

Features first year results from the alternative fertiliser and biological products trials

Woady Yaloak Catchment Group

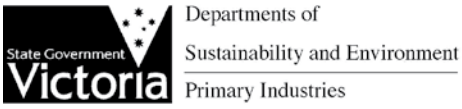
Annual Report

Jan to Dec 2009

ALCOA

The desired outcome of the Woady Yaloak Catchment Project:

- Viable businesses
- A strong community capable of managing change
- A natural environment that nurtures business viability and works within the capacity of the catchment
- Protection of remaining natural flora and fauna.



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Kevin and Alice Knight receiving their McKell medal award from Tony Burke, Minister for Agriculture, Fisheries and Forestry, Peter Garrett, Minister for the Environment, Heritage and the Arts and the Victorian Minister for Agriculture and Small Business, Joe Helper.

Photo courtesy of DAFF website.

1. Chairman's Report

Welcome to the 17th Woady Yaloak annual report. The executive committee has had to take some very difficult decisions in 2009 to ensure the Catchment Group continues into the future. The most significant has been the suspension of on-ground works though neighbourhood groups. We simply cannot raise sufficient funds to support the amount of on-going work identified through the neighbourhood group process.

This is a very disappointing outcome, as Woady Yaloak in conjunction with Alcoa, pioneered this local, across farm boundary approach a decade ago. This innovation was the envy of many Landcare groups, who could see the value in localised planning, the peer encouragement that it fostered and the ease of applying for funds.

The results from this approach speak for themselves. During this time we supported 190 landholders across 45 neighbourhood groups conduct more than 1,400 projects worth $4.6 million. Two thirds of this $4.6 million investment came from landholders.

All this work has changed the landscape. Everywhere you look, the half a million trees planted during this time are showing. Hundreds of hectares of weeds and erosion have been treated thanks to the 3,300 hours of machinery work and 4,000 litres of chemical spraying. Pastures have been sown or improved on 5,800 hectares.

Another difficult decision has been to reduce the employment of our very dedicated and hard working staff. Our four part time staff of Cam, Jen, Helen (who took over from Pam) and Suzie now work less than 3 days a week in total, a reduction of 29% compared to last year. We thank all of them for sticking with the project during these very uncertain times.

However the Woady Yaloak Executive Committee is not prepared to let nearly two decades of the community working together be lost. We are adamant the core of landcare must remain around supporting on ground works.

People join Landcare to do Landcare activities. Therefore with the limited amount of money we still have available, we will be retaining our staff to provide advice and support a group project in each of the seven landcare groups in the catchment. The intent is for each landcare group project to maintain interest and community interaction. The research work on alternative fertilisers and biological products will continue.

Finally we will continue to search for new funds and lobby government to rethink the terribly narrow application of their prioritisation approach. Landcare has created a high value asset, the landcare community. However under the current thinking, landcare as we know it is under threat. The current support offered to 'grass roots' landcare is simply inadequate to maintain this base activity and therefore to maintain community participation. We will continue to fight for a better deal for local landcare.

This year was also a time when the hard work of people in the catchment was duly recognised by those outside. Alice and Kevin Knight won the 23rd McKell Medal, the most prestigious Australian award

for excellence and achievement in natural resource management. Lex Hadler won the Corangamite award for his ongoing work in the Misery Moonlight catchment and Alice Knight was also awarded an Order Of Australia medal. Cam Nicholson was a finalist in the 'our community' program. Susie Lunnon was also recognised for her individual landcare contribution from the Corangamite CMA. Congratulations to all involved.

The executive committee must be thanked for contributing during a trying 12 months. David Coutts, Peter Donovan and Jane Archer resigned from the committee after many years of hard work and we welcome Karen O'Keefe from the Misery Moonlight group. This brings to 32 the number of landholders from the Woady Yaloak community who have served on the executive committee. Thanks to the ever reliable Rick Pope, Peter Dahlhaus and Tony Wilson who provide ongoing computer and planning support.

I believe the Executive committee have put in place the right mix to maintain the engagement of the Woady Yaloak Community and ensure we remain a innovative and vibrant group on the landcare scene.

Wishing you all a prosperous 2010.

Daniel Laffan

Chairman

2. 2009 in review

The review of 2009 is described in five parts. These are:

- Commitment by landholders to undertake new works in the next 12 months
- Works that were claimed by landholders in 2009
- Staffing to support planning and implementation
- Revenue to match the proposed works
- Other highlights and activities

2.1 Commitment by landholders to new works

A reduction in the level of support offered to neighbourhood groups saw a decline in the commitments for new works to $269,500. This was a fall of $92,500 from 2008 and was of similar low levels to 1997 and 1998. It was less than half of the long term average (figure 1).

Thirty four people applied to conduct new work, a 29% decrease on 2008 and well below the long term average. Activity in tree planting fell below 10,000 trees, the lowest since the Woady Yaloak Catchment Project started. However two core landcare activities of erosion and weed control increased in 2009. There was also ongoing activity in salinity control in the Pittong area.

Fourteen neighbourhood groups committed to activities, although the average per groups was less than $20,000. Landholder contribution to on ground commitments was 49%, significantly less than the long term average of 60% of the total cost of the works.

