

Case Study – Merricourt Station

Piloting Adoption of Grazing Best Management Practices for Improving Water Quality in the Upper Burdekin Rangelands

Owners: Verna Webb & Shirley Symes – Managed by John, Verna & Ross Webb

Years on Property: 22 years since 1988 – Managers since 1999

Property size: 31 357 acres / 12 690 ha

Business Focus: Cattle breeding property with fattening of steers for turn off to Jap Ox specifications. Some progeny is sent south for fattening at another property.

Land types: Mix of tertiary sedimentary soils with areas of Brigalow/Blackbutt country, Box, Tableland ironbark country and minor patches of Bendee scrub. Significant frontages to braided watercourses which can flood over areas of the property during the wet season.

Background

“Merricourt” is located in the Campaspe River Catchment approximately 60 kilometres south of Charters Towers in the Upper Burdekin Rangelands. The property frontages to several small to medium sized water courses (Big & Little Policeman Creek, Brigalow Creek and Windsor Creek). Predominated by a mix of alluvial and Brigalow/Blackbutt country, there is also patches of Narrow leafed Ironbark tableland, Box and Bendee on the property. “Merricourt” is considered a slightly smaller than average size property for the district. For the Webb family, maintaining a successful business has required careful design and implementation of property improvements as well as utilising off-property fattening for some of the steers produced at “Merricourt”. In the past ten years, significant effort has been made to improve the property infrastructure, particularly fences and waters.

Owners, John & Verna Webb completed *RCS: Grazing For Profit* training in 2006. The transition to a partial rotational grazing pattern on the property has required a range of improvements to be made to the property. Subsequently, the property today has extensive fencing networks and thorough watering stock capabilities which have allowed for better management of the grazing pressure and pasture utilisation on the property in conjunction with the rotational grazing pattern. Several grants including the National Landcare Programme *SPIRAL Project* have also greatly assisted the rate of change on “Merricourt” in recent years. John & Verna, have gone on to also completed *RCS Grazing Land Management*, *RCS Nutrition*, *MLA Edge Network: Grazing Land Management* and *AgForward QLD GPS & Computer Mapping* in recent years.

WQ BMP Project

In 2009 “Merricourt” joined the DLC WQ BMP project, with the intention of changing the management across four paddocks. Two of the paddocks feature areas of frontage country associated with Little and Big Policeman Creek. John, Verna and their son Ross have actively participated in property mapping, NRM property planning and in field training activities on offer as part of the project.



New Solar Array installed on “Merricourt”

Overall the project has added water infrastructure to four paddocks, improving the evenness of grazing pressure across these four paddocks. Additionally, the extra water points will also encourage cattle to water away from the semi permanent water holes that in some years can be found in Little Policeman Creek, decreasing the grazing pressure in the more sensitive areas of the paddock.

Practices Adopted

The proposed management actions to improve the site were based on recommendations from *Managing for water quality within grazing lands of the Burdekin Catchment – Guidelines for land managers*, which has been consistently used in conjunction with the WQ BMP project. Management actions selected for these paddocks include:

- *Managing Wet Season Rest*
- *Managing Grazing Pressure*
- *Managing for Even use of Pasture*

To achieve these actions, the following on ground infrastructure methods were also adapted from the booklet:

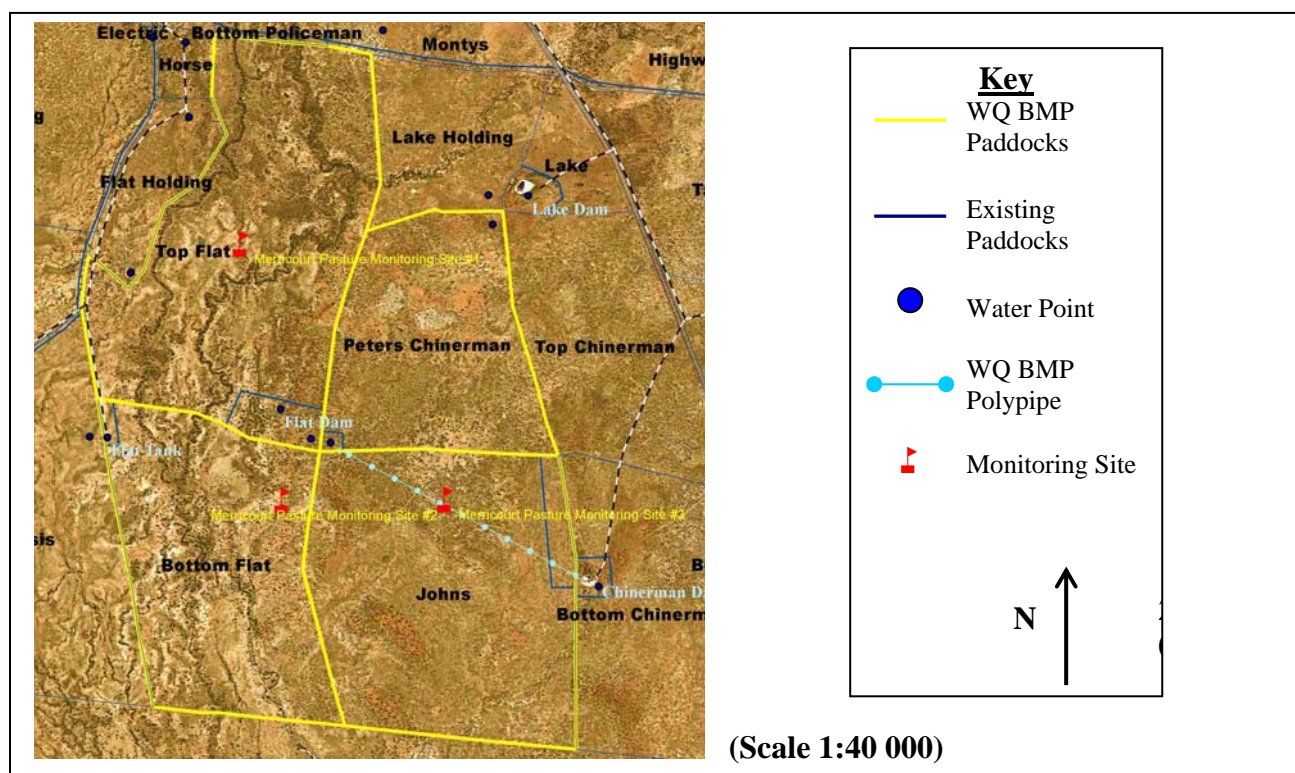
- *Establish a frontage paddock (completed prior to project)*
- *Water points strategically located away from priority waterbodies*

John & Verna decided that to make the project worthwhile, the new water infrastructure would be piped using a solar pump from an existing dam across a distance of three kilometres to a corner of the four paddocks. This resulted in four paddocks receiving an additional off stream watering point:

- *Top Flat Paddock* (609 ha)
- *Bottom Flat Paddock* (436 ha)
- *Peter's Paddock* (355 ha)
- *John's Paddock* (592 ha)

The total area of the project site comprises approximately 1992 hectares. This represents 16% of the total property area of "Merricourt", on some of the better land types. The subdivisional fencing in the four paddocks was completed prior to the project and installation of additional water infrastructure was completed in January 2010.

Figure 1.0 – Merricourt Property Map Showing Water Quality BMP Project focus site



Management

The 2010 wet season was above average, with 806 mm recorded at “Merricourt” from November 2009 – September 2010. A partial wet season rest has been incorporated in all four paddocks associated with the project to varying degrees during 2010, as outlined below:

- **Top Flat:** Spell 15/12/2009 – 19/01/2010 & 09/03/2010 – 03/06/2010
- **Bottom Flat:** Spell 19/01/2009 – 09/03/2010 & 03/06/2010 – 08/09/2010
- **Peter’s:** Spell 17/11/2009 – 24/12/2009 & 01/02/2010 – 07/06/2010
- **John’s:** Burnt & destocked 11/11/2009 – 30/08/2010

Such management actions were taken to promote extra growth of the pastures in the paddocks during this time, and were part of the wider rotational grazing pattern for the property.

