

NEW PROJECT APPLICATION



Australian Government

Department of Agriculture, Fisheries and Forestry
National Landcare Program

Community Support Component 2005-06

Office use only
Project No.

It is recommended that applicants read the 2005-06 Community Support Component Guidelines prior to completing this form.

Proposals must be submitted to the relevant regional body as a Microsoft Word document in the format shown below (downloadable from www.daff.gov.au/landcare). Proposals may be submitted by email, floppy diskette or CD ROM.

1. NRM Region (& State): Goulburn Broken Catchment, VIC	2. Project location (nearest town or towns): Yea, Alexandra, Mansfield, Shepparton, Echuca
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3. Proposal Title (10 words or less): Nutrient cycling, soil health and water quality - Fixing a leaky system.

4. Applicant organisation (also include ABN where applicable): Goulburn Murray Landcare Network (ABN 25 431 176 621) and Upper Goulburn Catchment Group (ABN 55 438 965 796)
Is your organisation incorporated? Yes (circle appropriate response)

5. Partner organisations (where applicable):												
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Barmah Cattlemen Association</td> <td style="width: 50%;">South West Goulburn Landcare Network</td> </tr> <tr> <td>Hughes Creek Collaborative</td> <td>Undera Landcare Group</td> </tr> <tr> <td>Sheep Pen Creek Landcare Group</td> <td>Fort Dodge Pty Ltd</td> </tr> <tr> <td>Department of Primary Industries Tatura, Seymour</td> <td>Echuca Beef Group</td> </tr> <tr> <td>Landcare Australia Limited</td> <td>Landmark (Wesfarmers) Yea & Alexandra</td> </tr> <tr> <td><i>Soilcam Ltd</i></td> <td></td> </tr> </table>	Barmah Cattlemen Association	South West Goulburn Landcare Network	Hughes Creek Collaborative	Undera Landcare Group	Sheep Pen Creek Landcare Group	Fort Dodge Pty Ltd	Department of Primary Industries Tatura, Seymour	Echuca Beef Group	Landcare Australia Limited	Landmark (Wesfarmers) Yea & Alexandra	<i>Soilcam Ltd</i>	
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6. Delivery agent (who will carry out this project?): Goulburn Murray Landcare Network and Upper Goulburn Landcare Network

7. Other regions involved in the project implementation (if applicable) (evidence of their support/ involvement should be provided/attached): NA

8. Project duration (1, 2 or 3 years): 3 years
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Note: all proposals will be considered for funding on a year-by-year basis with out-years being indicative at this time. Funding for out-years will be subject to satisfactory progress and budget availability

9. Project description summary (2-3 sentence paragraph, 50 words maximum): This project promotes and delivers effective and sustainable farming practices that produce multiple benefits, particularly improved skills & knowledge, soil health and water quality. Soil health experiments will fill critical gaps in knowledge and will be used to raise industry and community awareness. An integrated education and skills program (& resources) will be delivered to community and farmer groups.
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10. Project budget summary:			
(\$)	Yr 1	Yr 2	Yr 3
NLP funds	80,000	80,000	80,000
Matching (in-kind)	133,600	156,000	133,600

11. Project description:

1. Provide clear description of the:
 - a. project objectives;
 - b. NRM issue(s) that the projects addresses;
 - c. briefly outline the proposed activities and methodology to be used in achieving these objectives;
 - d. specific NLP outcomes the project will deliver; and
 - e. the significance of these outcomes for sustainable agriculture and broader NRM issues.

a) Objectives

1. Promote sustainable farming practices to communities across the catchment, particularly the beneficial role of dung fauna (nutrient cycling, soil carbon, soil aeration, microbial activity, & water quality) in improving soil health, pasture productivity and water quality.
2. Significantly increase the rate and amount of animal dung incorporated into the topsoil across all seasons.
3. Respond to strong and positive community involvement / investment in Landcare pilot projects (Undera & Yea / Yarck) and build on their success. This project is a response to increasing community interest and demand for knowledge and skills.
4. Quantify the beneficial impact of dung beetles on soil health.
5. Safeguard previous investments by developing dung fauna-friendly parasite management options for cattle and horses in the Goulburn Broken catchment.
6. Build stronger partnerships between landcare and the broader community, industry groups and other NRM organizations.
7. Maximize private investment in maintaining sustainable farming practices and ‘natural capital’.
8. Report project outcomes to all stakeholders and broader community.

b) NRM Issues Addressed

1. Poor incorporation of cattle dung on pastures, leading to loss of nutrients and carbon.
2. Soil compaction resulting in poor aeration, poor plant root development and reduced pasture productivity.
3. The need to use fossil fuel and labour (harrowing) to break-up cattle manure in areas where dung beetle activity is low.
4. Nutrient pollution of waterways when dung is blown or washed into streams.

