

DAV39

FARM BUSINESSES, WOOL PRODUCTION & BIODIVERSITY

FINAL REPORT (MILESTONE 8)

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native vegetation
and biodiversity

improving farm profits through biodiversity

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ABSTRACT

Project title: Farm businesses, wool production & biodiversity

Start and finish date (year/month): September 2002 – April 2006

Project team members:

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Objectives

1. To increase wool producers knowledge and skills of managing and enhancing areas of native biodiversity on their properties,
2. To encourage wool producers to make more informed management decisions on integrating farm & native biodiversity management
3. To highlight the environmental, social and financial costs and benefits of retaining and enhancing native biodiversity on wool properties
4. To better inform industry of the barriers to facilitating the adoption of conservation of native biodiversity, so industry programs can be revised accordingly.

Methodology

The approach had four core elements.

It involved a case study approach to farm businesses. Nine case study wool properties were selected in 3 regions throughout central Victoria, including in the Springhurst, Ararat and Maryborough/Maldon districts.

Inferential statistical methods, spatial modelling and rule-based modelling were used to analyse and model ecological data. Detailed financial, social, agronomic and native vegetation data was collected from each of the case study farms. Maps were then constructed highlighting the location of native vegetation, pasture production potential and gross margins for each paddock. Using derived maps, relationships determined from new data and interpretation of existing literature, strategies for managing biodiversity and farm profits were devised

Detailed economic analysis of these strategies was carried out using standard techniques for determining profitability and cash flow of strategies compared to a 'do-nothing' approach

Finally, standard and novel extension techniques were used to engage a wide range of landholders, extension officers and others, and produce a number of communication products.

Implications

The farm business approach integrates biodiversity values, agronomics and economics, and is important for providing a realistic understanding of the alternative approaches for achieving biodiversity outcomes on private land.

In summary, we have shown that economically, financially and environmentally sound strategies exist for hill country grazing woolgrowers in Central Victoria. The results indicate possibilities for reorganizing woolgrowing businesses in hill country to achieve farm business goals of increasing profit in financially feasible ways and also achieve wider environmental goals. For 15 out of 17 wool properties investigated at least one of the four strategies we tested are profitable and affordable and expected to improve environmental outcomes. This is a significant finding in terms of opening up possibilities for redirecting agricultural investments in these hill country landscapes so as to achieve more sustainable production systems.

The project has also shown how to successfully communicate findings about biodiversity management by framing this management in a farm business context. There has been a very positive response to the extension effort, particularly to field days that targeted both graziers and extension staff. The 'dog collar' communication product was a notable hit

Collaboration

Goulburn Broken Catchment Management Authority

Bestwool 2010 program

DPI Meat & Wool program

Arthur Rylah Institute (DSE)

University of Melbourne

Elders Limited

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Landmark

Sponsors

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Land & Water Australia

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MILESTONE NO.:	8	DATE OF FINAL REPORT: 30TH APRIL 2006	
LWA PROJECT REFERENCE NO.:	DAV39		
PROJECT TITLE:	Farm businesses, wool production & biodiversity		
PRINCIPAL INVESTIGATOR:	Jim Crosthwaite Dept Sustainability & Environment BNR, PO Box 500, East Melbourne 3002		
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OTHER COLLABORATORS	Jann Williams, LWA Peter Hanrahan, PHCPL Louise Thomas, DPI Ararat Bill Malcolm, University of Melbourne Vivienne Turner, ARI Neil MacLeod, CSIRO Kim Lowe, DSE Jim Shovelton, Mike Stephens & Associates Frank Jones, Elders Limited Craig Turner, Landmark Peter Vesk, University of Melbourne		
PROJECT OBJECTIVES	<ol style="list-style-type: none"> 1. To increase wool producers knowledge and skills of managing and enhancing areas of native biodiversity on their properties, 2. To encourage wool producers to make more informed management decisions on integrating farm & native biodiversity management 3. To highlight the environmental, social and financial costs and benefits of retaining and enhancing native biodiversity on wool properties 4. To better inform industry of the barriers to facilitating the adoption of conservation of native biodiversity, so industry programs can be revised accordingly. <p>The project was established to identify, test and communicate opportunities to enhance native vegetation and biodiversity on wool properties in Central Victoria, whilst managing for profitability and other producer goals.</p>		
MILESTONE 8 (from the Project Schedule) :	<p>Components</p> <ol style="list-style-type: none"> 1. Case study farm reports completed and distributed to case study farmers 2. Three case study farm reports (for the records) forwarded to LWW 3. Two scientific articles detailing case study farm findings ready for submission 4. Final project report (summing up) 5. Summary of further progress of uptake of project findings into policy 6. Report on the social drivers for woolgrowers 7. A map showing regions to which the project results apply to 8. Project evaluation report 9. Report on plans for ongoing communications/legacy of project 10. Progress on activities against the agreed communication plan 		