The rotational grazing patterns on Merricourt typically favour wet season rest of different parts of the property in different years. However, in most years it is envisaged that these four paddocks will be given a higher priority for a typical wet season spell due as they are considered as the better land types and more prone to flooding during the wet season.

The water infrastructure installed in the paddock is designed to allow the Webb family to better manage the grazing pressure in the paddock at different times of the year, but particularly during the dry season. Significant improvement in the options for managing the pasture resources have been delivered through this project. Subsequently, this should improve land condition and water quality.

In the 2010 wet season, every paddock of “Merricourt” was given a full or partial wet season spell as a result of improvements to infrastructure and the rotational grazing system. This has taken over ten years to plan, develop and implement. Further improvements are also planned in the future for “Merricourt”. Cattle were re-introduced to the four WQ BMP Project paddocks in June 2010. Pasture utilisation will be managed by close monitoring of land condition and pasture yields and the use of grazing charts as outlined below.

Monitoring

A total of three dry season land condition and photo monitoring sites were established in November 2009. Both site #1 & #2 are located on alluvial/black soil country near to Policeman Creek. Site # 3 is located on a Narrow Leaf Ironbark Grey Clay/Yellow earth land type.

- 🚩 Site #1 is located in *Top Flat paddock* where new stock water has been introduced.
- 🚩 Site #2 is located in *Bottom Flat paddock* where new water has been introduced.
- 🚩 #3 is located in *John’s Paddock* where new water has been introduced.



“Merricourt” Land condition Site #1 – Nov 2009

The average land condition for the paddocks was solid to high B condition, with the presence of 3P grasses, legumes and the relatively high ground cover improving the condition rating. Conversely the presence of Indian couch was noted as minor and all three sites were relatively low in the presence of woody weeds (Chinee Apple, Rubbervine, Parkinsonia). Importantly the residual yields and groundcover levels at all three sites was noted as being fairly high at all sites. Site 3 was also subject to a burn in early November prior to the monitoring site being established.

Table 1.0 – Merricourt Land Condition Assessments End of Dry December 2009

Site	Pasture Composition	Pasture Cover Level & Yield (#)	Soil Condition	Woody Plant Density (m ² /ha)	Weeds	% of Carrying Capacity	Overall Land Condition Rating
#1 Top Flat	A Golden Beard, Bluegrass, Buffel Grass, Isol. Stylo Sidas	A 86.5% 3 000 kg/ha	A V.Good, a few signs of patch cover in and around Buffel tussocks, Some surface sealing	A 2m ² /ha Box, Mimosa, Scattered Currant Bush & Bauhinia	B Mimosa Chinee Apple (light/mod), Rubbervine scattered on the creeks	B 90-95% CC	B <i>Weeds</i>
#2 Bottom Flat	A Golden Beard, Bluegrass, Buffel Grass, Black Spear	B/A 50% (B) 1 000 – 1 250 kg/ha (A)	B Some surface sealing & compaction. Some sheet erosion. Still fair condition	B 7m ² /ha Scattered currant bush, Whitewood, Bauhinia, Emu Apple, Lancewood suckers	A Nil	B 60 % CC	B <i>Cover, CC & Woody plant density</i>
#2 John's Paddock (Burnt Nov 09)	B Golden Beard, Seca Stylo, Bluegrass, Native Forbs Legumes, Wiregrass & Indian Couch moderate	B/C 7.5% < 100 kg/ha	B Good, Some soil crusting High leaf litter Post Fire	B 9m ² /ha Narrow Leaf Iron Bark, Bloodwood, Whitewood, <i>Terminalia aridicola</i>	A Nil	B 50% CC Difficult to judge due to fire	B <i>Having the ability to carry a fire – the paddock would have been in good condition</i>

[#] Yields were only estimated by and no calibration samples were cut. Yields may possibly have been over estimated by as much as 25 – 40%.

