



*Canter For Climate*



## **CASE STUDY**

Diana O'Donnell

**BLACK RIVER - FAR NTH QLD**

# CASE STUDY - Diana O'Donnell

**Who:** Diana O'Donnell, Sustainable Agriculture Advisor

**Location:** Black River, QLD. (25km north west of Townsville, Far North Queensland)

## Geo climate

**Rainfall:** average 1,150mm/yr but is highly variable year to year, with a short ~4mtn wet summer and prolonger dry.

**Climate:** Dry tropical with hot muggy very wet summers and warm very dry winters

**Soil Type:** Silty clay

**Topography:** Very low sloping

## Management System

**Number of Horses:** 2 to 4

**Land Area:** 2.3 ha

**Purpose of Ownership:** Pleasure horses, hobby farm

**Key Topics:** Regenerative grazing, strip grazing.



## Introduction

Diana has been a professional agriculturalist her entire 40 year career having worked for the Department of Primary Industries (now DAF) and the Dept of Natural Resources (now DE) and the two north Queensland not for profit Natural Resource Management bodies, now known as Terrain and NQ Dry Tropics NRM. Over the years she has assisted landholders in soil conservation, landcare, weeds and feral animal control, sustainable sugarcane production and grazing management.

She became a horse owner for the first time in 2000, gifting herself a horse for her 40th birthday, having ridden others' horses since her teenage years. Her journey into regenerative grazing with horses began in 2013 while she lived on small acreage at Black River, near Townsville.

The horses Diana cared for at Black River were mostly off the track Thoroughbreds with the occasional crossbred. Diana was an active Pony Club Instructor and her daughter competed around North Queensland.

For the final three years at Black River Diana's horses were strip grazed across the property, resulting in significant improvements in the pasture quantity and quality.

*Strip grazing horses resulted in significant improvements in the pasture quantity and quality*

## Grazing Management

### What was it like at the start?

Diana and her husband bought the property at Black River in 2007. Prior to purchase the paddocks had been over-grazed by the neighbour's cattle, with substantial amounts of weeds and bare patches, so needed to receive spelling, .

The weeds were Snake weeds (*Stachytarpheta* spp), Hyptis (*Hyptis suaveolens*), Sida (*Sida retusa*), Flannel weed (*Sida cordifolia*), Billy goat weed (*Ageratum houstonianum*), Joyweed (*Alternanthera sessilis*) and Rattle pods (*Crotalaria* spp).



The paddocks' grass species were:

- predominantly Indian Couch (*Bothriochloa pertusa*), a poor quality species that often doesn't produce much bulk and quickly disintegrates once the dry sets in;
- some Black Spear Grass (*Heteropogon contortus*) producing good quality feed that persisted well into the dry but the 'spear' seed heads caused issues with the horses' rugs;
- some patches of Green Couch (*Cynodon Dactylon*);
- small areas of Qld Bluegrass (*Dichanthium sericeum*) a good native grass producing reasonable amounts of good quality feed that held into dry;
- a fair amount of the introduced and locally endemic scrubby legume, Seca/Townsville stylo (*Stylosanthes scabra*) which provided excellent quality feed that the horses chose to graze to varying degrees throughout the year.

Diana spent the first five years killing the weeds with various herbicides in attempts to improve the pasture. The horses were being rotated around the existing 4 paddocks, giving the pasture rest periods but Diana saw only small improvement in pasture quality during this time.

In 2013 Diana was introduced to regenerative/high density/adaptive strip grazing through working with graziers in the Collinsville region. She then attended a Resource Consulting Services (RCS) introductory grazing management workshop where they taught the standard phases of growth of grasses and how grazing influenced the quality and quantity of feed produced. However Diana's main take home message was 'Put your effort into what you want'.

**“So I stopped spending my time spraying weeds and put it into shifting temporary fences. I saw a response to my pastures within a wet season.” - Diana.**



## Changes made

Strip grazing was introduced in 2013. With each move the horses were given a new ~5 to 15m strip across the paddock, resulting in ~ 500 m<sup>2</sup> of new grazing. They remained on each strip for a day or two depending on the feed available, and Diana's work schedule.

The property's boundary fences were of four stand barbed wire with the four internal paddocks of ~0.5ha paddocks fenced with three stand plain wire. The strips were made with stamp-in pig-tail posts with single strand electric line run off a mains power energiser.

The strip grazing resulted in excellent utilisation of the pasture, with even the less preferred species being consumed. There was even distribution of manure across the paddock and substantial trampling of "weedy" species. The strip grazing also gave each area longer rest periods after grazing.

Each paddock had a small shelter and if the horses needed access to these Diana would only move the front fence giving the horses new pasture each day but allowing them to remain on the grazed area back to the shelter.



Diana attempted to never give access to an area that was grazed for more than a week as this pasture would be actively re-growing and she didn't want these new shoots grazed immediately.

**"Now I would set up a track system to give constant access to the shelters and to save me constantly moving water." - Diana O'Donnell**

Water was available throughout the paddocks from centrally located taps but was taken to each strip via long hoses to a light mobile trough.

It would usually take four to six weeks to do a round of the property, with the pastures well recovered in this time during the wet season. Once the dry had set in Diana would get one or two more rounds from soil moisture, and if lucky to get another round or two later in the year if some winter rain occurred.



Photo: Portable water trough.



Photo: Before grazing.



Photo: After grazing, manure being incorporated by dung beetles.

When there wasn't pasture available the horses were fenced on a ~20m x ~20m area around a hay feeder. This was placed on the worst, barest or weediest, patch on the property. The wasted hay becomes mixed with the urine and some manure and provided a wonderful ground cover and increased nutrition to these degraded areas. Most of the manure was collected from the current hay feeding area and either put onto the last hayed area, placed on nearby bare areas just outside the current area or added to compost for the garden.