The important ecosystem service that dung fauna can provide is absent from most of South-Eastern Australia. Australia had no large herbivorous mammals at the time Europeans introduced domestic stock and so had no invertebrate fauna capable of burying large quantities of dung. Currently there is a combined total of about 700,000 meat and dairy cattle in the Goulburn Broken Catchment, producing over 100,000 tonnes of dung daily! This resource is poorly utilized, with significant and negative catchment-wide consequences.

Currently over most of South-Eastern Australia, only two species of dung beetles are widely distributed and their activity is restricted to only three months of the year. The extensive use of veterinary chemicals toxic to dung fauna compounds this. Consequently, significant amounts of nutrients and carbon are lost from farms due to poor rates and amounts of dung being incorporated into the soil; earthworms bury little and much dries out and is either washed or blown away. By significantly increasing the rates and amount of dung buried, this project will underpin improvements in soil health; pasture productivity and stock health on a catchment scale.

- If cattle dung dries out before being incorporated into the soil, up to 80% of nitrogen is lost to the atmosphere.
- The depth of dung burial varies from 50mm to 300mm, supplying nutrients directly to the root zone.
- A substantial saving (eg. \$40/ha/yr) can be made by eliminating harrowing, with year-round dung beetle activity.
- Dung beetles disrupt the life-cycle of intestinal parasites, so serve as a biocontrol agent.
- When active and in large numbers, dung beetles can bury up to 80% of fresh dung.
- The tunnels dug under and around dung pads produce excellent aeration of the soil and their digging deepens the topsoil.
- Increases in plant yield are obtained when dung is intimately mixed with soil, compared to when dung is left on the soil surface in the absence of dung beetles.

Though it is well understood that dung burial is a critical ecosystem service in grazing ecosystems, current knowledge lacks the quantitative detail to estimate the level and value of this service. This project aims to fill some of those gaps.

c) **Activities & Methodology**

- Education & Promotion - In conjunction with Landcare Australia Limited, develop a range of education and promotion material on the beneficial role of dung fauna in sustainable agriculture. A farmer information kit will be developed and include technical and general information on soil health (incorporating experimental results, see below), dung fauna-friendly parasite management for stock and dung fauna identification aids.
- Community education will be achieved at major agricultural field days (Elmore, Stanhope, Seymour Farm Expos), local events (town agricultural shows), industry groups (Beef Cheque & Pastures for Profit) and existing networks (Landcare). Emphasis will be on increasing knowledge and developing transferable skills.
- Ninety landholders will invest significantly in the project in the Echuca, Shepparton, Yea, Alexandra and Mansfield districts (Yr 1), by purchasing subsidised dung beetle 'starter colonies' (1100 to 1500 beetles), in return for their participation during the project (surveys, monitoring each colony, adoption of related sustainable farming practices, demonstrations). For maximum project return subsidised starter colonies will be limited to one, or two per farmer per year. Each released colony will be monitored following release.
- In each district an initial farm survey will determine existing dung beetle species diversity, allowing informed selection of new species.
- Farmer Agreements will ensure participants manage intestinal parasites of stock in a dung fauna-friendly way. The Project Manager / Landcare will ensure longer term monitoring at release sites is maintained.
- The beneficial impact of dung beetle activity will be measured and evaluated at a selection of farms where dung beetles have not previously occurred, as well as sites where dung beetles are well established. Exchangeable sodium, potassium, calcium and magnesium, available potassium, total nitrogen, total phosphorus, carbon, microbial activity and aeration will be examined using an experimental design developed in conjunction with soil chemists from the Victorian Department of Primary Industries, Tatura. Experiments will be conducted across soil types, in irrigated and dryland pastures and include CO₂ Evolution, Cellulose Degradation (cotton strip method), commercial soil tests and aeration. Using experimental results, estimate rates of dung burial at different levels of dung beetle activity.
- Demonstration sites, where farmers can see for themselves the impact of dung beetles, will play a major role in convincing new farmers to invest in dung beetles and participate

in this project. Having begun small-scale releases of several new species of dung beetle over the last few years and with an existing client-base of 40+ we are well placed to launch this large-scale project.

