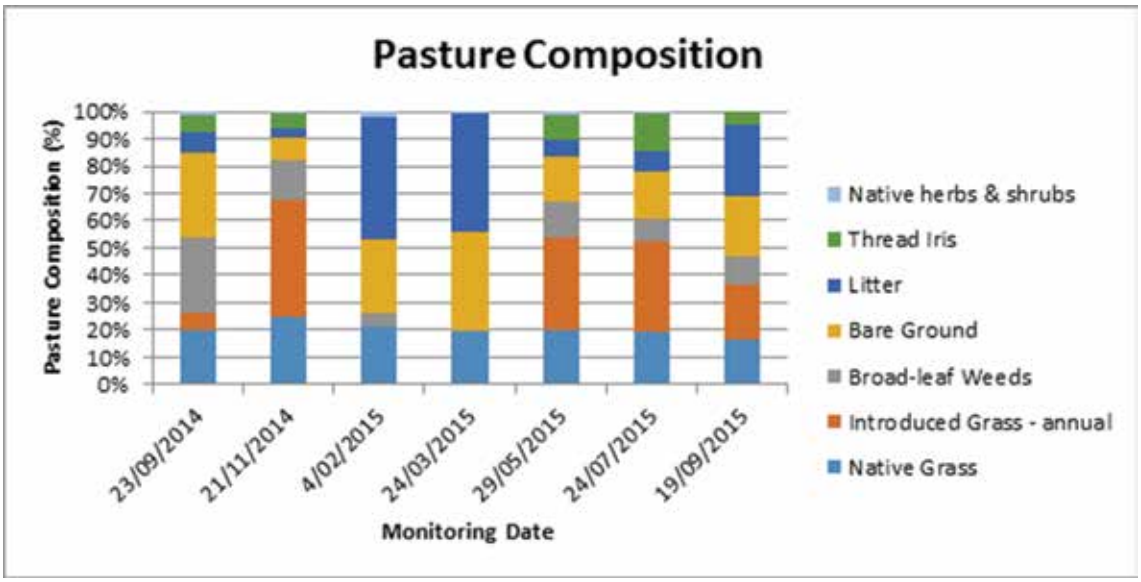
"Kangaroos are a pretty big problem at the moment. We have a permit to cull 50 each year, but right now there are hundreds of them grazing the pastures. There's not much I can do though, so I just have to monitor groundcover and make sure I prevent sheep grazing where the groundcover is low."

Jason says he will continue to keep grazing pressure low. "I've always believed that it is better to err on the side of under-grazing. If the sheep are well fed, we get good wool cuts, and higher prices, so it isn't as though we're missing out on revenue. I am hoping we will be able to buy more sheep and reduce our off-farm work as the property recovers, but it will come down to how the pastures recover. "

As shown in Figure 3 at the Treloar's monitoring site the native grass was between 15 and 25 percent of the pasture composition. Spear grass was over 50 percent of the native grass present with a small amount of brush wire grass and wallaby grass.

Allowing a rest period for the plants is critical to allow the recovery process to be achieved. Observations at the monitoring sites indicate that 90 percent of the native grass recovery was from established plants which had been burnt rather than plants germinating from seed. Figures 4 and 5 show examples of this type of growth.

**Figure 3: Composition of the pasture at Jason and Kirsty Treloar's monitoring site.**



## Lessons Learned

- To ensure good recovery of native pastures, careful grazing management is critical.
- Finding the balance between making an income and allowing the recovery of pastures after fire is difficult however should be managed with the long term gain in sight.
- The recovery process has taken longer than first thought. After the fire it was thought two years would allow full recovery, however with variable climatic conditions it appears this could take another one to two years.

**Figure 4: of Spear Grass growing around the edges of a burnt plant (November 2014)**

**Figure 5: Example of Spear Grass growing from a burnt butt (February 2015)**

# CAREFUL MONITORING IMPROVES RECOVERY

Name: Joe Keynes
Location: Keyneton
Annual Rainfall: 500mm
Farm size: 6800 Ha
Enterprise: Wool, lamb, beef, cattle and cropping

Joe Keynes farms 6800 hectares of hilly grazing land with his brother Graham, with Joe looking after the southern Keyneton region of the farm and Graham managing the northern Moculta region. Both properties were seriously damaged by the Eden Valley fire in January 2014.

"The Eden Valley bushfire reached Keyneton on the Friday evening, reaching Moculta later in the night, giving us a pretty tough 24 hours until it was contained late Saturday night. In that time over 85 percent of our family's property was burnt, with 50 kilometres of fencing destroyed."

Immediately after the fire, the Keynes' realised they had to destock. A supportive livestock agent helped the family arrange agistment for two-thirds of their stock, while about two thousand sheep were placed in the farm's droughtlot, and others moved to a nearby cropping property after a neighbour offered his lupin stubble for grazing.

"Our stock agent, the local community and the extended farming community were extremely willing to provide agistment for our sheep who were moved to stubbles for the summer months."

They did however find it difficult to find agistment for cattle, which eventually went to the South East.

"We were contemplating selling a portion of the cattle because we couldn't find agistment for them."

Joe was conscious of biosecurity when sending his stock on agistment. "We were selective on what animals were sent on agistment, all of our stud stock stayed on the home property to ensure there was no disease risks which is an important consideration for us."

The Keynes' also implemented a strict regime which they still use now, which involves quarantining the returning stock into a 5ha paddock for a few days to allow weed seeds to pass through their system.

"We now leave these areas destocked and monitor the weed seeds which germinate. We have found one area of caltrop which has germinated. We also shear all returning sheep to further reduce the risk of weed seeds and treat them for lice off shears, this has allowed us to move to 8 monthly shearing which we were aiming to do anyway," he said.

Even though rain in February 2014 refreshed the landscape, and manually feeding the sheep in the droughtlot was very labour intensive, the Keynes' chose not to return any sheep to the property until the season break in May. At this time, four months after the fire, Joe returned many of the sheep from agistment on cropping properties, to a stocking level of 2.5 dry sheep equivalent DSE/Ha, compared to a pre-fire 'normal' of 3 DSE/Ha.