Once an area became heavily covered in hay, usually in about a month, the hay-feeder was moved with the horses to the next worst area.

**“We were lucky that our winters were so dry and mild that I rarely had to provide access for the horses to the shelters while they were on the hay feeder. This meant I could place the hay feeder anywhere on the property, as needed.” - Diana O'Donnell**

When the wet season started in earnest these areas were seeded with improved pasture grass and legume species. Usually a few early season summer storms would have started the decomposition of the hay.

*Manure was never collected from the grazed paddocks but was allowed to be incorporated by dung beetles and soil biology*

Two patches where hay was fed during winter of 2015



Photo: 10th January 2016



Photo: 26th February 2016

Here there was a poor germination of sown species but grasses already in the area were able to take hold.



Photo: Sown Rhodes grass establishing extremely well in this patch.



Photo: Ready to be grazed.

The grass seed mix was mainly Callide and other varieties of Rhodes grass (*Chloris gayana*), with Gatton Panic (*Panicum maximum* var. *Trichoglume*) and Green Couch (*Cynodon Dactylon*).

The legumes seeded were Verano stylo (*Stylosanthes hamata*), which was soft fine stemmed and scrambling, Sitrato (*Macroptilium atropurpureum*) a vine, and Burgundy Bean (*Macroptilium bracteatum*) an erect herb.

All paddocks were fertilised with CK88 (15N : 4 P : 11 K : 14 S) at the low rate of ~20kg/ha twice a year, early and late in the wet.

## Soil regeneration

During this time Diana became aware of the critical part plant roots play in feeding the soil biology. She had appreciated the importance of ground cover from plants to prevent erosion, but had not realised the important process of plants secreting simple carbohydrates out of their roots to encourage the soil microorganisms like fungi and bacteria to live close, even inside, their roots. These beneficial soil microorganisms provide access to a much wider range of nutrients than the plants have been able to obtain on their own.

The not palatable species were no longer seen as problems to be eradicated but were seen as helping the ground to recover. As the soil become more fertile and the pasture became stronger these “weeds” faded from the system.

Slashing was undertaken if the pasture was growing faster than the current number of horses could utilise and was becoming rank. The slashing was done as high as possible (20cm) to ensure that sufficient stem was left to allow the good pasture species (Seca stylo, Rhodes, Green panic and and native blue grass) to recover quickly. Slashing was also only undertaken once or twice a year and the good pasture species were always given a change to seed at least once a year. Control of the potentially toxic Rattle pods continued through hand weeding.

Neighbours that were continually grazing their 5 ac with two horses had numerous bare areas and poor grass. The below photos were taken at the same time either side of our adjoining boundry.



Photo: Neighbouring property, continually grazed.



Photo: Just over the fence, Diana's strip grazed area.

The photo at right is another neighbour who mowed frequently and kept their pasture grasses very short and therefore stressed by making it regrow repeatedly from root reserves. This slowed the plants recovery and reduced their ability to have extensive deep root systems. This paddock never grew any bulk of grass.



*The bigger a root system a plant has the more soil moisture and nutrients are available to it*

## Horse management

The horses on the property were usually Diana's mare [Maddie], her foal [Chaos], Diana's daughter's OTT (Off the Track Thoroughbred) gelding [Bugle], a young Warmblood cross [Regency Lilth AKA Lily] and occasionally another OTT being re-educated.

**“While there were only 2 riders we usually had the extra one (or three) horses that most of us horse owners seem to acquire” Diana jokes.**

While Diana was a pony club instructor, most of her riding was purely pleasure trail riding. Diana's daughter competed around north Queensland in dressage, showjumping and eventing.



Photo: Lily, Bugle and Freckle



Photo: Maddie and Chaos (ten days old)

The horses were routinely provided twice daily hard feeds and supplements with additional hay provided as required depending on pasture availability.

Confining fit highly energetic and sometime young animals into small areas meant they required regular exercise. Most of them were taken out at least every 3rd day for 10 to 15km rides, mainly at the trot with additional flat work sessions at home.

**Diana adds “If the horses seemed “toey” at feed time and in need of a run I would release them into the biggest section of the paddock and encourage them to have a good run around for awhile, bringing them back into their current grazing section with the feeds.”**

## Results

Within a wet season of initiating strip grazing the pasture was providing more feed of a higher quality longer into the dry season. “By the 3rd year I had the new legumes and Rhodes across much of the property. The native Blue grass was also significantly increased and even the Indian couch was growing more feed now reaching up to 30cm of growth as compared to the ~10cm when we first purchased the property.”

As the plants now had bigger healthier root systems they were continuing to grow longer once the rain stopped. The pasture was now outcompeting the weeds and the weed population drastically reduced. There was almost no bare ground anywhere on the property.

Diana was now doing almost no herbicide spraying with only treatment of specific individual plants that were major pests or poisonous..

Worming was almost eliminated although I rarely picked up manure from the pastures as the dung beetles and active soil biology almost always had the dung incorporated into the soil by the time the horses were back into an area. For the last year at Black River the worm egg counts resulted in only one horse (the youngest) being wormed once.

## Conclusion

The time and effort in moving fencing and water for strip grazing was compensated by the reduction in weed control. The improvement in the pasture definitely made the effort worth it for Diana.

**“I had more pasture all year round with substantial reduced feed costs during the dry season. Also having healthy productive pastures increased the value of the property at sale.” concluded Diana.**



## Further Information

- This Case Study is part of a series produced by Canter for Climate. Further examples can be found on our website, [via this link](#).