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<p>ACHIEVEMENT RESULTS FOR COMPONENT 1 & 2:</p>	<p>1. Case study farm reports completed and distributed to case study farmers 2. Three case study farm reports (for the records) forwarded to LWW</p> <p>The case study farm reports have been completed and have been distributed to each of the 9 case study woolgrowers that participated in the project. Three of these reports are attached to this milestone, as samples of what was distributed. “Farm report 1”; “Farm report 2”; “Farm report 3”</p>
<p>ACHIEVEMENT RESULTS FOR COMPONENT 3:</p>	<p>3. Two scientific articles detailing case study farm findings ready for submission There have been 7 scientific p written since the last Milestone report as follows:</p> <p>1. Crosthwaite, J., Moll, J. Dorrrough, J. Malcolm, L. (2006) Profitability and financial feasibility of strategies to increase native vegetation in Victorian hill country. Paper presented to the Annual Conference of the Australian Agricultural and Resource Economics Society, Manly, February 2006.Submitted to Aust. J. Ag. & Res. Eco 2. Dorrrough J, Moxham C, Turner V, Sutter G (2006) Soil phosphorus and tree cover modify the effects of livestock grazing on plant species richness in Australian grassy woodland. <i>Biological Conservation</i> 130, 394-405. 3. Dorrrough J, Moll J, Crosthwaite J (submitted) Can intensification of temperate Australian livestock production systems save land for native biodiversity? <i>Agriculture Ecosystems & Environment</i>. 4. Vesk PA, Dorrrough J (2006) Getting trees on farms the easy way? Lessons from a model on eucalypt regeneration in pastures. <i>Australian Journal of Botany</i> in press. 5. Moll, J., Dorrrough, J.,Crosthwaite, J. and Straker, A. (2005) Improving native biodiversity management on wool properties in central Victoria – investment analysis of four strategies. A paper presented to a Resource Economics Workshop ‘Identifying production and environmental trade-offs at the farm level’. Organised by the AGSIP project AG13 in partnership with the Australian Agricultural and Resource Economics Society. 28 October 2005, Rockhampton. <i>To be published as conference proceedings; papers are with referees</i> 6. Dorrrough J, Moll J, Vesk PA (2006) When is natural regeneration cheaper? Assessing the costs of getting trees on farms. Paper submitted to the ‘Veg Futures The conference in the field’. Albury. <i>Currently being referred and to be published on-line</i> 7. Dorrrough J, Moxham C (2005) Eucalypt establishment in agricultural landscapes and implications for landscape-scale restoration. <i>Biological Conservation</i> 123, 55-66.</p>
<p>ACHIEVEMENT RESULTS FOR COMPONENT 4:</p>	<p>4. Final project report (summing up) The final project report has been integrated in to the template of this Milestone 8 Final Report.</p>
<p>ACHIEVEMENT RESULTS FOR COMPONENT 5:</p>	<p>5. Summary of further progress of uptake of project findings into policy See the attached EWR report titled; “Policy uptake report”.</p> <p>The most important policy achievement has been the development of a pilot project delivering incentives at the whole farm level. This is a \$500,000 DAFF-funded project under the Native Vegetation Pilot program. The pilot will be managed by Goulburn Broken CMA, drawing on expertise and findings from the Farm businesses, wool production & biodiversity project and also from projects trialling Market Based Instruments.</p>

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	<p>The findings will be used in regional delivery programs of DSE, DPI (Catchment & Agriculture Services) and northern CMAs. Individual extension officers are adopting the findings into their work (as evidenced by follow-up surveys), while more systematic incorporation into programs is occurring via managers of relevant programs (eg. Kim Lowe DSE, Geoff Park, Malory Weston North Central CMA).</p> <p>Findings are also likely to be used in DPI’s Meat & Wool extension program. The management team for that program have requested funding to support this. A first funding bid failed, but the team is continuing to press the case with the Animal investment program in DPI.</p>
<p>ACHIEVEMENT RESULTS FOR COMPONENT 6:</p>	<p><i>6. Report on the social drivers for woolgrowers</i></p> <p>Family goals as well as current business situation were assessed during farm visits for the eight case study farms. This assisted development of suitable strategies for achieving public and private goals. The team also drew on in-depth interviews that studied the long-term motivations of selected landholders in the Goulburn catchment (Farmar-Bowers 2004). This research highlighted the importance of five personal drivers (family succession, enjoying farming, overcoming isolation, learning about farming, and educating children) to what opportunities landholders took up. In conjunction with DAV39 project, further research was commissioned to test the findings about motivations, and also to examine the issue of opportunities further. The researchers were asked to comment specifically on farmer take-up of the strategies recommended by DAV40 and DAV39.</p> <p>Fourteen confidential in-depth interviews, involving twenty-one people, were conducted in western Victoria with farmers who ran a sheep enterprise as part of their farm business.</p> <p>It was found that how landholders responded to opportunities depended on how they fitted with their Personal Career Path (PCP). In general, the interventions most likely to be taken up by farmers voluntarily and perhaps enthusiastically, are those that farmers see as advancing their PCPs within the context of the needs of their families. Farmers would tend to take up more NRM options if they could see them contributing rather than as impositions.</p> <p>The researchers found that the approach of the ‘farm business & biodiversity’ projects was generally in accord with their findings approach, and that the communication products were likely to be well-received. However, it was found that education early in the PCPs of farmers is likely to have the most profound effects on how farming is carried out in the long-term. Nevertheless, programs that target NRM change directly can be successful, particularly if they account for where landholders are on their PCP.</p> <p>A copy of the report is attached. “Understanding farmer decision systems that relate to landuse”</p>
<p>ACHIEVEMENT RESULTS FOR COMPONENT 7:</p>	<p><i>7. A map showing regions to which the project results apply to</i></p> <p>Based on the biophysical locations of the case study farms an estimate was made of the area to which the farm results are likely to apply. The map suggests that the projects ecological and economic results may apply to 10.5 million hectares within south-eastern Australia. This area is likely to underestimate relevance within the southern, central and northern tablelands and western slopes of NSW. Certainly ecological results obtained in the current study reflect patterns observed beyond the mapped areas. The map and report is attached. “A map for decision making and management utilising results from the LWW and LWA Farm business & biodiversity projects”</p>