"We had been planning for a while to buy another property in the south-east of the state, to split our risk and help us manage climate variability. The fire forced our hand somewhat, so we purchased 700 acres at Avenue Range, so we could reduce the stocking rate at home and provide land for our cattle," Joe said.

Since the fires, the Keynes' have used BIGGs monitoring site to help manage their stocking rate, with a target of 1000 kg DM/Ha.

"We don't work on a fixed stocking rate. We use visual assessments along with the BIGG data, and if the dry matter is going to drop below 1000kg, we take the pressure off the paddock."

Figure 1 demonstrates the Keynes' strategy, with the dry matter average of the flat and slope sections of a completely burnt paddock rarely falling below 1000kg/Ha through September 2014 to 2015. To achieve this they conservatively set stocked with 500 ewes from April 2015 until lamb marking in July. Following this, when the pastures started to respond to the winter rains, 1000 ewes and lambs grazed the paddock through all of July. The paddock then had a large rest period until November.

**Figure 1: Dry matter measurements on Joe Keynes' property from September 2014 to September 2015. Two sections of the paddock were monitored; a flat section and a slope.**

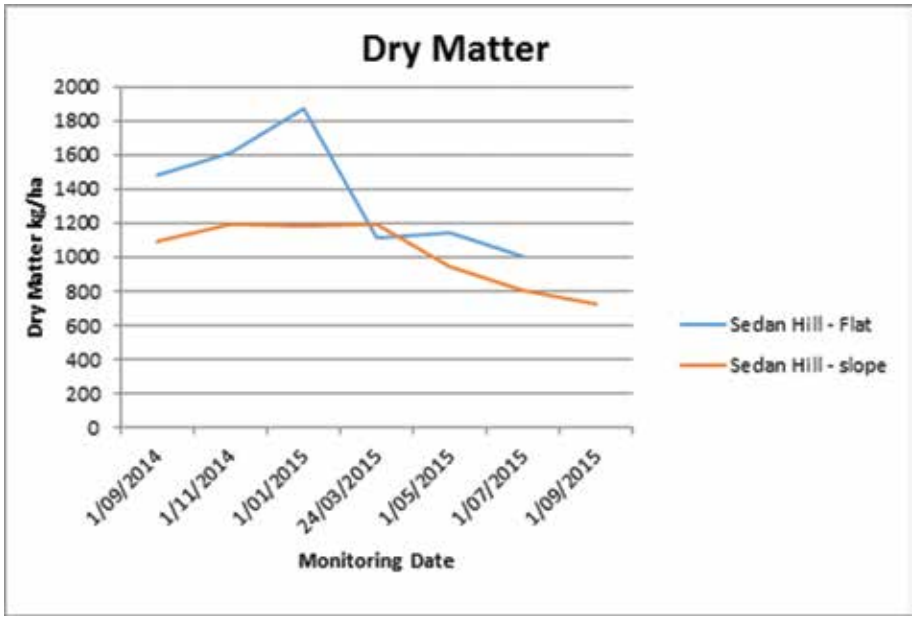
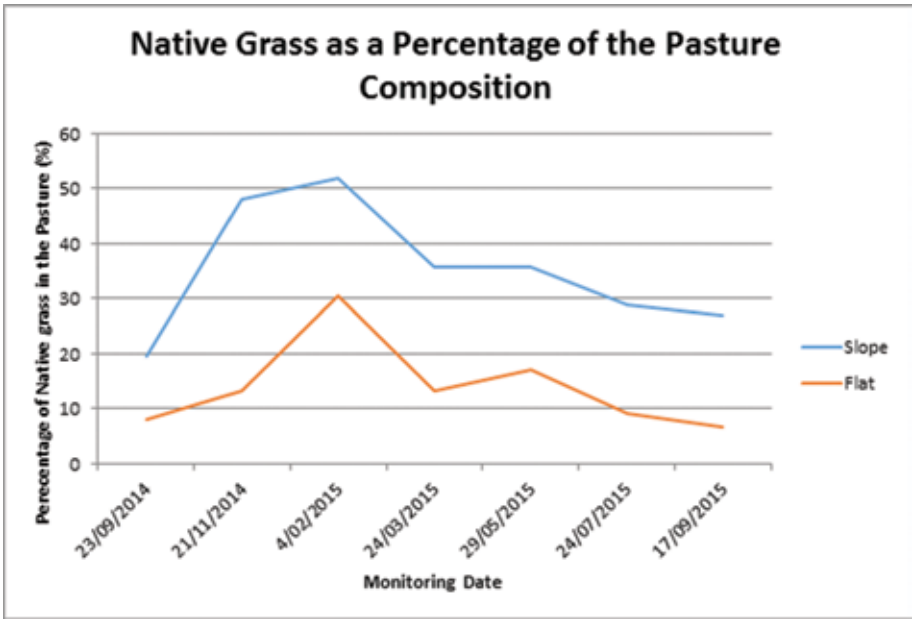


**Figure 2: Sedan Hill monitoring site native grass levels as a proportion of the total pasture composition**




"To make this work, we've had to reduce our overall number of livestock. In reducing our stocking rate, we use the principle that it is more profitable to have fewer ewes in good condition, than more ewes in poor condition. When the sheep are in better condition we get a higher lambing percentage, better sale weights and heavier wool cuts," he says.

The monitoring of the slope and flat sections of the paddock have demonstrated significant differences in the recovery. Figure 2 shows the proportion of native grasses within the pasture, showing native grasses make up a higher proportion of the slope. In both sections, native grasses responded well to summer rains in November 2014 and January 2015. Monitoring of species noted that brush-wire grass, in particular, grew well after summer rain.

"We can learn from the graphs how much difference landscape makes. When we set up new paddocks on our properties now, we're trying to fence the slopes separately from the flats. That way we can control the grazing depending on land class, pasture species and growth," Joe says.