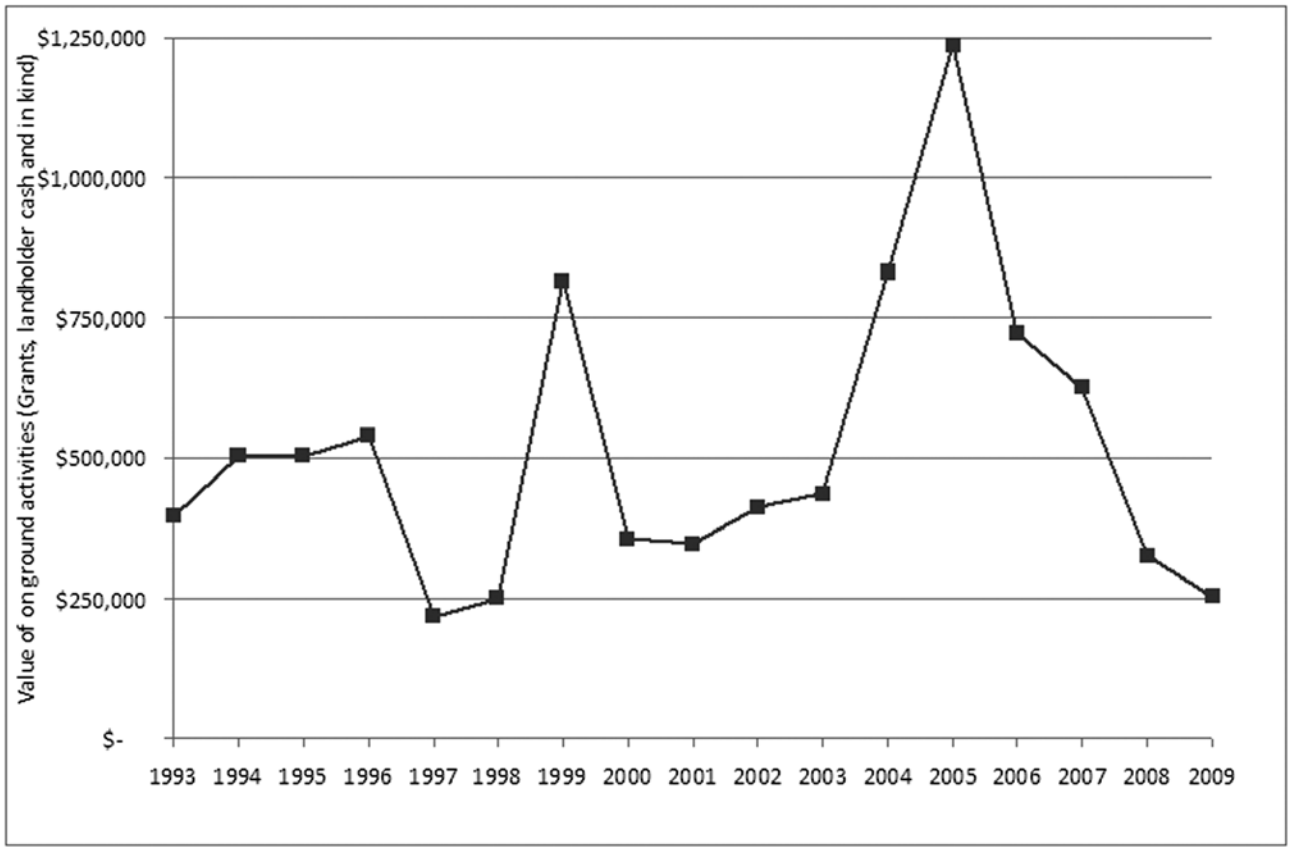

Figure 1: Annual investment in the Woady Yaloak Catchment Project from funding partners and landholders

A summary of the works to be undertaken in 2009 is listed (Table 1).

Table 1 Works planned in 2009 (compared to 2008)

Activity	Quantity in 2009	Change from 2008	Total project expenditure[1]
Creek crossing	0 crossing	0 crossing	$ 0
Erosion control Wetlands	0 hrs	0 hrs	$ 0
Earthworks	440 hrs	+249 hrs	$ 56,198
TOTAL	**440 hrs**	**+249 hrs**	**$ 56,198**
Fencing			
Erosion	1.3 km	+0.7 km	$ 10,605
Landscape (shelterbelts)	3.6 km	-10.3 km	$ 23,150
Rabbits	0.0 km	0 km	$ 0
Remnants	0.1 km	-0.6 km	$ 500
Salinity	4.3 km	+1.9 km	$ 30,134
Waterways	1.6 km	-1.1 km	$ 12,578
Wetlands	0.4 km	+0.4 km	$ 2,554
TOTAL	**11.3 km**	**-9.1 km**	**$ 79,521**
Pastures			
Fertiliser/lime/gypsum	0 ha	-35 ha	$ 0
Herbicide manipulation	0 ha	0 ha	$ 0
Seed (pasture, lucerne)	2 ha	-124 ha	$ 380
Seed (saline areas)	55.1 ha	+41.9 ha	$ 30,720
Subdivisional fencing	0 km	-1.6 km	$ 0
Watering points (paddock)	0 troughs	0 troughs	$ 0
Watering points (off stream)	0 troughs	-6 troughs	$ 0
TOTAL			**$ 31,100**
Rabbit ripping	48 hrs	+48 hrs	$ 4,170
Salinity			
Survey	1 survey	0 survey	$ 18,700
Recharge drains	0 km	-1.1 km	$ 0
Recharge dams	0 dam	-1 dams	$ 0
Drains (waterlogging control)	2.0 km	+0.5 km	$ 3,500
Weed control (discharge)	13.5 ha	-11.1 ha	$ 27,100
TOTAL			**$ 49,300**
Trees			
Landscape (shelter belts)	9690 tubestock	-13300 tubestock	$ 22,572
	0 km direct seeding	0 km direct seeding	$ 0
Trees (salinity recharge)	1200 tubestock	-2100 tubestock	$ 2,250
Trees (above salinity discharge)	0 tubestock	0 tubestock	$ 0
Watercourses	1120 tubestock	-2630 tubestock	$ 3,190
	0 km direct seeding	0 km direct seeding	$ 0
Wetlands	500 tubestock	+500 tubestock	$ 1,379
Total tubestock	12,510 tubestock	- 17,530 tubestock	$ 29,391
Total direct seeding	0 km direct seeding	0 km direct seeding	$ 0
TOTAL			**$ 29,391**
Weed control			
Mechanical / cultivation	0 hrs	-199 hrs	$ 0
Herbicides (non saline areas)	292 litres	+56 litres	$ 19,628
TOTAL			**$ 19,628**

1 Includes grant allocation, landholder cash and 'in kind' contribution.

2.2 Works completed and claimed by landholders

Works completed and re-imbursed by the Woady Yaloak catchment project in 2009 amounted to $119,985.35. This was a $138,471.39 decrease on the previous record year, reflecting the scaling back in the number and scale of projects. Claims made by landholders were 9.1 % under budget.