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<p>ACHIEVEMENT RESULTS FOR COMPONENT 8:</p>	<p><i>8. Project evaluation report</i> A project evaluation was conducted by Jeff Coutts, and is attached. "Evaluation of native vegetation projects"</p> <p>Key findings are:</p> <ul style="list-style-type: none"> • scope is there to make a significant contribution to regional catchment targets as the strategies are relevant to up to 2 million hectares in Victoria, and 6 million hectares across south-eastern Australia • considerable work has been undertaken to better understand approaches to managing native vegetation to maintain biodiversity on farms across the regions covered by both Farm business & biodiversity projects. • generally positive reaction and interest to significant efforts to engage with a large number of producers, their extension and advisory staff (public and private) and key groups such as Catchment Management Authorities and others
<p>ACHIEVEMENT RESULTS FOR COMPONENT 9:</p>	<p><i>9. Report on plans for ongoing communications/legacy of project</i> Ongoing communications for the project are planned, for beyond the project completion date of April 2006. Activities include regional "wrap up" dinners, poster displays at various sheep events including Sheepvention, a farm walk near Maldon, and continued distribution of dog collars and brochures to woolgrowers via Landmark and Elders wool reps. The ongoing communications and legacy the project will leave, are outlined in the updated communications plan, which is attached, "Communications plan Dav39 May06"</p>
<p>ACHIEVEMENT RESULTS FOR COMPONENT 10:</p>	<p><i>10. Progress on activities against the agreed communication plan</i></p> <ol style="list-style-type: none"> 1. 800 Dog collars and brochures have been distributed to Central Victorian woolgrowers to date, with another 800 due to be distributed by the end of May. Collars and brochures have also been distributed to LWW, LWA, AWI program and project staff, DPI and DSE extension officers, and Elders and Landmark wool reps. The attached document, "Evaluation of dog collars", shows the distribution record and evaluation of this product. A copy of the brochure is also attached; "Dog collar brochure" 2. A series of 3 extension notes have been designed and printed. These notes have been distributed to extension officers and attendees at field days. Distribution is not yet complete, as regional DSE/DPI offices, and CMA offices will also receive them. They are attached as follows: "Extension note 1"; "Extension note 2"; "Extension note 3". 3. The LWW website has been provided with relevant documents and information accessible by woolgrowers and the general public. A website has also been created under the DSE website, with further detail and a more detailed range of downloadable documents and facts sheets than the LWW website. This website has been linked through to the LWW website, enabling access to a greater range of information and project data. 4. A woolgrower field day was held at Springhurst on the 28th March. Approximately 10 local woolgrowers attended the day, with about 10 agency extension staff. Another field day planned for the Maryborough/Maldon region had to be cancelled due to extremely dry and un-suitable conditions for showcasing environmental works. This day has been postponed as a farm walk with the local Bestwool group run by Jim Shovelton in August/September 2006. 5. The ABC rural news featured a radio interview by Jim Moll, after the Springhurst field day. See the attached document "Communications record DAV39" for a list of all press releases and articles produced by the project. 6. Presentations and displays have been made at several conferences and meetings since December 2005. These presentations are also listed in the attached "Communications record DAV39". 7. Two field workshops were held in early December 2005, to present the project findings to extension officers and program staff across central Victoria. This also provided an opportunity to survey all participants to gauge reactions to the findings. The survey

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	results can be viewed in the attached documents; “Extension report 4 March”, “Producer Extension report”; “Case report final”, “Field day farmer report”.
	The attached document; “Communications record DAV39” highlights all communication activities over the life of the project

SUMMARY OF PROJECT METHODS:

The approach had four core elements

- a case study approach
- inferential statistical methods, spatial modelling and rule-based modelling
- farm business analysis, and
- standard extension techniques

Nine case study wool properties were selected in 3 regions throughout central Victoria, including in the Springhurst, Ararat and Maryborough/Maldon districts.

Detailed financial, social, agronomic and native vegetation data was collected from each of the case study farms. Inferential statistical methods, spatial modelling and rule-based modelling were used to analyse and model this data. Maps were then constructed highlighting the location of native vegetation, pasture production potential and gross margins for each paddock. From these maps, strategies for managing biodiversity and farm profits were devised, and detailed economic analysis of these strategies was carried out using standard techniques for determining profitability and cash flow of strategies compared to a ‘do-nothing’ approach.

Each strategy was applied to each farm (via modelling), and the financial and impact on native vegetation condition and biodiversity was predicted for each case study farm.

In conjunction to the testing of potential strategies this research project examined current relationships between grazing management strategies (including pasture sowing, fertiliser, grazing intensity and frequency of grazing) and vegetation composition and structure and the pattern and processes of eucalypt regeneration. To examine vegetation patterns and current distribution of eucalypt saplings agronomic and vegetation data collected across the 9 farms was combined with further data from another 8 properties and data from adjacent public lands and reserves. To examine the processes and temporal frequency of eucalypt regeneration under varying management rules-based modelling, based on extensive compilation of existing literature, was used (this work was undertaken in collaboration with Dr Peter Vesk, University of Melbourne). These various forms of ecological data were used to inform the strategies tested and were integrated into economic analyses.

Standard and novel extension techniques were used to engage a wide range of landholders, extension officers and others, and produce a number of communication products.

STATEMENT OF KEY FINDINGS, THEIR INTERPRETATION AND PRACTICAL SIGNIFICANCE AGAINST EACH PROJECT OBJECTIVE:

The research findings highlighted a number of ways Central Victorian woolgrowers can go about improving the condition and extent of native vegetation and biodiversity on their properties, at the same time as managing for profitability.

The following table lists the major findings from the research, and the implications for woolgrowers, extension staff and industry.