- Where possible, use past records from the Shepparton Irrigation Region's Drainwatch project (running for 10 years), to compare nutrient levels in drainage before and three years after the introduction of dung beetles.
- All participating farmers will be expected to share and spread 'their' dung beetles locally, once populations are well established.
- Project outcomes will be reported in scientific and popular journals, the local press and pamphlets.

d) Delivering NLP outcomes

1. 'Support for the (national) Landcare movement.'
2. 'Adoption of sustainable and innovative practices of primary producers throughout rural and regional Australia.'
3. 'Increase skills and knowledge through sharing of information on sustainable practices.'

e) The significance of these outcomes for sustainable agriculture and broader NRM issues

(Numbered as per 'd' above)

1. Projects such as this rely heavily on existing local and regional networks. The project will expand the activities of regional Landcare and build diverse, productive partnerships between community, industry and agencies. New partnerships in turn promote new learning and new opportunities. Given the obligate ecological relationship between large herbivores (cattle etc) and dung beetles, and the fact that this significant ecological niche is largely vacant, the project has a very high likelihood of success. All these factors make this project suited to delivery by landcare.
2. Our pilot projects (Yarck/Yea & Undera) have clearly demonstrated that many farmers quickly appreciate the benefits that dung beetles provide. Any reluctance to invest comes from an information and skills gap. The project will empower farmers by giving them the skills and information to manage a critical ecosystem service, which will in time provide multiple benefits (on-farm and catchment-wide) and will make an important contribution to any sustainable grazing enterprise. The importance of good information, a positive message and known demonstration sites can't be understated.

Our project puts emphasis on developing understanding and transferable skills, particularly the 'monitoring', 'dung fauna ID', 'soil assessment' and 'parasite management' components. The large stakeholder/partner base (industry, corporate, community, agency) will ensure that information and skills become widely available. The developed information, tools, educational material and research findings will have value beyond the Goulburn Broken catchment boundary.

12. Justification/Demonstration of Stakeholder Consultation and Support:

Demonstrate or describe consultation, including technical advice sought, and support from stakeholders (if applicable). Provide letters of support, where appropriate, to strengthen claim.

Stakeholder Consultation & Support

Ian Linley – application advice.

Megan McFarlane – GB CMA, application advice.

Project support, letters attached

John Feehan / Soilcam.

Kate Sergent, Dept of Primary Industries, Seymour, Vic.

David Burrows – Soil Scientist. Dept of Primary Industries, Tatura, Vic.

Landcare Australia Limited, Sydney

Landmark (Wesfarmers) Yea & Alexandra

Fort Dodge

Echuca Beef Group members

Howard Pascoe Consulting PTY Ltd

Sheep Pen Creek Landcare Group

Cattlemen Association of Barmah

Home Ck-Spring Ck Landcare Group

South West Goulburn Landcare Network

Hughes Creek Collaborative

13. Links to relevant NRM regional planning process:

How does this project contribute to the regional investment strategy and regional catchment targets, and what priorities does it target?

The Objectives and Outcomes of this project reflect and underpin the priorities of major GB CMA policy and planning documents. For example:

Goulburn Broken Regional Catchment Strategy- November 2003

The health of the Catchment's soils is critical for the region's continued prosperity.

Most (41 per cent) soils on the lower slopes and floodplains are poorly drained, low in nutrients and often acidic. A further 15 percent of catchment soils are poorly drained with dense subsoil clays of moderate to low fertility. The remaining soil types occur mainly in the Upper Catchment. They have good drainage and are used for forestry or support native forests. These granite based soils are prone to acidity making them unsuitable for cropping and grazing without big inputs of lime.

In addition to salt, the Catchment generates 360 tonnes of phosphorus and 2,854 of nitrogen each year. Of this, about 290 tonnes of phosphorus and 1,950 tonnes of nitrogen leave the Catchment via waterways. We contribute 33 per cent of the Murray River water flow above the Murrumbidgee, but nearly 60 per cent of the turbidity. Because of the nutrient and chemical loads, the risk of algal blooms is high and they occur frequently in and downstream of the Catchment. The increased nutrient loads also affect many native species. Major sources of nutrients include irrigation.

Goulburn Broken Dryland - Priorities

The long term targets of our revised dryland salinity management plan are to:

- Deliver an integrated program to protect and enhance natural resources within the catchment
- Develop a high level of community responsibility and accountability.
- Control land degradation and protect important terrestrial and aquatic assets.
- Maintain water quality for all beneficial uses, including agricultural, environmental, urban, industrial and recreational.

Soil Health

We will seek to maintain the capacity of region's soils to support human health and habitation and to contribute to enhanced water and air quality.