Forty six landholders made claims for completed work, about half the number of 2008 (appendix 1). Thirty of these landholders had also claimed in 2008, reflecting the financial support is being shared among the landholders in the catchment.

2.3 Support staff

The Woady Yaloak Catchment Project used the services of four people to help support the project. Three are engaged on a part-time basis as contractors and the fourth as a casual. Total employment in 2009 was equivalent to 0.55 of a full time person (2.6 days per week) and is a 29% reduction from the previous year (table 2). Total costs of employment, including travel and other expenses fell by 26.1%.

Table 2 People engaged by the Woady Yaloak Catchment Project (2009)

Name	Title	Employment duration*	Employment tenure
Cam Nicholson	Project manager	0.9 days / week	Contractor[2]
Jennifer Clarke	Neighbourhood group facilitator	1.0 days / week	Contractor[3]
Suzie Lunnon	Neighbourhood group GIS officer	0.2 day / week	Part time employee
Helen Sharpe	Treasurers / accounts	0.4 days / week	Contractor[4]
Students from Marcus Oldham College	Casual staff for alternative fertiliser trial	0.1 day / week	Casual employees
	TOTAL	**2.6 days/week**	

* use of contractors is on an as needs basis and varies considerably throughout the year.

2.4 Revenue to match group activity

Five organisations supported the Woady Yaloak Catchment Project in 2009, with total revenue amounting to $120,668. The major contributions came from the Federal Government through the Caring for our Country initiative (32%) and the Victorian Government via the soil health program and Second Generation Landcare program (32%). Other contributions came from the Corangamite CMA Regional Catchment Investment Plan and the Golden Plains Shire. The Woady Yaloak Catchment Group raised $17,699 from levies, events and interest on deposits.

2 Partner in Nicon Rural Services
3 Director, JTC Rural Facilitation
4 Sharpe books.

2.5 Activities and highlights of the Woady Yaloak Catchment Project in 2009

On ground activities

- The on ground works committee, led by Danny Laffan met and considered 45 new projects
- 53 farm visits were conducted by Jennifer Clarke and Cam Nicholson
- A rabbit baiting program was conducted in the Misery Moonlight and Pittong areas.

Committee initiatives

- Reviewed the 2008-2012 five year plan in light of dramatically changed funding circumstances
- Made a $500 donation to the Victorian Landcare Council, an independent group representing landcare to Government
- Engaged with Southern Farming Systems and other Landcare networks to form the Farmcare consortium
- An independent audit of the financial position of the Woady Yaloak Catchment Group was completed by accounting firm Prowse, Perrin & Twomey
- The members of the 2009 executive committee are listed (appendix 2) and past executive members (appendix 3).

Publicity and communications

- Alice and Kevin Knight won the 2009 McKell Medal
- Lex Hadler won the Corangamite regional primary producer award
- Alice and Kevin Knight and the Woady Yaloak catchment group featured on the ABC Landline program
- Presentations were given at the Victorian landcare network conference at Phillip Island, and two Landcare Readiness meeting in Castlemaine and Bendigo
- The Woady Yaloak website was maintained
- Held two successful neighbourhood group gatherings at Cape Clear recreation reserve (AGM) and the Christmas gathering feature long range weather forecaster, Haydon Walker at the Rokewood football ground. Total attendance was 110 people.
- Committee members Peter Everist and Martin Forbes were both re-elected to the committee of the National Gorse Taskforce, with Peter elected Chairman
- The chairman attended three regional network chairs meetings, discussing landcare challenges with neighbouring catchment groups
- The Catchment Group hosted nine tours. This included six secondary and tertiary groups, local Federal member Darren Cheeseman and State and Federal government bureaucrats
- Distributed 500 copies of the 2008 Woady Yaloak annual report to politicians, bureaucrats, sponsors, agency staff, the catchment community and visitors
- Feature articles in the Stock and Land and Weekly Times
- Two local newsletters were produced.

Geographic Information System

- Susie Lunnon maintained the GIS and photolibrary
- Students from the School of Mines Ballarat revisited many waterway sites assessed in 2003 to measure changes in stream condition.

3. Financial position

Productivity

- Completed the first year of a major evaluation project of alternative fertiliser sources and soil conditioners on nine sites in the catchment (refer to section 4 for results)
- A reduced cost soil testing service continued with Farmright Technical Services Laboratory in Kyabram

The Woady Yaloak Catchment Group Inc. made an operating deficit of $60,037 for the year ending December 31, 2009. This operating deficit is in line with expectations.

Funding received and banked for on ground works, support staff, publicity / communication and other initiatives totalled $163,144. The majority of this income was via grants for specific on ground works and facilitation support. Additional income from interest, member levies and other events amounted to $17,699.

Total expenditure in 2009 was $223,181. Expenditure was $128,358 less than 2008, reflecting the reduction in on ground works, which decreased by $141,723. The overall cost of contracts and salaries increase to $108,491. This was a results of work conducted on an alternative nutrient management trial. Consultancy contracts, salaries and travel for more traditional landcare support decreased by 26.1%.

The net assets of the Woady Yaloak Catchment Group declined to $151,591 in 2009. This is in line with expectations as the executive committee agreed to use accumulated funds to continue unsecured on ground works in 2009. Plant and equipment accounted for only $2,187 of these assets.