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KEY FINDINGS	Implication of finding (what you need to do)		
	Landholder	Extension officer	Program/Industry
1. Adopting a whole farm business approach has potential to identify ways that farm goals and broad-scale native vegetation management can be achieved	A whole farm planning exercise including sound farm financial appraisal, will help landholders to pinpoint priority areas for improving stock carrying capacity and profits, at the same time as improving native vegetation management.	Promote the whole farm approach, including sound farm business analysis in the context of a whole farm plan, to landholders, to achieve both production and environmental goals	Promote the whole farm approach as a method of analysing the financial and environmental impact of alternative management strategies.
2. Fencing to land class combined with Deferred grazing of hill country, can generate between 10-30% increase in annual profits and potentially increase native vegetation condition and cover on hill country.	Fence according to land-class on hill country, and adopt deferred grazing management on these areas.	Promote ground cover and management benefits and investment costs of land class fencing Promote biodiversity and stocking rate/economic benefits of deferred grazing Promote environmental and weed benefits of deferred grazing to hill country landholders.	Promote/provide incentives for land class fencing and watering points, particularly on hill country
3. Improving profitability on productive parts of the farm, can offset biodiversity management on other areas of the farm—up to 15% of the farm area.	Correcting nutrient deficiencies on already productive paddocks, can increase carrying capacity by 24% on average—depending on fertiliser history. Adopting intensive rotational grazing across the property, can also increase carrying capacity by 37%, as well as offset biodiversity management on 15% of the total farm area.	Promote regular soil testing on a paddock basis. Promote targeted fertiliser application, while managing least productive parts of the farm for native vegetation outcomes. Promote profit and native vegetation benefits of intensive rotational grazing.	Promote incentives for whole farm planning incorporating biodiversity management on priority parts of the farm. There is still much uncertainty as to the biodiversity benefits of rotational grazing. There is a need to encourage funding of alternative grazing strategies
4. Frequent grazing and competition from introduced/improved pastures substantially reduce the likelihood of natural regeneration by paddock trees.	Use grazing management to enhance the likelihood of successful natural regeneration. Crash graze if seedlings absent and remove stock to promote germination and establishment	Promote those strategies that increase the likelihood of tree regeneration	Promote/provide incentives for appropriate fencing and investigate potential for incentive payments to control livestock and weeds where regeneration potential is high
5. Paddock trees currently provide the potential to substantially increase tree cover through natural regeneration but tree decline could halve this potential in only 30 years	If managing for increased tree cover prioritise those places most likely to regenerate naturally.	Promote natural regeneration as the favoured form of getting trees back in the landscape where spatial likelihood is high	Promote/provide incentives for management strategies that increase the likelihood of broadscale tree regeneration.
6. Carefully positioned shelter trees can increase sheep performance and wool profits by \$1 /DSE per year in the long term, however this requires investment in fencing and temporary de-stocking of shelter areas.	Encourage the establishment of shelter trees in all paddocks, preferably in large clumps.	Promote the financial benefits and costs of establishing shelter trees	Promote/provide incentives for temporary fencing to encourage shelter trees
7. The most rapid and low cost increases in vegetation condition are likely to be obtained through natural establishment of trees and shrubs in native pasture	Encourage natural regeneration to establish shelter, through temporary fencing	Highlight the financial and biodiversity benefits of natural regeneration over conventional establishment methods	

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8. There is much uncertainty about how long it takes for native plants to re-establish and this translates into risks and costs for the grower or investor. For this reason maintaining or enhancing the condition of existing native vegetation in moderate to good condition is far more cost effective than establishing new vegetation	Manage existing native vegetation better rather than establish new patches	Identify which native vegetation areas to maintain or enhance, and how	
9. The cover and richness of plant species declines exponentially with increased soil phosphorous, primarily as a result of fertiliser application	Reduce or eliminate phosphorous application on parts of the farm being managed for biodiversity	Identify the priority parts of the farm to manage for biodiversity, along with reduced fertiliser application	Incorporate information about native plant responses to phosphorus fertiliser into current industry programs
10. Approaches that seek to integrate native vegetation into an extensive low input production system may lead to the greatest gains in native vegetation condition and extent			Incentive payments, for provision of ecosystem services, could be explored for those farmers willing to undertake extensive low input management systems
11. Changes in land management to improve native vegetation condition, have potential to applied to approximately 2 million hectares throughout Central Victoria.		Promote the use of deferred grazing, targeted fertiliser use, natural regeneration and intensive rotational grazing to central Victorian woolgrowers	The mapped area highlights the areas where incentives for adoption of the project findings could be applied
12. On areas of the farm where wool-growers are intent on intensification through fertiliser application, there is little opportunity to integrate productivity and native vegetation. Under these circumstances native vegetation outcomes must be met through lands especially set aside	Fence off (with gates) and cease fertiliser on those areas managed for biodiversity outcomes alone	Identify the priority parts of the farm to manage for biodiversity	Incentives payments may be required to achieve more than 15% of the farm managed for biodiversity outcomes

It is necessary to understand what these messages mean to policy makers and program managers. The farm business approach that integrates biodiversity values, agronomics and economics is important for providing a realistic understanding of the alternative approaches for achieving biodiversity outcomes on private land.

In summary, we have shown that economically, financially and environmentally sound strategies exist for hill country grazing woolgrowers in Central Victoria. The results indicate possibilities for reorganizing wool-growing businesses in hill country to achieve farm business goals of increasing profit in financially feasible ways and also achieve wider environmental goals. For all wool properties investigated at least one of the four strategies we tested are profitable and affordable and expected to improve environmental outcomes. This is a significant finding in terms of opening up possibilities for redirecting agricultural investments in these hill country landscapes so as to achieve more sustainable production systems.

Objective 1. To increase wool producers knowledge and skills of managing and enhancing areas of native biodiversity on their properties.

The project endeavoured to increase the knowledge and skills of Central Victorian wool producers in a number of ways. Firstly, the project findings highlighted to woolgrowers that biodiversity can be managed successfully in a profitable wool enterprise. This finding was strengthened by highlighting to woolgrowers the impact of various biodiversity management strategies. These strategies were measured in terms of impact on average investment cost, short and long term extra farm profits, 15 year cash flow budgeting, as well as estimates on the future condition of native vegetation.

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Findings were communicated to woolgrowers via field days in trial regions, as well as via Elders and Landmark wool agents.

An easy to read brochure containing the key project findings including impact on farm profits and environment coupled with a printed dog collar, provided a unique communication product to attract the attention of different types of woolgrowers. These brochures and collars were distributed to Central Victorian woolgrowers with the help of Elders and Landmark wool agents. The Land Water & Wool website was printed on the dog collar and brochure, so provided another way interested woolgrowers could access further information on the project findings.

A series of 3 extension notes were also printed, which provided hard copy of findings, highlighting and detailing practical implications of various strategies of managing biodiversity and farm businesses.

The attached communications plan outlines several ways the project findings were communicated to woolgrowers, in order to increase their knowledge and skills of managing and enhancing areas of biodiversity on their properties.

Objective 2. To encourage wool producers to make more informed management decisions on integrating farm & native biodiversity management

Wool producers are being encouraged to make more informed management decisions, though highlighting information that is new and relevant to their wool growing operations. In particular, this new information comprises financial information detailing the impact of various management strategies on farm investment, profitability and cash-flow. These measures are made relevant for central Victorian woolgrowers, as the presented data is based on case study farm results located in various regions across Central Victoria.