Figures 3 and 4 show the different types of native grasses that were found at the Sedan Hill monitoring site. There were five different species of native grass monitored in the transects with lemon grass also found in the creek between the flat and the slope.

The dominant native grass on the slope was brush wire grass, up to 85 percent, followed by spear grass which was between 20 and 45 percent at different times of the year. On the flats the spear grass was dominate up to 90 percent of the native grass at the first monitoring and the brush wire grass was up to 65 percent of the native grass composition, on Joe Keynes' pasture after growth following summer rains.

**Figure 3. Sedan Hill Monitoring Site Composition of Native Grasses on the slope and flat measurement sites.**

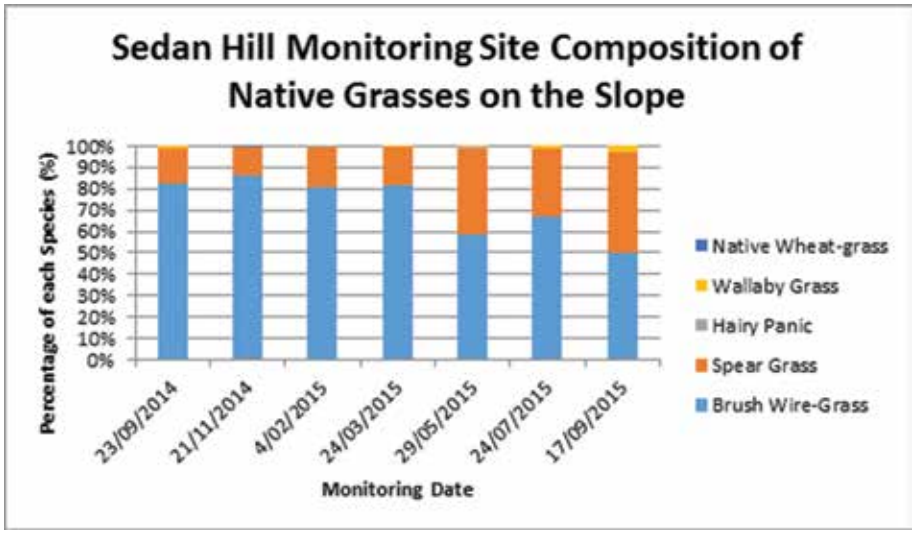
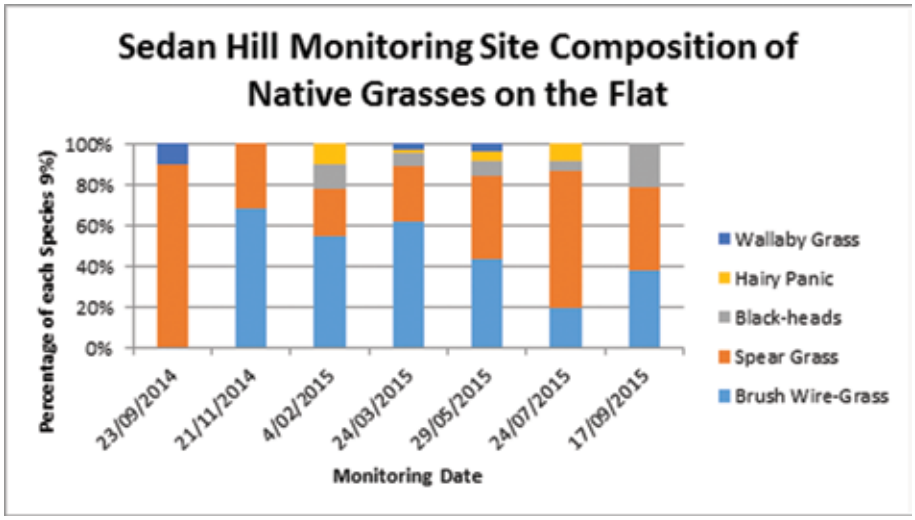



**Figure 4. Sedan Hill Monitoring Site Composition of Native Grasses on the Flat**




## Key messages

- Fencing to landclass helps with rotational grazing, preventing over and undergrazing resulting in more productive pastures.
- Maintaining a minimum kg/DM target ensures the pastures continue production and will respond to any rainfall event. It also prevents helps to maintain ground cover, reducing the risk of erosion and ensuring organic matter remains in the soil.
- Maintain strict biosecurity measures to prevent weed seed contamination and the risk of livestock diseases

## Flat

**1482 Kg/DM/Ha September 14**

**1876 Kg/DM/Ha- February 15**

**1140 Kg/DM/Ha July 15**

**800 Kg/DM/Ha September 15**
**After heavy graze**

## Slope

**1096 Kg/DM/Ha September 14**

**1191 Kg/DM/Ha February 15**

**800 Kg/DM/Ha July 15**

**720 Kg/DM/Ha September 15**

# TWICE BURNT IN MOCULTA

Name: Graham Keynes
Location: Moculta
Rainfall: 450mm
Farm size: 6800 Ha
Enterprise: Wool, prime lamb, beef and cropping

Graham Keynes experienced not one but two bushfires on his property in a period of 11 months in 2014.