A condensed profit and loss, balance sheet and equipment schedule are presented (appendix 4). A copy of the full independent audit conducted by Prowse, Perrin & Twomey, Certified Practicing Accountants is available on request from the Woady Yaloak Executive Committee.

4. Evaluating alternative fertilisers and biological products for pastures and crops

There is growing farmer interest in using alternative nutrients sources and biological soil enhancers as an alternative to traditional manufactured fertiliser and/or to improve soil 'health'. However as many of these products have only recently appeared on the market, the scientific evidence to support the suggested responses is often limited. Farmers in the Woady Yaloak catchment were interested in investigating the response of a range of alternative products tested under local conditions.

The three year trial is evaluating:

- alternative nutrient sources (animal manures and liquid fertiliser) that are locally available and comparing these to traditional inorganic fertilisers (common practice)
- the impact of some recently promoted biological products to change soil biological activity and in turn plant production.

The results presented are the first six months of these trials.

Treatments

Eight sites were identified by farmers in the catchment. The sites represented a range of typical pastures and crops. All sites were soil tested before the trial commenced. This included a traditional soil test (table 3), as well as a test to measure biological activity in the soil (table 4). All sites will be retested after 3 years.

Table 3: Key soil test results (traditional soil test) – tested Spring 2008

Site	Site description	P (Olsen)	K (Colwell)	S (KCl 40)	pH (CaCl2)	Al (%)	PBI	CEC
1	New tall fescue pasture	11.3	90	13.6	4.6	3.0	115	14.51
2	Established lucerne	11.9	93	11.3	5.0	0.7	33	4.12
3	Triticale	18.5	203	8.9	4.9	1.2	58	6.80
4	Old phalaris pasture	12.1	132	11.0	4.7	2.7	61	6.71
5	Established lucerne	22.7	258	15.2	5.3	0.4	37	7.31
6	Chick peas	19.2	61	9.3	4.8	5.1	40	4.15
7	Old vic ryegrass / native pasture	6.5	123	9.0	4.8	2.3	126	13.10
8	Established lucerne	12.4	295	20.5	5.1	0.8	102	10.30

Table 4: Key biological test results – tested Spring 2008 (warm, moist conditions)

Test[5]	Comments
Total and active soil fungi	Total fungi high, especially in older pastures. Active fungi very low to nil. Severely out of balance, needs additional active fungi (compost or compost tea). Minimal beneficial (mycorrhizal) fungal infection.
Total & active soil bacteria	Total bacteria high, but active bacteria low at all sites. Severely out of balance, needs additional food source to stimulate bacterial activity (sugars or amino sugars)
Type of fungi	Good balance of disease suppressive and normal fungi at all sites
Balance of active fungi to active bacteria	Bacterial dominant. Apply additional fungal foods to address these imbalances
Protozoa	Low in all but one site. Suggested this will limit natural nutrient cycling. Needs additional protozoa from compost or compost tea.
Nematodes	Nematode levels low to very low. Suggested this will limit natural nutrient cycling.

Twelve products were applied, some repeated at multiple sites, some at only one site (table 5). The choice of product was determined by farmer interest. At each site one treatment was assigned no product. This was considered the NIL treatment and all other products have been compared to the response of the NIL treatment. A 'standard' fertiliser recommendation was also made for each site based on recommendations from Jen Clarke and Cam Nicholson.

5 Refer to appendix 1 for explanation of the reason behind the tests conducted

Table 5: Species description and products applied

		Alternative nutrients / biological products												
Site	Species description	NIL	Common inorganic fertiliser	Pig manure	Poultry manure	Seasol & Powerfeed	Worm Caste	Twin N	TM 21	Nutrisoil	Munash products	Compost products	Biosolids	Guano
1	New tall fescue pasture	X	X	X		X	X			X	X		X	
2	Established lucerne	X	X	X		X	X			X		X		X
3	Triticale	X	X	X		X	X		X	X		X		
4	Established phalaris pasture	X	X	X	X	X	X	X		X				
5	Established lucerne	X	X	X	X	X	X	X		X				
6	Chick peas	X	X	X	X	X	X	X		X				
7	Old vic rye / native pasture	X	X		X	X	X	X	X	X				
8	Established lucerne	X	X		X	X	X	X	X	X				

A description of the products is presented (table 6).

Products were applied in a completely randomised block design with 4 replicates. Each plot was 4m x 16m, providing a buffer between plots. Dry matter cuts were taken from the middle of each pasture plot and crop samples were cut to ground level and then threshed in the Southern Farming Systems plot header.

The rate and time of application of biological products was made in consultation with the product suppliers (table 7). Traditional fertilisers were determined by Cam Nicholson and Jen Clarke (table 8).