New information is also presented on the impact of various management strategies, not only on farm profits, but the condition of native vegetation and biodiversity on central Victorian properties. Estimates were made from detailed ecological modelling, of the likely condition of native vegetation under various farm management strategies. Maps were also produced for each case study farm, which showed the priority areas for management of native vegetation, and the areas that would be expected to be enhanced. The mapping results for each of the 9 case study farms enabled the team to predict which areas of typical hill country properties found in Central Victoria, were the highest priority for native vegetation and biodiversity management. The modelling results highlighted the management strategies that provided the best improvement in native vegetation condition, and the associated costs and benefits to the farm.

Woolgrowers can thus make more informed management decisions knowing which management strategies have the most potential to work on their properties, and the likely impact on the business as well as native vegetation condition. Results have been presented in a way which highlights the distribution of results from the 9 case study farms.

Four strategies that could potentially improve both the condition and extent of native vegetation and profits on wool properties were chosen for further analysis, out of the many possible combinations available to the wool grower.

1. Deferred grazing of hill country areas
2. Correcting nutrient deficiencies, as well as managing other 15% of the property for biodiversity goals
3. Intensive rotational grazing, as well as managing other 15% of the property for biodiversity goals
4. Using natural regeneration to establish shelter trees

Each strategy had to satisfy the following criteria:

- Increases the cover and/or extent of native vegetation, in identified priority native vegetation areas

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- Potentially increases the overall condition of native vegetation on-farm, though not necessarily within 15 years

The strategies also focused to varying degrees on dealing with other management and production issues:

- Match stocking rate to carrying capacity
- Remedy overgrazing of hill country and waterways
- Reduce fertiliser application in priority native vegetation areas

In evaluating the options against these criteria, information was drawn from the data collected on-farm, that is from the financial evaluation, agronomic assessments and vegetation surveys for each case study farm. Other research was also used, notably the Broadford long-term grazing experiment (DPI, 2003), shelter belt research (Rod Bird, 1991) and deferred grazing trials that are part of the Sustainable Farming Systems for Steep Hills project (DPI nd., Nie et al 2005, Zollinger et al 2005).

Using economic and financial criteria, all of the strategies that have been investigated have a place on grazing properties and a combination of strategies could work in many cases. With the exception of Shelter, each strategy was expected to be profitable on some farms. De-stocking for a considerable length of time was the major reason for the Shelter strategy being a poor investment. More likely natural regeneration would be staged over many years, gradually increasing the total area supporting regenerating trees. This would be possible using electric fencing on small parts of the property that are lightly stocked. This option warrants a closer look.

No one strategy is better than the others across all farms. Each strategy was found to be unprofitable on some farms. Overall, the strategies of Correcting Nutrient Deficiencies and Deferred Grazing performed the best, if implemented on the right farm. These two strategies require the least adaptation from current farming operations, and can be done at relatively low extra cost in many cases.

The overall finding for woolgrowers is, that they can manage their properties in ways that can improve both wool profits as well as biodiversity. The major concern of woolgrowers, being the extra cost and reduced profits associated with managing biodiversity, appears to be countered with the 4 strategies put forward by this project.

Objective 3. To highlight the environmental, social and financial costs and benefits of retaining and enhancing native biodiversity on wool properties

Environmental benefits of retaining and enhancing native biodiversity

The research undertaken in this research project highlighted that where intensive grazing management systems dominate few native plant species persist and regeneration of over-storey plants are unlikely. Bird abundance and diversity are also most impacted under intensive management. Intensive management is also well correlated with a general increase in the cover of annual grasses and forbs (broad leafed weeds). Thus it is apparent that where management leads to the loss of native biodiversity, there is an associated decline in overall environmental benefits.

This project has identified several approaches, suitable for varying management systems, that could lead to improvements in the current extent and condition of native vegetation across the existing farms. Much of the vegetation in the landscapes to which this project applies is either considered regionally endangered, vulnerable or depleted (eg. plains grassy woodlands, grassy woodlands, creek-line grassy woodlands, grassy forests). Thus the results obtained through this project have the potential to significantly contribute to regional native vegetation goals. The increases in the extent and condition of native vegetation are likely to also strongly contribute to broader environmental objectives such as salinity, soil and carbon management.

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The project has produced 6 scientific research papers and numerous extension material detailing the benefits of or approaches to improving the extent and condition of native vegetation. The results have also been widely presented at research conferences, policy forums, grower meetings and field days

Social costs and benefits

Over the long term, the project is likely to contribute significantly to meeting the family goals of graziers in central Victoria. Income is important to achieving these goals, but so are other matters including aesthetics and pride in good land management. The project has demonstrated that strategies that assist in retaining and enhancing native vegetation on wool properties are mostly a good investment on three grounds that are important to wool growers - profitability, cash flow and risk. The four strategies that were tested were devised on the basis of discussions with wool growers about their objectives, their current farming system and opportunities that they perceived. There is scope for graziers to innovate and find their own strategies that achieve both private and public goals, or to adapt the strategies tested in the project. The emphasis in the project on grazier's objectives means new strategies for vegetation management can be introduced with social benefit rather than cost.

The research undertaken in this project has also helped to understand and highlight farmers environmental and production goals. The study carried out by Quentin Farmer Bowers and Ruth Lane from RMIT, "Understanding farmer decision systems that relate to land use", has helped clarify our understanding of farmer decision systems particularly in regard to how farmers saw strategic opportunities and about using this improved understanding, about how to modify and promote findings from the Farm Business and Biodiversity Project.

The concept of the Personal Career Path (PCP) and the seven BOXES of policy influence were used to devise five general recommendations on how the findings from the Farm Business and Biodiversity Project (FBB) could be effectively promoted.

The promotion strategy actually being used in the FBB Project is in accord with the first two recommendations and emphasises both production and conservation advantages of the project's findings. The other recommendations are beyond the scope to the FBB Project but they have been included for completeness and to demonstrate one way in which the BOXES could be used.