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Site	Pasture Composition	Pasture Cover Level & Yield (#)	Soil Condition	Woody Plant Density (m ² /ha)	Weeds	% of Carrying Capacity	Overall Land Condition Rating
#1 Top Flat	A Golden Beard, QLD & Desert Bluegrass, Buffel Grass, Seca and Verano Stylo, native forbs & legumes Sidas	A 99% 3 500 kg/ha	A V.Good, Very good litter & mulch cover	A 4m ² /ha Box, Mimosa, Scattered Currant Bush & Bauhinia, Emu Apple	B Mimosa Chinee Apple (light/mod), Rubbervine scattered on the creeks Prickly Pear	B 95% CC	B <i>Weeds</i>
#2 Bottom Flat	A Golden Beard, Bluegrass, Buffel Grass, Black Spear, Isol stylos, native forbs / legumes Wire Grass, Indian couch	A 2500 kg/ha 85%	A Very Good, Mulching, high litter cover, signs of worm castings	B 6m ² /ha Scattered currant bush, Whitewood, Bauhinia, Emu Apple, Lancewood suckers	A Nil	B 85-90 % CC	A- / B+ <i>Cover, CC & Woody plant density</i>

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#2 John's Paddock (Burnt Nov 09)	B Golden Beard, Seca Stylo, QLD & Desert Bluegrass, Cotton Panic, Native Forbs Legumes, Wiregrass & Indian Couch moderate	A 1500 kg/ha 75%	B Good, Some soil crusting Very high leaf litter, worm castings, ant activity, minor bare areas (potentially from fire)	B 10m ² /ha Narrow Leaf Iron Bark, Bloodwood, Whitewood, <i>Terminalia aridicola</i>	A Nil	B 75% CC	B <i>Very good recovery from fire, noted wet season spell for 6 months in 2010</i>
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End of wet season Stocktake monitoring was completed in September 2010 following a wet season spell of varying degrees for each paddock. Yields for two sites associated with the project paddocks were estimated through cutting quadrats– as per the Stocktake Pasture Monitoring training package offered through DEEDI.

Table 2.0 Stocktake Pasture Sampling Results September 2010

Site	Notes	DM %	Yield (DM) kg/ha	Kg DM Available (25% Util.)	Stock days/ha
Monitoring Site #3 – Johns Paddock	Post Burn – Long Spell Nov 2009 – July 2010 – Blue Grass / Annuals	79.9	2481.2	620.3	62
Monitoring Site #2 – Bottom Flat	Spell 19/01/10 – 09/03/10 & 03/06/10 -08/09/10 Buffel/Blue Grass/Annuals	62.5	6362.8	1590.7	159



Land Condition Monitoring Site #3
John's Paddock – Nov 2009



Land Condition Monitoring Site #3
John's Paddock – September 2010

VegMachine (www.csiro.au/solutions/VegMachine.html) processes Landsat satellite imagery so that land managers can interrogate cover and land condition changes over time. The time series on the left of *Figure 2.0* reflects the average cover index value from 2002 to 2008. This particular time series was selected as it reflects a seasonal recovery period from the below average rainfall year in 2001/02 through the onset of several fair to good rainfall years until 2008.

Overlaying the paddocks developed under the WQ BMP project shows that they were generally in above average condition (>70% cover) for the most part. However, areas of low cover can be noticed in the cover series on the left and appear to match lightly covered areas or scalds in the SPOT5 image on the right. Ground truthing of these sites has revealed that they are sites that have been degraded in the past. With the improved grazing practices in place on “Merricourt” in recent years, these areas have significantly improved. In addition these areas are also susceptible to extensive flooding, typical of braided watercourses, which in some years can severely erode the area simply due to the amount of water moving over the landscape in such events. With the onset of the WQ BMP Project in these paddocks, it is hoped that the further changes to management and infrastructure will improve ground cover in future years.