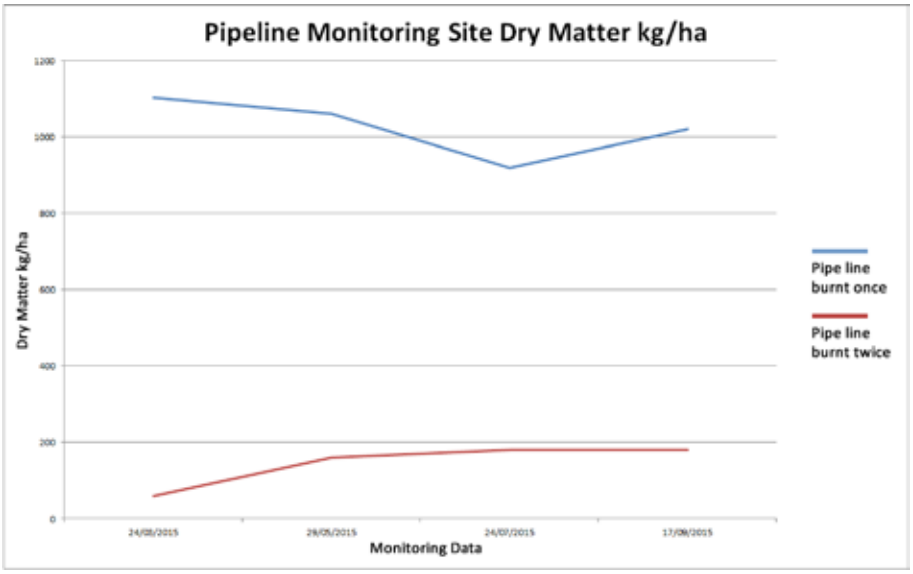
"Almost a year after the first fire, in December 2014, the Hutton Vale fire destroyed 1000Ha of my Moculta property, with about half of the damage affecting land that had already been burnt across the native pasture areas, and the other half being pasture that had missed the first fire. This included native pastures and some improved perennial pastures containing phalaris and sub clover."

"It was interesting that the phalaris pastures and a paddock planted to brassicas certainly slowed the course of the fire, with the brassicas preventing the fire spreading further south."

While the family had already arranged stubble agistment, as a result of the Eden Valley fire, which took some of the pressure off, Graham had to move 1000 sheep for a second time to the farm's droughtlot to manage through the summer, before re-stocking in autumn.

He selected a stocking rate of 2.5 DSE/Ha, below the pre-fire rate of 3 DSE/Ha. "Since the fires, 2.5 DSE/Ha is now the new normal. We manage the pastures to maintain a dry matter target, aiming for 1000 kilograms per hectare. However, after re-stocking the monitoring showed that the dry matter was too low where the pastures were burnt twice, so we've stopped grazing again," Graham says.

**Figure 1: Dry matter measured at Graham Keynes' monitoring site from March to September 2015.**



After the Hutton Vale Fire, BIGG established a monitoring site on Graham's property to measure the resilience of native pastures and how they recover after being burnt twice in one year.

Figure 1 shows the dry matter levels of Graham's pastures burnt once and burnt twice.

After the first Eden Valley fire the pastures received over 100mm rainfall, which allowed them to reshoot. With careful grazing management using rotational grazing methods these pastures have maintained 1000kg Dm/Ha. In comparison the twice burnt pasture are still only producing 200kg/DM/Ha as a result of their low reserves, after being burnt once, and not receive rain until much later after the fire which has prevented them from setting seed through 2015, further slowing their recovery process.

"Visually, eight months on from the Hutton Vale fire, the burnt and twice-burnt pastures are still noticeable on the landscape, and growth is weaker.

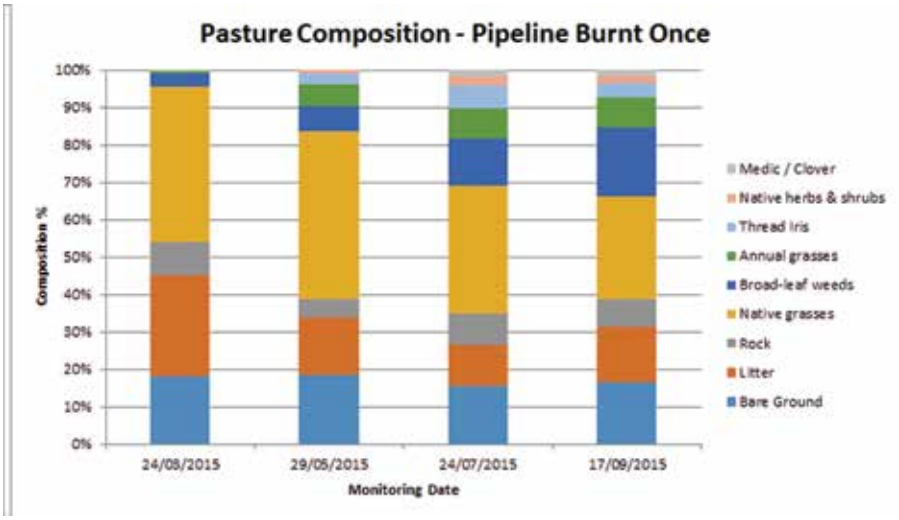



**Figure 2: Composition of Graham Keynes' pasture after the 2014 Eden Valley fire, measured from March**

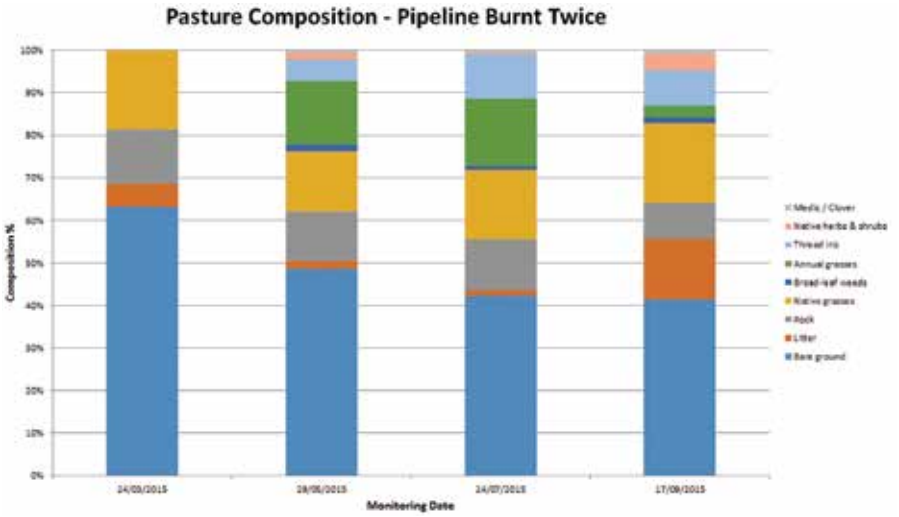



**Figure 3: Composition of Graham Keynes' pasture after being burnt in both the 2014 Eden Valley fire and 2014 Hutton Vale fire, measured from March to September 2015**

I have noticed the sheep now prefer the burnt areas because it is all fresh growth, so I am focussing on monitoring grazing to ensure the pastures receive enough rest."