In general, the interventions most likely to be taken up by farmers voluntarily and perhaps enthusiastically, are those that farmers see as advancing their PCPs within the context of their families. Farmers would tend to take up more NRM options if they could see them contributing positively to opportunities that meet their obligations to their family rather than as impositions that might hinder their progress in satisfying their motivations.

Education early in the PCPs of farmers is likely to have more profound effects on how farming is carried out in the long-term than regulations and incentives. This is because education and improved understanding, while not changing the trajectory of the PCP, may alter the ideas that individuals have about how they can progress their PCPs and satisfy their families' motivations. The long-term influence of education on PCPs suggests that even projects dealing with technical aspects of farm management could be given a greater influence in creating long-term change if the principles on which they are based are included in education programs.

Financial costs and benefits

The project has identified and detailed the likely financial costs and benefits involved in managing for both a profitable wool growing business, as well as improved management for biodiversity outcomes. These costs and benefits were analysed in two papers presented at conferences, and now submitted for publication.

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They have also been highlighted in communications products such as the Dog collar brochure, Extension notes series and website.

The results have also been expressed in a number of different ways such as likely investment costs, impact on annual profits (% returns and \$/ha), and impact on 15 year future cash flow. Break-even budgets and sensitivity analyses were also carried out to highlight which variables are most important in determining the level of costs and returns that can be expected by woolgrowers.

The four strategies were analysed using the results of applying each one to each case study farm. The results are as follows:

Investment Analysis

Strategy	Cost of fencing/water \$/ha	Cost of stock purchase \$/ha
Deferred grazing	\$30-90	\$76
Intensive rotational grazing	\$30-90	\$68
Correcting nutrient deficiencies	\$20-50 (variable)	\$125
Establishing shelter using natural regen	\$37-147	0

Analysis of the total investment cost highlights that the variation is high between farms, and the cost of purchasing livestock to make use of increased carrying capacity is a significant cost.

Profitability Analysis

Strategy	Is it profitable?	Increase in stocking rate req to break-even	BREAK-EVEN time (yrs)
Deferred grazing	YES	20%	3-13
Intensive rotational grazing	YES	22%	6-15
Correcting nutrient deficiencies	YES—depends on fert history	17%	5-15
Establishing shelter using natural regen	After 15 years	\$2.52 /DSE/year	14-15

Deferred grazing tends to break-even the soonest, and Establishing shelter the longest. The increase in stocking rate or gross margin per DSE (for the Shelter strategy) required for any of the strategies to break-even, is regarded as generally most achievable.

The following tables show the variability and average profit results for the 9 case study farms.

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Short-term profitability (over an initial 15 year period)

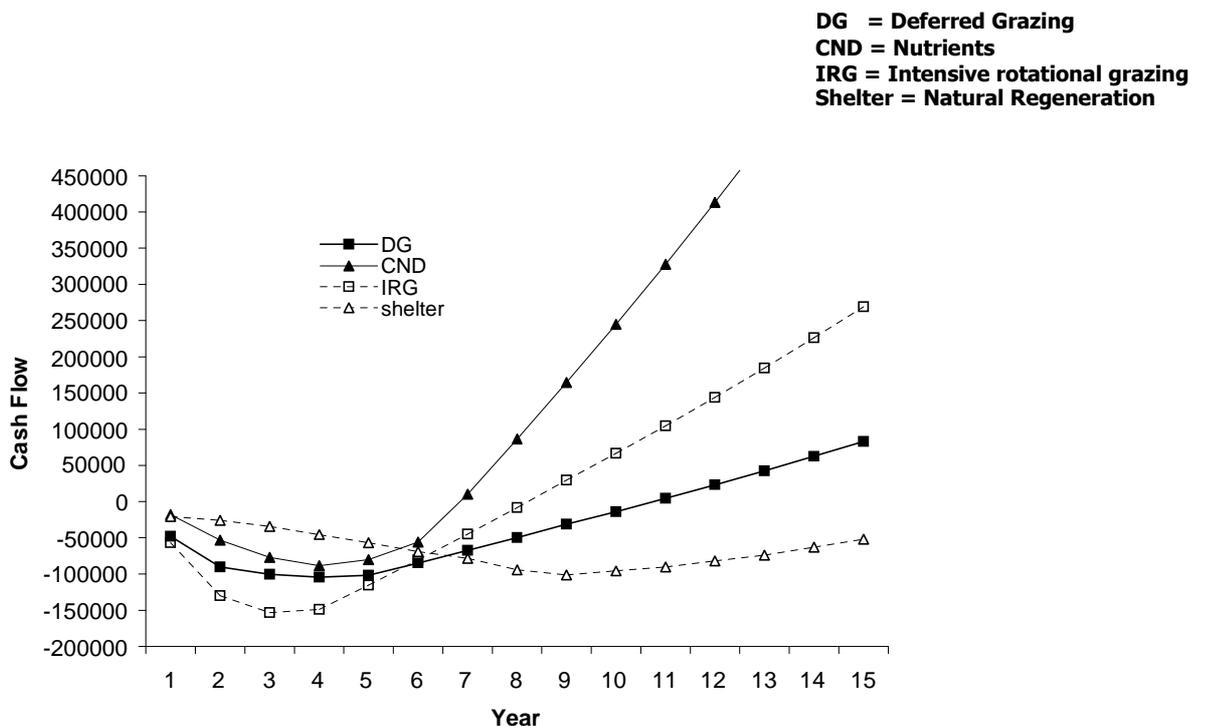
	Defer graz	Int. rota graz	Soil nutrient def	Est. shelter
Internal rate of return	0-52%	0-21%	0-61%	0%
average	9%	0%	15%	0%

Long term profitability (annual profits after 15 years)

	Defer graz	Int. rota graz	Soil nutrient def	Est. shelter
Annual return on capital	15-121%	-3- 19%	-38- 31%	19- 101%
average	29%	13%	14%	43%

Comparing profit results highlights that deferred grazing, intensive rotational grazing and correcting nutrient deficiencies can generate short-medium term extra profits, however establishing shelter through natural regeneration is a long term prospect.

The average cash flow of the four strategies is shown in the following graph.