Figure 2.0 – VegMachine Ground Cover Average – 2002 – 2008 and SPOT5 for WQ BMP Project Site

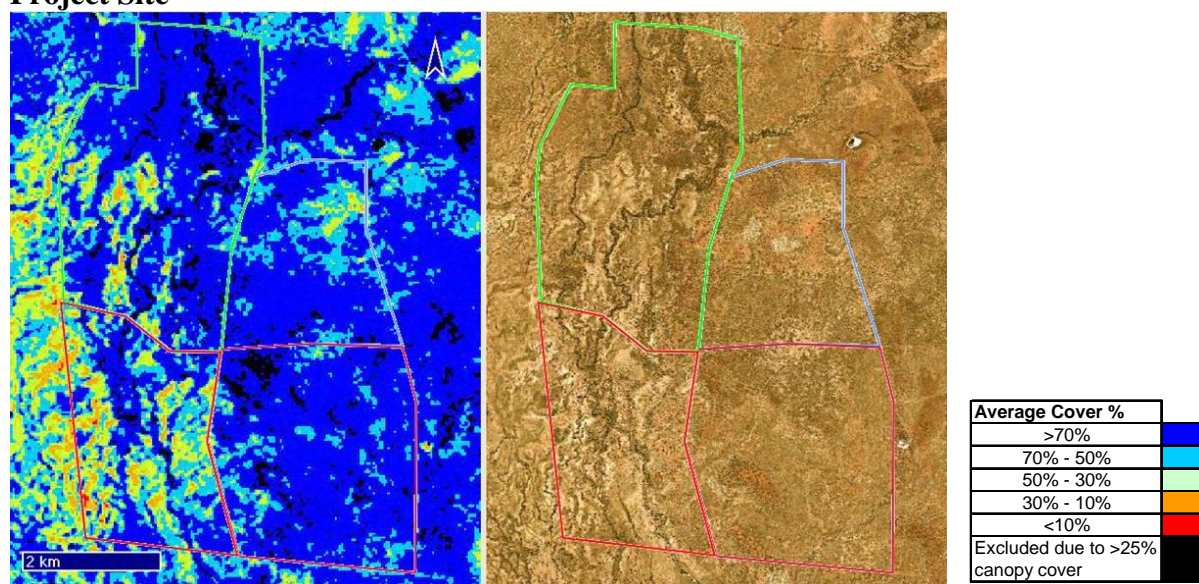
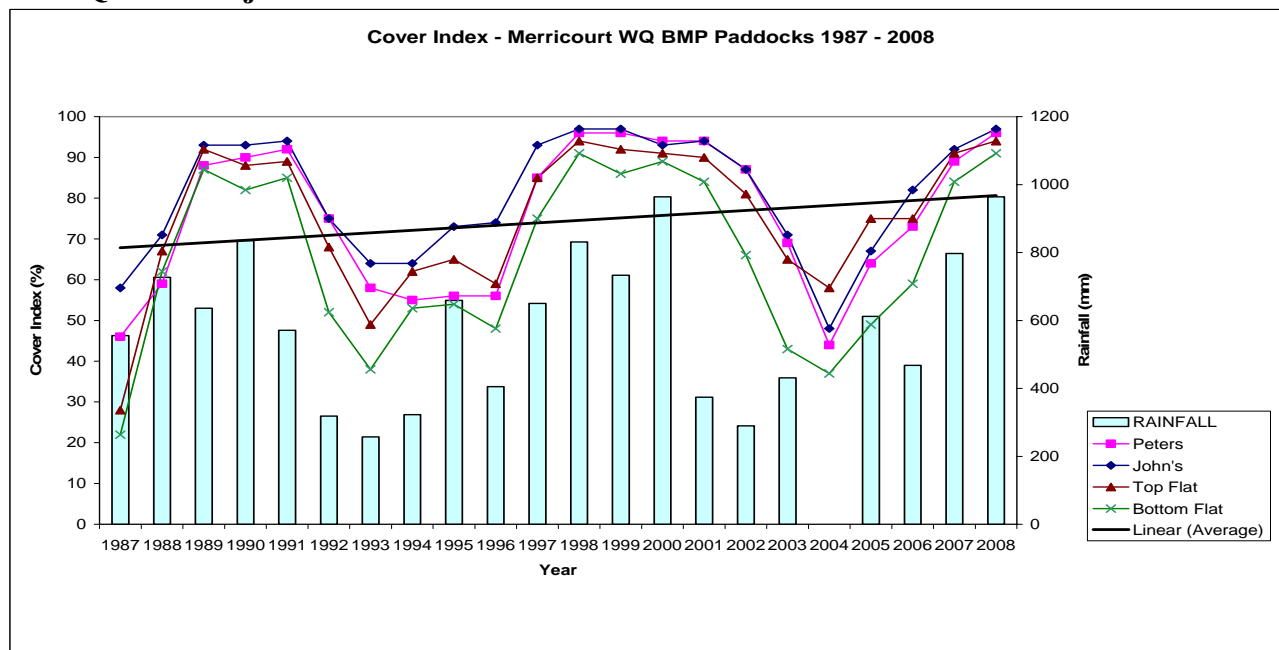