The composition of Graham's pastures are shown in Figures 2 and 3. Compared to the burnt once pasture, the burnt twice has a far higher level of bare ground (medium blue) and fewer native grasses (yellow). This difference has persisted through to September 2015, though the proportion of bare ground is decreasing.

The increased bare ground results in lower organic matter in the soil and increases the amount of run off after a rainfall event, which will further slowdown their recovery.

"Options like the droughtlot and agistment are on the table again for summer 2016, and we're going to sell some sheep and put the twice-burnt paddock out of grazing rotation for a year to give it the best chance of getting back to 1000kg/ha."

## Lessons Learned

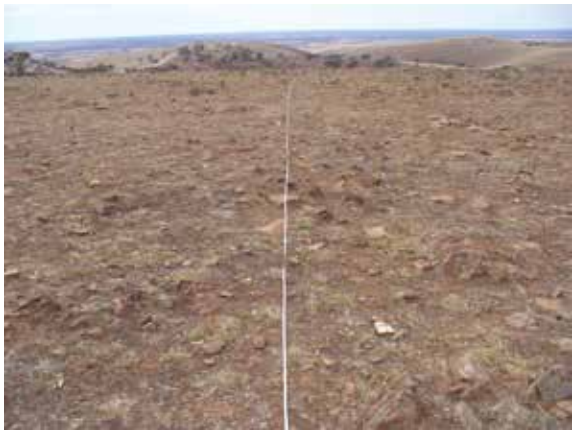
Quick decisions are needed after a fire. It's important to sit down with everyone in the business and think hard about what options will be the best in the long-term. Graham suggests including a farm advisor or stock agent to help work out the details

Collaboration: Graham found that workshops arranged by Natural Resources SAMDB were valuable both in the workshop content, and in the opportunity to meet with neighbours and discuss approaches for recovery.

**March 2015**

**1102 kg DM/Ha Burnt Once**

**60 Kg/DM/Ha Burnt Twice**



**September 2015**

**1020 Kg/DM/Ha Burnt Once**

**180 kg DM/Ha Burnt twice**

# DROUGHT LOT PROVIDES BREATHING SPACE

Name: Greg Koch
Location: Moculta
Annual Rainfall: 450mm
Farm size: 809ha
Enterprise: Wool, prime lamb and fodder

Greg Koch lost over half of his 800-hectare Moculta property in the Eden Valley bushfire, with about 450ha of pastures and 17 kilometres of fencing burnt. Greg avoided stock losses by protecting his sheep in a drought lot that he had previously installed using a Natural Resources SA MDB grant during the millennial drought.

"The drought lot allowed us to provide security and water for 1500 sheep, with donations of hay from the community providing feed in the immediate aftermath of the fire. Fortunately, this allowed me time to reflect and make decisions for the future of the farm, without having to rush into anything."

After having to turn down a few offers of agistment due to weed and caltrop problems, Greg was only able to find agistment for one mob of sheep.

Greg rested his pastures for four months until just before lambing in May 2014, when he made the decision to re-introduce ewes into his best lambing paddock, to maximise his lamb survival rates.

While the paddocks were rested, Greg re-built his fences with the help of BlazeAid, neighbours and his local hockey club. He took the opportunity to erect some additional fencing to allow fencing to land-class, which will allow him to better manage grazing in the future.

"Because the fire burnt at varying intensity in different paddocks, I varied the rest time, and left some paddocks until spring. Some of the more arable areas I sowed with oats or barley to provide additional early feed for livestock."

A key lesson Greg learnt from managing his business after the fire was the need for compromise.

"In some instances I left animals in a paddock beyond when I would have liked to rest the pasture, because I had no other rested paddocks and wasn't willing to sell my good breeding stock. The process of managing the business and pastures was a big juggling act."

The BIGG Native Recovery project included monitoring sites on both burnt and un-burnt pasture in the same paddock on Greg's property.

"The native pastures were incredible, and immediately started re-shooting. Within days of the fire I could see wallaby grass, spear grass and kangaroo grass on the fireground."

Figures 1 and 2 show the percentage of native grass in the pasture at Greg's monitoring site. Spear grass and brush wire grass were the main species with a small percentage of wallaby grass, which was no different from the unburnt area.

Figure 1- Pasture Composition within the unburnt pasture area.