This graph highlights that deferred grazing generally breaks-even the soonest, with establishing shelter unlikely to break-even within the first 15 years of development.

Objective 4. To better inform industry of the barriers to facilitating the adoption of conservation of native biodiversity, so industry programs can be revised accordingly.

These issues were addressed in the policy reports prepared for the project, as well as in the discussion sections of papers presented to conferences and submitted to journals.

Barriers to adoption of biodiversity conservation have in the past revolved around economics, and time and labour issues. This project has substantiated these barriers by financial and risk analysis, and has informed industry in a number of ways.

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Strategies have been identified that are compatible with farmer economic goals and can potentially achieve public policy goals, without necessarily requiring public funds for them to be profitable and affordable to the majority of farmers in the hills of central and north-east Victoria.

Government now typically intervenes to achieve biodiversity outcomes largely on a site-by-site basis, without considering the possible success of strategies at the whole farm level. Given the findings presented here, there is a case for a modified approach.

The first role of government might be to inform farmers in these locations, their advisers and financiers, and others in agribusiness that such opportunities are available. This information would necessarily emphasise that there are several available opportunities, and that careful case by case consideration will determine which strategies are good investments for the particular property. Some principles and methods to analyse the question and to help determine applicability might be communicated. Extra information advising on how to minimise the environmental effects of fertiliser use will also be required, given that the fertiliser-based strategy, which involves managing 15% of the farm primarily for biodiversity, is a better investment in more cases than either of the grazing strategies.

The second role of government might be to pursue initiatives that lead to greater uptake of the opportunities by farmers. For this role, the question becomes what policy will trigger change required to achieve sought after outcomes. It does not have to reflect a cost-share ideal. This would first require identifying what proportion of farmers are likely to adopt these opportunities, and at what rate. It would also require careful evaluation of the possible initiatives. Auction based programs like Bush Tender (Stoneham et al., 2003) will have a role – what the fit is between such programs and whole farm based approaches requires investigation (Crosthwaite 2003).

In summary, we have shown that economically, financially and environmentally sound re-organisational strategies exist for hill country grazing farms in parts of Victoria. The availability of such strategies can potentially contribute to the direction of future investment in farming systems. Farmers and their financiers will determine the overall pattern of investments. We have pointed to ways in which agri-environmental policy might influence this pattern.

Identifying and overcoming barriers to adoption, and incorporation of these findings into industry programs, is one of the key challenges of this project. Institutional arrangements may form a barrier to allow for the uptake of the findings by various programs leading to on-ground adoption. These include the investment processes, and institutional barriers between DPI, DSE and CMAs.

Extension staff who deal directly with landholders have existing relationships built on trust. It is important for these staff to feel confident and comfortable with the research findings before they can assist in promoting the benefits of the research. Landholders very rightly perceive risk with changes in management, such as rotational grazing. Therefore it is important to gain confidence and support, which could be achieved through field days on properties where these techniques are already being used. However it should be recognised that a key aspect of this research has been informing and developing management options from practice based research, which is then used to inform programs to increase the adoption of practices.

The research findings can contribute to the goals of different native vegetation and biodiversity programs. These programs usually prioritise sites based on conservation significance of the vegetation community and the quality of the vegetation. There are large areas of lower quality vegetation that offer a significant opportunity for increased native vegetation outcomes when considered as a part of a whole farm or property management system. This also represents a shift in the approach to native vegetation management, moving from the 'locking up' mentality to sustainably using native vegetation as a part of the productive farming system.

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A key implication for the way native vegetation programs are run is the immediacy of action needed to take advantage of ecosystem resilience in natural regeneration.

There is a clear pathway to integrate biodiversity conservation messages into agricultural education and extension programs so that it is a management consideration in whole farm production systems. While conducting the research the project team has engaged extension officers and landholders involved in the Sustainable Grazing Systems (SGS), Best Wool 2010, and Landcare groups.

It is acknowledged that the research findings do not provide a panacea. Farmers who already have high stocking rates have fewer options available. A different policy mechanism may be required to achieve biodiversity gains in this case.

Further work with institutions and organisations

There are opportunities for alignment or 'joining up' of policies and integration of program delivery to ensure clear and consistent delivery at the land manager level. This will not only result in optimising resources and knowledge, it will also stream-line delivery from an agency or service provider level and reduce the number of extension staff attempting to develop and maintain relationships with land managers.

In summary there are no major conflicts between the research findings and the broad direction of government policy. In terms of agricultural policy from industry or government the research findings might represent a shift, from merely minimising negative environmental impacts to the ability to demonstrate positive environment impacts from active agricultural production. The most significant challenge is finding the impetus for program managers and policy makers to change in light of these findings.

HOW WAS 'SUCCESS' TO BE MEASURED IN YOUR PROJECT?

The pathway to success was identified with the help of a program logic (Bennett's Hierarchy) (see below), for three categories of 'next user' - woolgrowers, extension officers and program industry staff.

Success was defined as:

- a) three types of changes by case study wool growers and their neighbours
- b) extension officers actively promoting results
- c) wider awareness of the findings

Surveys, phone calls, complete project outputs (ie. brochures etc), and feedback from meetings and conversations were used in the assessment of success. These results can be viewed in the attached evaluation report, "Evaluation summary of native vegetation projects" by Jeff Coutts.