Soil Health Strategy draft 2002

The Soil Health Strategy focuses initially on managing soil salinity (EC) and sodicity in irrigated regions, and acidity (pH), soil structure and erosion in dryland regions. Developing more resilient soils through improved protection of soil biodiversity will be promoted later on.

Management options

P 49. The responsible management of natural and managed (agro) ecosystems within the community will rely on the search for a correlation between the above and below ground diversity. Monitoring tools and some soil biological remediation options need to be incorporated into action plans to reflect a recognition of the importance

of soil biodiversity.

Potential Benefits of Modify Soil Health in the Goulburn-Broken Catchment

P 52. It would be possible to justify additional investment using public funds in further enhancement of natural resource quality and ecosystem services up to the public value of the additional improvement in these goods.

Shepparton Irrigation Region Implementation Committee - Priorities 2004

- 50% reduction in nutrient load from irrigation drains by 2006- 80% reduction in phosphorus loads discharged from sewerage- To improve the condition of 3000 km of streams to good or excellent over 30 years while maintaining the environmental condition of streams currently rated as good, very good or excellent.
- Regional Target of a 65% reduction in the loads of phosphorus reaching, and leaving the catchment.

Upper Goulburn Implementation Committee Priorities 2004

River Health & Water Quality

To achieve multiple benefits by integrating other regional priorities (Bio-diversity, Nature Conservation)

To reduce nutrient (N & P) & sediment loads leaving the catchment.

Specifically to attain a 65% reduction in the loads of phosphorus leaving the Goulburn Broken catchment by 2016.

Sustainable Irrigation

Improve water use efficiency of existing irrigation operations.

Establish demonstration sites of best management practice for irrigation scheduling for a range of enterprises, & conduct farm walks/ field days at these sites.

Average reduction of 25% in water use & 40% increase in profitability per ML by June 2003.

Less surface & sub-surface run-off to streams, reducing salt & nutrient loads.

Soils

Minimise sediment & attached nutrient input to waterways from adjoining lands.

Prevent environmental damage & protect sustainable agriculture through prevention of soil health decline.

Community Program / Integration

3. Develop the capacity of Landcare groups to engage local govt, industry & educational institutions in development initiatives.

7. Engage the community, including small & absentee land holders, in integrated natural resource management.

C) Increased community understanding of natural resources issues & the priorities to address them

Accelerated transfer of new ideas / thinking.

Mid Goulburn Broken Implementation Committee priorities Document 2004

River health & Water quality

Reduce potential phosphorus loads by 65% by 2016 by reducing phosphorus loads from: irrigation drains by 50%, dryland and diffuse sources by 20%, wastewater management facilities by 80%; and urban drainage

Soil Erosion/Soil Health

Ensure sustainable agriculture and land management through protection of the soil resource.

Minimise nutrient (sediment) input to waterways from adjoining steep lands.

Community Capacity Building

Increased community understanding of natural resources issues and the priorities to address them.

Skilled and capable communities managing their natural resources.

Sustainable Water Use

Increased water use efficiency of irrigation practices throughout Goulburn Broken Dryland.

Exploring options for Enhanced Ecosystem Services in the Goulburn Broken Catchment, 2004.

P22 Exec Summary

Invest in research on soils and soil organisms under intensive irrigation and fertilizer regimes. Are there long-term trends or critical thresholds? What are the limits of intensification? Can irreversible changes occur? Is the balance of soil ecosystem services to industrial inputs financially efficient and sustainable?

P22... greater investment to link process with service is required to ensure the ecosystem services concept reaches its full potential. Analysis can vary in scale from enterprise to catchment and can utilize tools from dynamic modeling to multi-criteria evaluation. All should be linked with participatory methods that connect researchers and community together.

P 28 Final report "Dung decomposing organisms highlighted as important natural capital in effective ecosystem functioning." See Fig 7.1

Natural Values Volume

Soil health is highlighted as a critical issue in this document;

For example, page 112 "12.3.1 Ecosystem services need to be carefully defined."

Natural Assets Volume

Soil health is highlighted as a critical issue throughout this document;

For example, page 87 "There is strong evidence that our more intensive agricultural practices have reduced the carbon store, particularly the humic forms, in soils in South Eastern Australia."

14. Contact person for project:

First Name: Bertram Last Name: Lobert
Position: Landcare Facilitator
Phone No.: 03 5790 8606 Facsimile: 03 5797 3199
Mobile:

*Email address: bertram.lobert@iinet.net.au

Postal Address: PO Box 74, Yea, Vic 3717

Please indicate above with an asterisk (*) the prime preferred method of contact (ie. via your phone/ fax/ mobile/ or email).