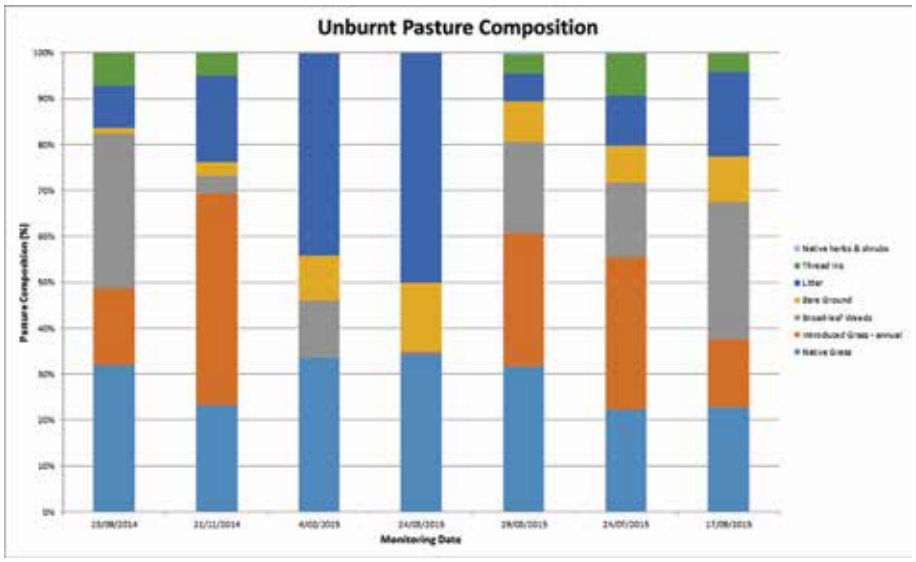
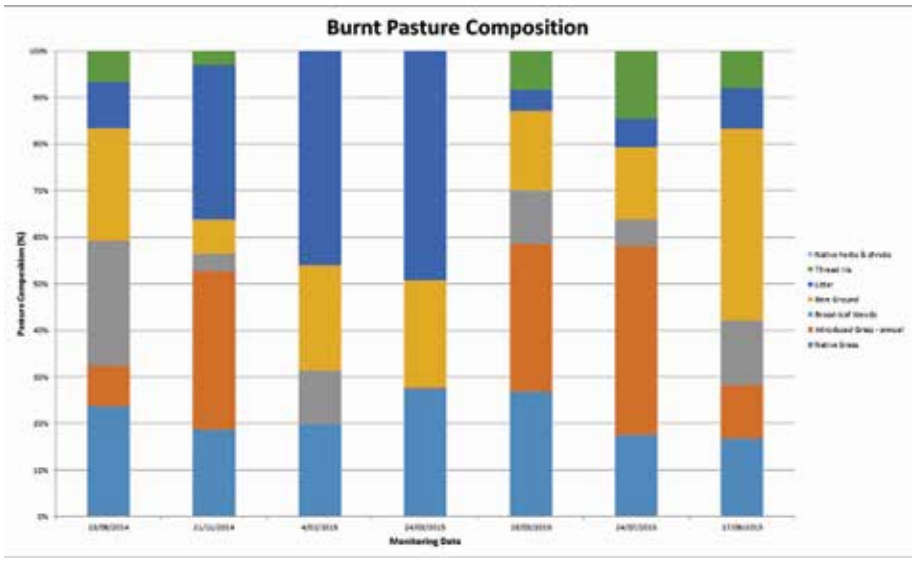



Figure 2: Pasture Composition – within the burnt pasture area.




Anecdotally some producers have noticed increases in kangaroo grass as a result of the fire.

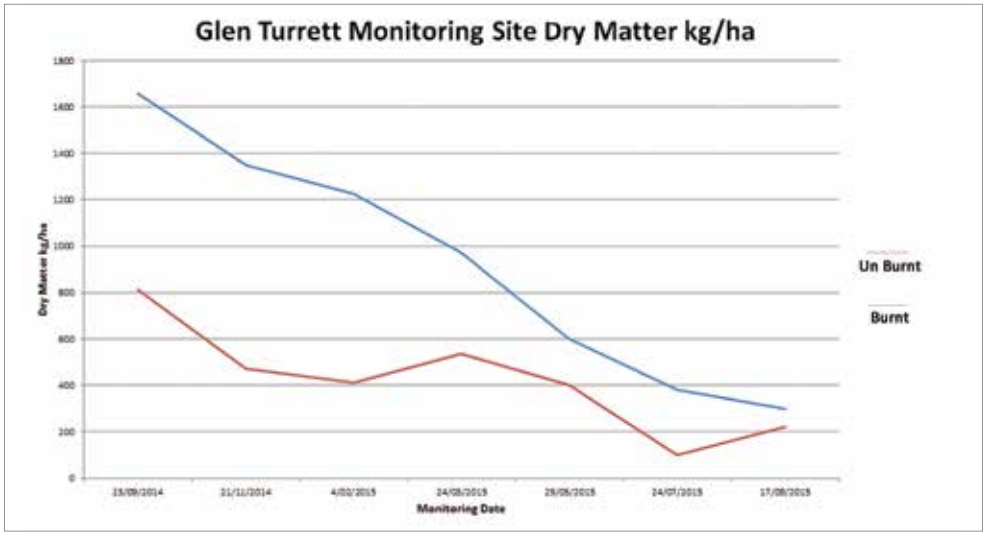
Due to the fire and grazing, the number and size of the native grasses in the burnt area was 10-20% less than the unburnt over the monitoring period. However there was no increase in annual grasses or broadleaf weeds in the un-burnt area, indicating that the perennial native plants recover faster in comparison with the annual based plant communities.

Monitoring over a year highlighted the challenge Greg faced in growing sufficient feed for his livestock, as shown in Figure 3.

"Ideally I would have rested the burnt section for a lot longer, to allow some dry matter to develop, but because only part of the paddock was burnt, I had really valuable feed in the un-burnt area, so I re-introduced sheep."

Greg also found it difficult to prioritise grazing paddocks.

Figure 3: Dry Matter at the Glen Turret Site



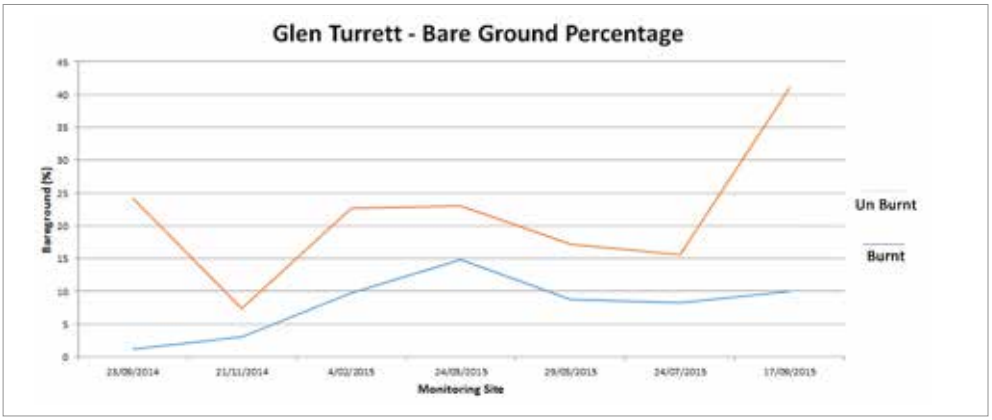

"Some of the paddocks which were completely burnt needed a lot more recovery compared with those which were only partly burnt which made it difficult to work out a rotational grazing plan."
Greg took good initiative and put pasture cages into the burnt and unburnt areas to monitor the growth of the different areas without grazing pressure. Figure 5 demonstrates how the pasture would look in the burnt area without grazing. The green plant in the cage is brush wire grass, it has set seed, indicating a good root growth. The sheep have grazed the other brush wire plants around the cage down to 1-2cm in height which has resulted in these grazed plants being unable to set seed, thus slowing down the recovery process.