Table 6: Product used

Product	Comments
Common inorganic fertilisers	A range of fertiliser commonly used in the district, applied to match deficiencies identified from soil testing.
Pig manure from grower sheds	The sample contained 3.32% Nitrogen, 1.89% phosphorus, 2.61% potassium, 0.82% sulfur, 62.8% DM[6]. It was applied in an uncomposted form.
Poultry manure and wood shavings from broiler sheds	The sample contained 2.74% Nitrogen, 1.52% phosphorus, 1.56% potassium, 0.43% sulfur 73.1% DM[2]. It was applied in an uncomposted form.
Seasol and Powerfeed	Seasol is an organic seaweed plant conditioner. It contains naturally occurring growth regulators, trace elements, alginates, carbohydrate and vitamins derived from kelp. Powerfeed (12:1.4:7:0) is an organic fish fertiliser. It is a source of amino acids, proteins, beneficial bacteria, trace elements and vitamins. Powerfeed has been fortified with extra nitrogen, potassium, a small amount of phosphorus and humates.
Worm Caste	Worm castings claim to act as a plant nutrient and soil conditioner, in a mixture of readily available nutrients, bacteria and enzymes. It is the solid product of vermiculture (worms). The castings are spread in combination with lime. The lime provides a calcium source and neutralises the environment for the microbes in the castings.
Twin N:	Contains a selection of high yielding nitrogen fixing microbes. A proportion of the microbes live within the plant (roots, leaves, stem). The rest establish in the root zone very close to surface of roots and root hairs. A secondary effect is the production of growth factors and release of substances that improve nutrient solubility. Applied in addition to the standard fertiliser recommendations. For the cropping sites, where nitrogen was part of the standard fertiliser application, the rate of nitrogen applied in that form was reduced by 50%.
TM 21	A bio-stimulant that feeds and increases the population of micro-organisms in the soil.
Nutrisoil	Broad spectrum liquid plant food, which includes soil bacteria. It is the liquid product of vermiculture (worms). Typical analysis contains: 492 mg/kg Nitrogen, 130 mg/kg Phosphorus, 700 mg/kg Potassium.
Munash products	A combination of three products supplied by Munash. Ecomin Balance, a natural mineral fertiliser containing 2.4% phosphorus, 5% potassium, 1.5% sulfur, 10% calcium, 5% magnesium, plus trace elements. Two foliar products were also applied: Bio N, a product which supplies bacteria and enzymes, with the ability to fix atmospheric nitrogen and Omniboost K, a product containing 6% nitrogen, 13% phosphorus, 3.1% potassium, 3.3% sulfur, plus magnesium, trace elements, amino acids, fulvic acid and uptake enhancers.
Compost products	A combination of solid and liquid compost products (tea). Supplying organic matter, available nutrients and organisms. Sampi fish oil emulsion was used with the spring application to provide available nutrients and discourage insect and fungal attack.
Biosolids	Byproduct from sewerage treatment plants. It contains 1.3 to 1.4% total phosphorus, very little of which is readily available, 1.4 to 1.6% total nitrogen, most of which is immediately available. Almost neutral pH. The product is about 50% organic matter. Also provides trace elements.
Guano	Supplied as Guano Gold Kwik start. This product contains 11.6% phosphorus (total P), 28.8% calcium (total Ca) and 8.8% silica. It provides a combination of available nutrients and slow release nutrients. Silica increase exchange sites for nutrient storage. This product was spread in a mix: 75% Guano Gold, 25% Muriate of Potash.

6 Tested by SWEP Analytical Laboratories

Table 7: Rate of products applied and time of application

Product	Application rate	Timing Pasture/Lucerne	Timing on crops
Inorganic fertilisers	See table 6	Late May	Post sowing, pre - emergence
Pig manure	4.2 tonne/ha (6.4 m^3/ha), pasture/lucerne 6.2 tonne/ha (9.6m^3/ha) crop	Late May	Post sowing, pre - emergence
Poultry manure	2.1 tonne/ha (5m^3/ha) pasture/ lucerne 3.2 tonne/ha (7.5m^3/ha) crop	Late May	Post sowing, pre - emergence
Seasol & Powerfeed	5 litres/ha of each (200L water/ha)	Mid June Late August Early November	First application after emergence: 3-4 tillers for cereals, 15 cm for broadleaf. Second application early flowering.
Worm Caste	200 kg/ha worm caste 2.5 tonne/ha lime	Late May	Post emergence
Twin N	50 mL/ha (300L water/ha)	Mid June Late August	First application after emergence: 3-4 tillers for cereals, 15 cm for broadleaf. Second application early flowering.
TM 21	250 ml/ha (80L water/ha)	Mid June Late August	Post sowing, pre- emergence. Second application late August.
Nutrisoil	5 litres/ha (95L water/ha)	Mid June Late August	First application after emergence: 3-4 tillers for cereals, 15 cm for broadleaf. Second application early flowering.
Munash products	250 kg/ha Ecomin Balance (solid) 2 litres/ha Bio N (foliar) 2 litres/ha Omniboost K (foliar) (76L water/ha)	Solid product – mid May. Foliar product – mid June	Not applied at any crop sites
Compost products	Compost (solid): 780 kg/ha crop 1.7 tonne/ha lucerne Compost tea (foliar): First application 40 litres/ha (40L water/ha) Second application 40 litres/ha + 15 litres/ha Sampi fish oil emulsion (40L water/ha)	Solid product – early June. Foliar product – first application mid June, second application early September	Solid product and first foliar application – post sowing, pre-emergence. Second application of foliar product – early September
Biosolids	250 kg/ha	Late May	Not applied at any crop sites
Guano	112.5 kg/ha Guano Gold 37.5 kg/ha muriate of potash	Early June	Not applied at any crop sites

Table 8: Rate and type of inorganic fertiliser applied in 2009

Site	Description	Rate (kg/ha)	Product
1	New tall fescue pasture	125 100	Triple superphosphate Muriate of potash
2	Established lucerne	280	Super potash 2:1
3	Triticale	100 185	DAP Gypsum (for sulphur)
4	Old phalaris pasture	265	Super potash 3:1
5	Established lucerne	150	Single superphosphate
6	Chick peas	100 60	DAP Muriate of potash
7	Old vic rye / native pasture	375	Super potash 5:1
8	Established lucerne	115	Triple superphosphate

Note: The early flowering foliar applications (nutrisoil, seasol and power feed) were not applied to the triticale crop because the crop was very tall at this stage and foliar application with a backpack spray unit was impossible.

Results & discussion

The range in fertility and biological activity in the soil would indicate the potential for a response to the chosen products. The overall biological activity of the soil was reported as being low to very low. The level of macronutrients (phosphorus, potassium and sulphur) was also below desirable levels at most sites.