Figure 3.0 below shows the annual groundcover trends across each of the four treatment paddocks from 1987 to 2009. VegMachine assesses the imagery data to give cover index values from 0% - 100%. When an average is calculated and a line of best fit is added to the data series for these four WQ BMP paddocks a continuing improvement in cover values is noticed. The below graph highlights the important role seasons play as well as in more recent years how changes to management have assisted to maintain high cover levels.

Figure 3.0 – Groundcover trends generated by VegMachine: 1987 – 2008 compared to rainfall for WQ BMP Project



The figures and table below highlight the difference to grazing pressure that the WQ BMP Project has made. As a result of installing new water infrastructure in the central location of the four paddocks, it has moved the grazing pressure away from the problem areas in Bottom Flat and Johns Paddock.

Table 3.0 – Even Grazing Pressure Data

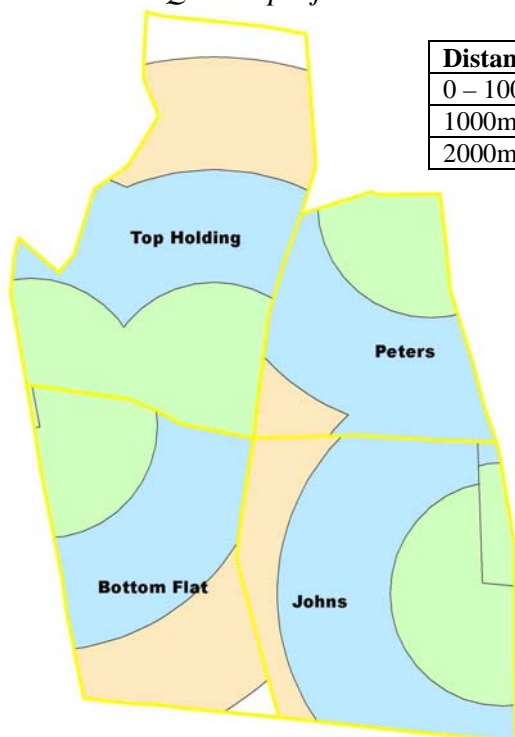
Paddock Name	Buffer Zone	Area of Paddock (before)	% Paddock (before)	Area of Paddock (after)	% Paddock (after)	Difference
Johns	0m – 1000m	149.36 ha	26.7 %	239.07 ha	42.7 %	16 %
Johns	1000m – 2000m	318.24 ha	56.8 %	308.61 ha	55.1 %	-1.7 %
Johns	2000m – 3000m	92.72 ha	16.5 %	12.64 ha	2.3 %	14 %
Peters	0m – 1000m	129.6 ha	35.5 %	207.91 ha	53.7 %	18.2 %
Peters	1000m – 2000m	225.03 ha	58.2 %	179.01 ha	46.3 %	- 11.9 %
Peters	2000m – 3000m	32.25 ha	8.3 %	0 ha	0 %	8.3 %
Top Flat	0m – 1000m	226.7 ha	35.6 %	232.78 ha	36.6 %	1.1 %
Top Flat	1000m – 2000m	207.75 ha	32.6 %	200.28 ha	31.5 %	-1.1 %
Top Flat	2000m – 3000m	153.58 ha	24.1 %	152.49 ha	24.0 %	-0.1 %
Bottom Flat	0m – 1000m	160.55 ha	35.5 %	185.15 ha	41.0 %	5.5 %
Bottom Flat	1000m – 2000m	169.98 ha	37.6 %	181.89 ha	40.3 %	2.7 %
Bottom Flat	2000m – 3000m	121.16 ha	26.8 %	84.65 ha	18.7 %	8.1 %