Like a lot of graziers affected by the fires, Greg noticed that sheep preferentially grazed the burnt pasture ground due to the higher nutritional fresh growth on offer. This meant that in February 2015 while the unburnt ground still had over 1000 kg/ha dry matter, the burnt area was down to less than 400 kg/ha. One of the lessons he learnt is that being able to divide the burnt and unburnt areas would be beneficial to the pastures to allow them to be grazed separately so they could have a rest from grazing and recover. This could be achieved using temporary electric fencing.

Figure 4: Pasture Cage in the Burnt Area, November 2014.

Groundcover was also monitored on Greg's property, shown in Figure 5. The unburnt area has generally remained within typical targets of greater than 85 percent groundcover (less than 15 percent bare), even when dry matter has been low. By comparison, the burnt pasture groundcover has remained below 80 percent (bare ground above 20 percent)

Figure 5: Bare ground (inverse of groundcover) measured at Greg Koch's monitoring site from September 2014 to September 2015.




for most of the measurements. Low groundcover can present an erosion risk as well as provide an indication that there is insufficient feed for stock.

To reduce his grazing intensity and improve the health of his pasture, in 2015 Greg turned off his crossbred lambs earlier than normal, and used an SAMDB grant program to buy lick-feeders. The lick-feeders were initially used in the drought lot, and then were moved out in to the paddocks to take some pressure of the pasture.

He found the lick feeders to be highly effective, both in terms of pasture recovery, and in time – Greg estimates that it reduced his feeding trips for supplementary feeding from three to once per week, which was significant during a time when he was busy re-building fences and working off-farm to bring in supplementary income. In July 2015 there was still a clear difference between the burnt pasture (left of the road) and unburnt (right of the road).

In July 2015 there was still a clear difference between the burnt pasture (left of the road) and unburnt (right of the road).

## Lessons Learned

The top suggestions Greg would have for anyone affected by fires would be:

"Have a plan: If you farm in a bushfire-prone region, consider ahead of time what you would do with your stock, and assess your options. Then if you are hit by fire, you have a strategy ready, which will help reduce stress in a challenging situation.

"Take the time to inspect agistment paddocks: While agistment can be a lifesaver after a fire, it's important to check the quality of the paddocks. I had to regretfully reject a very generous offer of agistment because of high levels of caltrop which I couldn't afford to deal with when the sheep would return home."

# CATTLE CHALLENGE FOR JAESCHKE FAMILY

Name: Andrew and Kate Jaeschke
Location: Glen Rufus Park
Eden Valley
Annual Rainfall: 425mm
Farm size: 726 ha
Enterprise: Cattle stud, Beef
Fire Impact: 685 ha lost in Eden Valley fire

Andrew and Kate Jaeschke received valuable support from fellow cattle breeders after 95 percent of their property was burnt in the Eden Valley fire.

"We had 200 cows with calves to find agistment for, and thanks to a couple of breeders we were able to move them all onto stubble paddocks within a day and a half. We lost about 160 of our sheep, but we were also able to get the remaining 450 sheep off the property, onto stubbles the same weekend," Andrew said.

The couple left their property bare until May 2014, while they started replacing fences and water lines.

"We lost all of our fences, and about 6km of pipelines. It took us, with our four kids, more than 12 months to replace most of it, and we're still working away at replacing and burying pipelines now, after 18 months," Kate said.

When their stubble agistment ended, Andrew and Kate returned 200 cattle and 400 sheep to the property in May 2014, four months after the fire. To provide additional feed they sowed 40 Ha of oats for grazing and hay.

After the livestock returned, the family found an additional cost of the fire; a large number of their ewes and 16 cows had burnt teats and could not rear young. The family had long been considering expanding their cattle stud, so used this challenge as a prompt, and sold their remaining sheep in November 2014, replacing them with 50 cows with calves at foot.

**Kate and Andrew Jaeschke and their children planted 5,000 saltbush seedlings to revegetate after the Eden Valley fire.**

Each summer since the fire, Andrew has organised agistment for a portion of the cattle herd.

"We have a friend who takes 62 head each summer to graze his stubbles, which gives us a bit of relief. We try not to supplementary feed our stock, but we had to in autumn 2015 after such a dry spring. It helps that we wean our bull calves and sell them to Queensland. They spend about 10 weeks in the yards, and then are sold at 6-8 months, so the pastures don't have to support them for long."

Since the fire, Andrew and Kate de-stock about a quarter of their property in spring for seed-set to help the grasses recover.

"After the fires the grasses didn't recover well straight away. I think a lot of the seeds were cooked, except for the geranium, which grew way too well. Now they're all looking pretty good though. In fact I'd say there's more native grasses now than there used to be, they seemed to recover better than the introduced grasses," Andrew said.

After receiving a grant from Natural Resources SA Murray Darling Basin, the Jaeschke family fenced off a section of the North Rhine River that runs through their property, and planted 5,000 saltbush seedlings.

"We definitely wanted to re-vegetate the river, but we talked to a few specialists who said that if we planted trees, we would have to wait five to six years before we could re-introduce stock," Kate said. "We weren't keen to wait that long, and we found out that saltbush was a good alternative and could be grazed earlier, so we chose that instead. The two of us and our kids planted most of the bushes, and the local school helped as well," she said.

The couple chose not to irrigate the bushes, partly because of the remote location, and to ensure those that survived were hardy.