The results for total dry matter have been mathematically analysed to take into account the natural variability across the site. The mathematical analysis enables a figure to be derived that separates out whether the differences are due to chance or luck or whether it is due to the product used. This is called the least significant difference or LSD. If the difference between two treatments is less than the LSD, then even though there may be difference between the numbers, this difference is due to chance or luck. However, if the difference is greater than the LSD, then the difference is not due to chance or luck, it is due to the product used. If we repeated the trial we would expect the same result to occur 95% of the time. Put simply any product that exceeds the LSD value can claim to have achieved a different result and that difference is repeatable.

All results are compared to the no application treatment.

The results only refer to the first winter and spring drymatter collections and the crop yields.

A word of caution. These results are for the first six months of a three year project, so avoid drawing strong conclusions at this stage.

There was a significant increase in dry matter production from the pig manure and poultry manure compared to the NIL treatment. For the pig manure this occurred across all pasture and lucerne sites tested. The increase in pasture dry matter ranged from 12% to 31% for the pig manure. For the poultry

manure a significant increase in production was only recorded at two of the four pasture sites (figures 2 & 3).

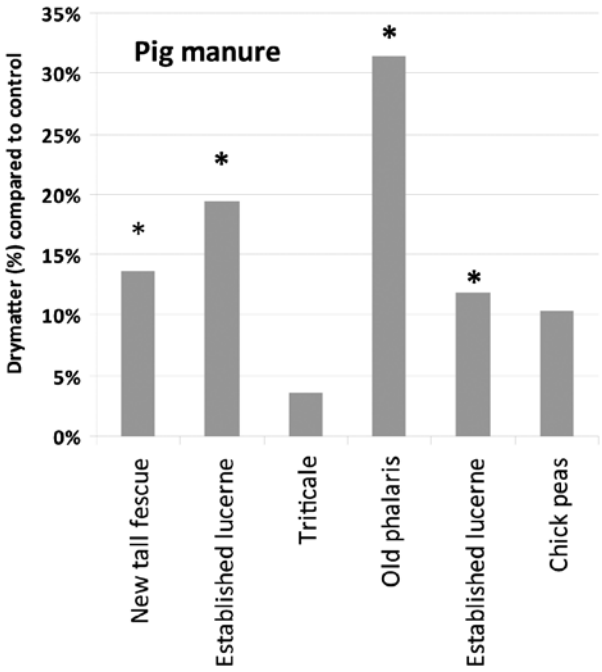

Figure 2

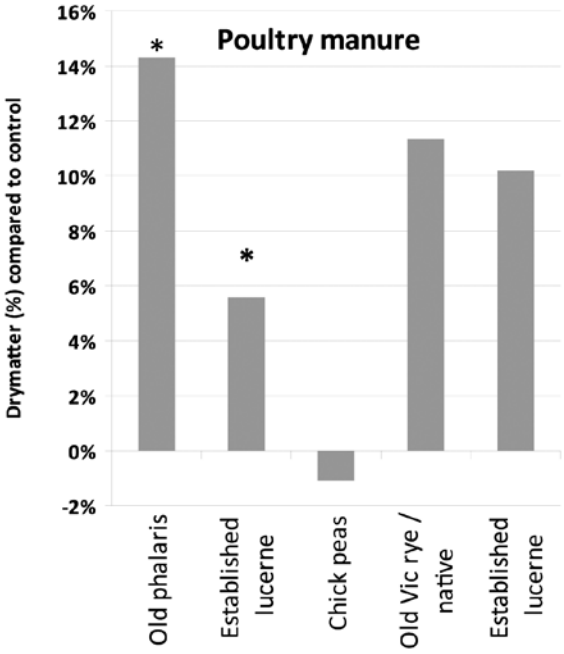

Figure 3

Figures 2 & 3: Increase in dry matter production compared to the NIL treatment (asterix indicates significant difference (p=0.05))

This is not surprising as the heavy application rate supplied significant amounts of nitrogen and phosphorus (table 9). However both manures were applied as a once off application and the long term effects still need to be quantified.

Table 9: Rates of nutrient applied by manures

Product		N (kg/ha)	P (kg/ha)	K (kg/ha)	S (kg/ha)
Pig Manure	crop	151	86	118	37
	pasture/lucerne	100	57	79	25
Poultry Manure	crop	64	35	36	10
	pasture/lucerne	43	24	24	7

There was no significant increase in any of the other products tested, except for traditional fertiliser at one site. This is despite several of the sites measuring soil fertility below optimal levels.

Late application of products (mid May) combined with the late break in June may have limited the potential pasture response to the other products that were supplying nutrients. The benefits from these applications may be seen in year two and beyond.

For the crop paddocks, the lack of response, even to the animal manures was likely to be a result of a hot dry period at the end of the growing season. These climatic conditions significantly affected yield and grain quality, overshadowing the potential response to the products applied.

There was no significant response to any of the biological products applied. This is to be expected as all suppliers made clear the products would take more than one season before the full benefits were realised. Continued testing in subsequent years, along with some fine tuning of product application will enable any long term benefits to be realised.

Acknowledgements: Special thanks to Adam Walton, Steve Fagg, Peter Mellington, Doug Hucker, Brett Missen, Troy Missen, Rob Phillips and Ken McBeath for providing sites to conduct the trials.

Appendix 1 Recipients of funding (2009) – Asterisk indicates a claim in 2008

Banks*
Bermingham*
Blomeley
Bodman*
Boyle*
Butterworth
Callaghan
Carr, G*
Clark
Cunningham*
Dales L/C grp*
Drummond*
Edgar*
Ellis
Everist*
Fagg, G*
Fagg, L*
Farey
Farm Advisory
Grenville Landcare Group
Hadler*
Jefferson
Kennedy, J*
Kennedy, R*
Kerr, C
Kerr, M*
Knight*
Kopke*
Laffan*
McBeath*
McKenzie, C*
McKenzie, G*
McRoberts*
O'Keefe
Phillips
Richardson*
Rokewood Golf Club*
Rowe, G
Smith, D
Stabeusz*
Stewart, G*
Walton B*
Wilkie*
Wills, P
Woady Yaloak Equestrian Centre*
Young

Appendix 2: Woady Yaloak Catchment Project Inc.