1% = Top Flat (6.09ha), Bottom Flat (4.36ha), Peter's (3.55ha), John's (5.92ha)

Table 3.0 highlights the importance of spreading water infrastructure within new and existing paddocks to ascertain more even use of the pasture system. Importantly in the future, it is expected that the new water infrastructure will affect the way that the property is managed, particularly in regards to the grazing rotation patterns. It is hoped that the new waters will alleviate the grazing pressure from around water points and promote cattle to graze throughout the paddock more evenly.

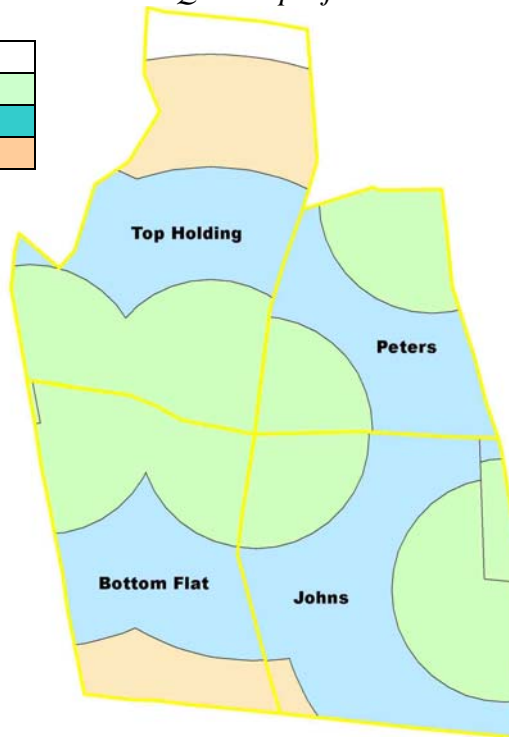
Figure 4.0 below outlines visually the improvement in the distance to water rings data associated with the improvements implemented through the WQ BMP Project. The diagram below illustrates the value of the new water in the central location of the four paddocks.

Pre – WQ BMP project



Distance from Water	
0 – 1000m	Light Green
1000m – 2000m	Light Blue
2000m – 3000m	Light Orange

Post – WQ BMP project



Acknowledgments

This case study is part of the “*Piloting Adoption of Grazing Best Management Practices for Improving Water Quality in the Burdekin Rangelands*”. This project is supported by Dalrymple Landcare Committee Inc, through funding from the Australian Government's Caring for our Country and NQ Dry Tropics NRM.

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Compiled by: John Nicholas – November 2010

Merricourt Photo Monitoring Site # 3 – November 2009



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Merricourt Photo Monitoring Site # 2 – September 2010



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