## Lessons Learned

Andrew has increased the amount of land sown to lucerne, as a fodder paddock to supplement feed, and also to provide a fire-break in summer.

The family have now buried all their water-pipes, after 6km of pipelines were burnt in the fire.

De-stocking paddocks at key periods during the year can assist in seed set and recovery of native species.

# TREE PLANTING REJUVENATES THE LANDSCAPE

Name: Michael Evans
Location: Flaxman Valley and Eden Valley
Annual Rainfall: Wootoona 614mm
Kappalunta 400mm
Farm size: 2100 ha
Enterprise: Beef, Prime lambs and Wool
Fire Impact: 1650 ha lost in Flaxman Valley and Eden Valley fires

After two fires in one week destroyed pastures and hundreds of well-established trees on Michael Evans Family's farm, he started immediately on the process of bringing life back to the property.

Michael's farm 'Wootoona' at Flaxman Valley comprises of 650 hectares of improved pasture. As a result of the Flaxman Valley fire in January 2014, 150 hectares was lost, as well as 23km of fencing and a hayshed.

Three days later, the Eden Valley fire ignited and destroyed Michael's second family property "Kappalunta" near Eden Valley. The entire 1400ha property was burnt. Approximately 30 kilometres of fencing, water infrastructure, many she-oaks and more than 100 large gum trees were destroyed. Additionally, 130 sheep were burnt and were put down following the fire.

Michael's management of the livestock was implemented with the help of the local community, for which he was most grateful.

"We moved the remaining sheep to Wootoona straight after the fire, thanks to Angaston Transport. Then with the help of neighbours, Ag Bureau members and stock agents we agisted all of our animals, with some cattle going as far as Kingston and Robe," he said.

Michael rested the properties without stock for the following eight months, until spring 2014 when the grasses were growing strongly and groundcover was high.

When returning livestock to bushfire affected country, Michael stated that he had restocked the land to 60 percent of its previous carrying capacity, and has been monitoring groundcover since then to adjust the stocking rate as needed.

"My goal is to monitor and maintain groundcover of at least 85 percent. For this conservative stocking rate after two dry springs I have had to reduce the stocking rate back down to 40-50 percent for summer 2015/16, to ensure these ground cover targets are met."

As part of the BIGG response to the fires, landholders were given the opportunity to participate in an incentive program to assist with certain elements of

the recovery. Michael was one of the recipients of this funding, which allowed him to commence revegetation of the Eden Valley property.

"In the fire we lost so many trees, some of which were hundreds of years old, and countless small eucalypts and she-oaks. I wanted to help the whole landscape recover, not just the pastures, so by utilising the incentive program, we fenced off some of the North Rhine creek and planted 800 native plants," said Michael.

The plants, including a range of varieties of trees and shrubs, are endemic to the local plant community. They were planted as tube-stock from Trees for Life and State Flora in winter 2015, and will be watered a few times through the first summer to aid establishment after the dry spring.

Michael has also made a change to the design of his replacement fencing, with the introduction of steel.
"We use a six strand fence with a steel strainer and three star droppers, followed by a MaxY steel dropper which will hopefully ensure the fences might survive in the case of another fire."

Eighteen months after the damaging fires, Michael is still working on fence repairs, with a few boundary fences at the Eden Valley property still needing completion.

Michael is finding that his higher rainfall improved pasture at Wootoona is recovering well, with no visible difference to the pasture. However, the Eden Valley property, with the more intense fire and lower rainfall, is still showing weak growth, with natives being thinner in appearance with slower growth rates than before the fire.

"There's still a lot more time needed until the pastures return to their original quality and quantity. I'm monitoring and making adjustments to help the grasses regenerate. With the new trees we've planted, I can see that it will eventually recover."

## Michael's top tips

Seek advice from people who have experienced bushfire recovery situations, and keep in contact with other farmers affected by the fire to ensure opportunities are not missed and provide a sounding board to help make the difficult decisions.

Invest in adequate property insurance with a reputable insurance company and conduct annual reviews.

Pasture recovery is not just a one year process. Don't undo your good work from resting pastures in the first year by over grazing in following years. Continue to monitor and be tactical with grazing management depending on the season.

# Glossary

**Drought Lotting**
Can also be known as confinement feeding, is an intensive feeding system for maintaining animals in a confined area where the feed and water are supplied.

**Dry Sheep Equivalent**
DSE: A measure based on the feed requirement of a 50kg dry sheep, used as a measure of stocking intensity.

**Dry Matter**
DM: Dry weight of plant matter, measured in kg/ha.

**Feed Budgeting**
A system used for closely matching pasture feed supply and grazing animal demands.

**Seed Bank**
A reserve of seed in the soil which has the potential to germinate in coming seasons.

**Stocking Rate**
The number of animals grazing a set unit of land for a specific period of time.

# APPENDIX

## Guidelines for Interpretation of Soil Results

The following guidelines are from the Rural Solutions SA document "Standard Soil Test Methods & guidelines for Interpretation of Soil Results" Authors Brian Huges, David Davenport and Lyn Dohle

### Soil pH – (Calcium Chloride)

| pH Ca | Interpretation | Lime requirements for pastures |
|---|---|---|
| < 4.8 | Strongly acidic | Lime or equivalent required ASAP |
| 4.8-5.2 | Moderately acidic | Lime or equivalent required in the near future |
| 5.2-5.5 | Slightly acidic | Consider liming as preventative strategy |

### Phosphorus (Colwell P) (mg/kg)

| Pastures | |
|---|---|
| Very Low | <10 |
| Low | 10-18 |
| Marginal | 18-25 |
| Adequate | 25-45 |
| High | >45 |

### Sulphur (KCl-40) (mg/kg)

| Pastures | |
|---|---|
| Low | <5 |
| Marginal | 5-10 |
| Adequate | >10 |

### Copper (DTPA) (mg/kg)

For pastures 0.1-0.3 is low and >1 is high

### Zinc (DTPA) (mg/kg)

For pastures 0.3-0.5 is low and >1 is high


**Further Information:**
**www.biggroup.org.au**