Executive Committee – 2009

Name	Portfolio group member	Landcare group
Daniel Laffan (Chair)	• Strategic partnerships • Finance • On ground works • Communication / publicity • Productivity	Grenville
Jane Archer (to April 2009)	• Communication / publicity	Rokewood
John Carr	• Finance (Chair)	Rokewood
Col McKenzie	• Productivity (chair) • On ground works	Misery Moonlight
Peter Donovan (to June 2009)	• Productivity	Misery Moonlight
Karen O'Keefe (from July 2009)	• On ground works	Misery Moonlight
Peter Everist	• Strategic partnerships • Finance • On ground works	Haddon
Martin Forbes	• Strategic partnerships • On ground works	Dales
Alice Knight (past chair)	• Strategic partnerships (Chair) • Finance • Communication / publicity	Pittong Hoyles Creek
Kevin Knight (past chair)	• Finance	Pittong Hoyles Creek
Michael Rowe (past chair)	• Communication / publicity (chair) • Strategic partnerships • On ground works • Productivity	Pittong Hoyles Creek
Troy Missen	• Productivity	Werneth
Vacant		Werneth
CCMA representative	• Strategic partnerships	Corangamite CMA
DPI representative	• Strategic partnerships	DPI

Appendix 3: Woady Yaloak Catchment Group

Executive Committee members since inception

Name	Period of service
Jane Archer	2005 to 2009
Tim Bingley	1993 to 1999
Jim Boyle	1993 to 1999
Garry Bradley	1998 to 2002
Simon Caldwell	1993 to 1996
John Carr	1993 to present
David Coutts	1999 to 2009
Peter Donovan	2004 to 2009
Shayne Ellis	2000 to 2002
Peter Everist	2005 to present
Frank Faulisi	1995 to 1997
Martin Forbes	2008 to present
Ian Goode	1994 to 1996
Alby Gurkin	1995 to 1998
Lex Hadler	1993 to 1999 2001 to 2004
Peter Hirth	1996 to 2000
Doug Hucker	1998 to 2002
Nev Keating	1996 to 1997
Alice Knight (Chair 1998 to 2003)	1997 to present
Kevin Knight (Chair,1993 - 1998)	1993 to present
Daryle Kopke	1994 to 1999
Daniel Laffan (Chair 2008 to present)	1994 to present
Even Lewis	1999 to 2000
Ken McBeath	1993 to 1997
Col McKenzie	2004 to present
George McKenzie	1993 to 1997
Brett Missen	2002 to 2006
Troy Missen	2000 to 2001 2008 to present
Craig Mitchell	2006 to 2007
Karen O'Keefe	2009 to present
Michael Rowe (Chair 2003 - 2008)	2000 to present
Marion Walton	1999 to 2004

Appendix 4: Financial statements

WOADY YALOAK CATCHMENT GROUP INC
INCOME STATEMENT
FOR THE YEAR ENDED 31 DECEMBER 2009

	NOTE	2009 $	2008 $
INCOME			
Woady Yaloak Catchment Improvement Fund		5,000	10,000
Grants		119,368	373,863
Interest		3,663	8,431
Levies		12,269	5,812
Sponsorship		1,040	-
Sundry Income		727	491
TOTAL INCOME FROM ORDINARY ACTIVITIES		**163,144**	**398,597**
EXPENSES			
Annual Report		4,940	3,860
Audit & Accounting Fees		3,670	2,520
Catering/Functions		0	1,050
Contracts/Salaries		108,491	92,990
Depreciation		847	1,020
Donations		500	-
Educational materials		-	3,846
On Ground Works		103,506	245,229
Hire of Equipment		25	45
Insurance		894	932
Sundry Expense		308	-
Website		-	45
TOTAL EXPENSES FROM ORDINARY ACTIVITIES		**223,181**	**351,539**
OPERATING SURPLUS (DEFICIT)		**(60,037)**	**47,059**
TOTAL CHANGES IN MEMBERS' EQUITY		**(60,037)**	**47,059**

WOADY YALOAK CATCHMENT GROUP INC
BALANCE SHEET
AS AT 31 DECEMBER 2009

	NOTE	2009 $	2008 $
CURRENT ASSETS			
CBA Cheque Account		90,633	136,974
CBA NLP-SPG Cheque Account		12,284	14,912
CBA Term Deposit 6856		37,306	35,079
CBA Term Deposit 7779		49,126	46,484
CBA Improvement Fund		11,955	13,034
Trade Debtors		5,000	-
Sundry Debtors		1,085	2,365
GST Receivable		9,294	13,870
TOTAL CURRENT ASSETS		**216,683**	**262,718**
NON-CURRENT ASSETS			
Computer Equipment		348	638
Field Equipment		1,839	2,396
TOTAL NON CURRENT ASSETS		**2,187**	**3034**
TOTAL ASSETS		**218,870**	**265,752**
CURRENT LIABILITIES			
Trade Creditors		63,425	6,414
Grants Received in Advance		3,796	47,553
Employee liabilities		58	157
TOTAL CURRENT LIABILITIES		**67,279**	**54,124**
TOTAL LIABILITIES		**67,279**	**54,124**
NET ASSETS		**151,591**	**211,628**
SHAREHOLDERS EQUITY			
Accumulated Surplus		151,591	211,628

WOADY YALOAK CATCHMENT GROUP INC
EQUIPMENT SCHEDULE
FOR THE YEAR ENDED 31 DECEMBER 2009

Computer equipment			Dep		
Item	Purchase cost	Opening price	rate (%)	Amount	Closing price
Software*	$ 3,500	$ 59	40	$ 24	Written off
Data projector	$ 5,695	$ 96	40	$ 38	$ 57
Digital Camera (2)	$ 512	$ 40	40	$ 16	$ 25
Photo scanner	$ 326	$ 25	40	$ 10	$ 15
Computer 2	$ 1,064	$ 138	40	$ 55	$ 83
Laptop computer 2	$ 2,164	$ 280	40	$ 112	$ 168
		$ 638		**$ 255**	**$ 348**
Machinery					
Item	Purchase cost	Opening price	rate (%)	Amount	Closing price
Bait layers (4)*	$ 4,800	$ 805	20	$ 161	$ 644
Carrot cutter*	$ 600	$ 101	20	$ 20	Written off
Ripper*	$ 1,500	$ 307	18	$ 55	$ 251
Gas guns (2)*	$ 500	$ 50	25	$ 13	$ 38
Protective helmets (2)*	$ 150	$ 15	25	$ 4	$ 11
Direct seeding machine & trailer*	$ 5,000	$ 839	20	$ 168	$ 671
Spray unit	$ 1,677	$ 280	20	$ 56	$ 224
		$ 2,396		$ 476	$ 1,839
TOTAL EQUIPMENT				**$ 731**	**$ 2,187**

Appendix 5: Woady Yaloak Catchment Group

The laboratory at the Soil Foodweb Institute measure many organism in the soil. The key measurements in the Soil Foodweb Institute report are:

Fungi

Soil fungi perform many useful purposes in a soil. They break down the carbon in plant residues, releasing some nutrients for plant growth but also storing some of these nutrient in long thread like structures they grow called hyphae. When these hyphae break down they release these trapped nutrients. Fungi are the most important biological way of storing and releasing nutrients in a soil.

The growth of fungal hyphae also creates a net like structure that helps bind soil particles together. During growth of the fungal hyphae a glue like substance called glomalin is produced. The combination of the hyphae 'net' and the glomalin 'glue' improves the soils ability to store water and encourages root growth. Fungi and glomalin contain a lot of carbon.

However just measuring total fungi only tells part of the story. The active portion of the total fungi is also measured, to determine how much 'turnover' of fungi is occurring. The level of activity is influenced by having an adequate feed source (mainly carbon from organic matter) but also by heat and moisture. Testing under warm moist conditions (eg Spring) is the best time to determine the activity of fungi in the soil. Samples taken during dry conditions may be interpreted incorrectly.

There are many different types of fungi, some are highly beneficial to plant growth and some damaging. The easiest way to classify fungi is by the thickness of the hyphae they grow. Beneficial fungi generally have thicker hyphae.

One highly beneficial type of fungi is mycorrhizal fungi. These fungi infect the roots of most plants and the hyphae that grows from the fungus greatly increases the amount of soil the plant can explore. It improves the uptake of nutrients by plants, especially phosphorus from the soil. Mycorrhizal fungi also help protect the plant roots from root feeding nematodes and pathogens (see later). The measurement is sometimes divided into endo mycorrhizal, meaning the amount of fungus inside the plant and ecto mycorrhizal, meaning the amount of fungus outside the plant.

Not surprisingly cultivation and soil disturbance physically breaks the hyphae 'net' and reduces the total amount of fungi in the soil.

Bacteria

Bacteria are smaller than fungi but perform some similar functions. Bacteria breaks down organic matter, releasing some for plant growth and storing some inside themselves. When the bacteria die or are eaten, these nutrients are released. Bacteria also help bind small soil particles together.

Because bacteria don't grow hyphae like fungi, they require less carbon. Instead they require a lot of nitrogen.

Like fungi, there are good and bad bacteria. The most recognised good bacteria is rhyzobia that infect the roots of legumes and allow them to fix nitrogen. Also like fungi, the total amount of bacteria only tells part of the story. Therefore amount of active bacteria is measured.

Fungi to Bacteria ratios

Soil biological life is dominated by fungi and bacteria and both are important. Ratios that compare the amount of total and active fungi or bacteria provides some information, as does the ratio of fungi to bacteria.

The ratio of fungi and bacteria changes depending on the management practices and climatic conditions. Soils with greater soil fertility and higher organic matter generally have higher levels of fungi and bacteria. Cultivation and soil disturbance breaks fungal hyphae and therefore has greater impact on fungi than bacteria. Organic matter high in carbon compared to nitrogen, such as stubbles and dry pasture residues provides an ideal source of food for fungi. In contrast fertiliser containing nitrogen or legume residues favour bacteria. Soil pH is also believed to make a difference, with fungi favoured by low pH (acidic) soils and fungi by higher pH (alkaline) soils. Wet warm conditions favour growth of both bacteria and fungi.

As rule, soils with more active fungi are considered 'healthier' than soils dominated by active bacteria.

Protazoa

Protozoa feed on bacteria. The byproduct of this feeding are nutrients that the plants can take up. Protozoa are important to get a sense of the amount of potential nutrient cycling.

There are three main types of protozoa with one type, ciliates that thrive in compacted or poorly aerated soils. High numbers of cilliates can indicate a soil structure problem.

Nematodes

Nematodes feed on bacteria, fungi, plant roots and disease causing organisms. The byproduct of this feeding are nutrients that are available for the plants. Like protozoa, nematodes give an indication of the amount of nutrient cycling in a soil.

There are specific nematodes that only eat fungi, or bacteria or roots. Some nematodes also eat other nematodes. Nematodes are also important because they are a food source for other larger organisms in the soil.

The soil test will provide an indication of the type and proportion of nematodes that feed on bacteria, fungi, roots and other nematodes. It is suggested high levels of root feeding nematodes indicates poor soil health.

Beneficial nematodes (that eat bacteria and fungi) can be added to the soil but generally these are increased by improving their food source of bacteria and fungi.

Woady Yaloak Catchment Group

Annual Report

Jan to Dec 2009