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SEE Conditions	Better managing biodiversity whilst maintaining a profitable wool business
Results of Next Users' Work	Wool growers improving biodiversity in their properties

	Case study woolgrowers & neighbours	Woolgrowers in Victoria and SE Australia	Extension	Programs
CHANGES ADOPTED BY NEXT USERS				
KASA				
Knowledge	Integrated farm biodiversity management options that have been identified and agreed to. Adoption and implementation of some management options on some case study farms Willingness to consider outcomes (some adoption by neighbours of selected options)		Extension staff & consultants actively promoting results to woolgrowers	
Attitudes	Better understanding of native vegetation management and how it can be incorporated into the farm business for \$ benefit	Aware of the project detail and results, with a willingness to find out more details of the project Wool growers throughout Australia informed of AWI investment in native vegetation management	Better understanding on how to advise on biodiversity management and how it can be incorporated into farm business to meet multiple objectives	
Skills	Better acceptance of the need for integrated native veg management		Acceptance of native veg management and farm business realities	
Aspirations	Better decision making skills Better farm & biodiversity management Ability to integrate biodiversity management practises into farming			
Aspirations	Desire to integrate biodiversity & business management			
REACTIONS				
	<ul style="list-style-type: none"> Woolgrowers interested in participating & learning from the project Positive reactions to biodiversity management recommendations Strong farmer attendance at field days etc 	<ul style="list-style-type: none"> Woolgrowers interested in participating & learning from the project Positive reactions to biodiversity management recommendations Strong farmer attendance at field days 	<ul style="list-style-type: none"> Willingness to take part in the project and help communicate the results results 	<ul style="list-style-type: none"> Revised programs working with wool growers Seeking funds for further work on biodiversity issues on farm scale

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MONITORING AND EVALUATION:

Project monitoring and evaluation was carried out using a number of methods. Over the life of the project, notes were recorded from all meetings attended regarding feedback and questions raised when talking about managing for biodiversity and farm business goals. Surveys were also carried out and analysed with the help of the University of New England, Armidale, near the beginning of the project, and again at the end. There were also a number of “feedback workshops” held, particularly for woolgrowers and extension staff to provide the project team feedback on the various strategies developed and communicated by the team. A notable meeting held at Ararat, provided the team with critical feedback on how best to communicate the results to woolgrowers. Feedback meetings were held in each of the 3 trial regions.

Anecdotal evidence was also collected, such as quotes from woolgrowers at various field days, and made when interviewing for press releases.

Bennetts Hierarchy was used as a framework to evaluate the successes of the project. Each target audience identified, was assessed in terms of practise changes, skills, knowledge, aspirations, communications activities and messages.

Jeff Coutts from Coutts J&R/Pod Media, was engaged to pull of this information together into a usable format. The attached evaluation report “Evaluation summary of native vegetation projects”, uses all the above information collected by the project team, and draws conclusions from this material.

SUMMARY OF COMMUNICATION, TECHNOLOGY TRANSFER OR ‘ADOPTION’ ACTIVITIES:

(DETAILS OF THE FOLLOWING ACTIVITIES CAN BE SEEN IN THE ATTACHED DOCUMENT, “COMMUNICATIONS RECORD”)

1. Regional field days on selected case study farms, for local woolgrowers
2. Distribution of brochure and dog collar, outlining project findings, to central Victorian woolgrowers, via Elders and Landmark wool reps.
3. Presentations to Bestwool and Landcare groups in the trial regions
4. Annual display at Sheepvention Field Days, Hamilton VIC
5. Media field day held in the Ararat trial region
6. Extension officer field workshop, held at a case study farm at Ararat
7. Presentation and display of results at numerous local, regional, national and international conferences and workshops
8. Press releases to Victorian print media
9. Series of 3 extension notes designed and printed, and distributed to extension officers working with woolgrowers
10. Design and creation of web site to access project findings and background
11. Project update newsletter sent to all project stakeholders
12. Display of project findings and distribution of collars and brochures at wool sales
13. Preparation of individual custom farm reports to each participating case study farmer
14. Feedback workshops in each trial region
15. Publication of several research papers in peer reviewed academic journals

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ASSESSMENT OF ANY COMMERCIAL POTENTIAL:

Market Potential Assessment:

The findings generated from this research project have been developed into a unique communications product for central Victorian woolgrowers.

This product takes the form of a colourful information brochure with attached dog collar, printed with “Bark up the right tree” (see attached copy of brochure). This brochure and collar has been distributed to woolgrowers across Victoria, and has generated considerable demand. The brochure and collar have turned out to be a very marketable product, and future demand for this product could be high. Currently this product is provided to central Victorian woolgrowers free of charge. There could be potential to sell this product to other woolgrowers across Australia for a nominal fee, to cover costs of collars and printing (or for natural resource agencies to buy them in bulk for free distribution).

The support of Elders and Landmark in Victoria in sourcing and distributing this product, was viewed by the project team as building a significant alliance and valuable partner. This partnership has the potential to be strengthened with future collaborative work, and potentially extended to other regions in Australia.

There is also potential for the dog collar marketing idea to be used to market other products and services that AWI sees fit. Its worth noting that this innovative marketing idea was developed by the Victorian project leader, Jim Moll, who should be contacted regarding its further use.

LIST OF PRODUCTS

Products for woolgrowers
❖ Dog collar/brochure package
❖ Individual farm report for case study woolgrowers
❖ Field days held on case study properties to promote findings
❖ Access to project findings and more information via website
Products for extension officers
❖ Series of 3 “extension notes” , including case study examples
❖ Display poster with key findings for future woolgrower events
❖ Access to project findings and more detailed information via website
Products for industry/program staff
❖ Policy directions report
❖ Evaluation report
❖ Access to project findings and more information via website
❖ Map of regions that the project findings are applicable to
❖ Published research papers
❖ Final report including key findings

WHERE CAN THE READER OF THIS REPORT OBTAIN ADDITIONAL INFORMATION

Additional information can be accessed from 2 websites.

The first website is the land water & wool website, with project results posted on the native vegetation and biodiversity page: <http://www.landwaterwool.gov.au/research.asp?section=257>

An additional website managed by DSE, is linked to the LWW website, with further details on the project, including a selection of papers and press releases that can be downloaded:

<http://www.dse.vic.gov.au> > conservation & environment > biodiversity & agriculture

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OVERALL, WHAT ARE THE KEY LEARNINGS – GOOD OR BAD – FOR THE LWW PARTNERS (AWI & LWA) FROM YOUR PERSPECTIVE

Main Points:

- Adopting a whole farm business approach has potential to identify ways that farm goals and broad-scale native vegetation management can be achieved
- Woolgrowers can improve biodiversity as well as profitability on their properties
- Working with woolgrowers has been a rewarding experience
- The AWI/LWW partnership has provided credibility and enhanced communication of results
- Short time frames for ecological changes to occur meant some uncomfortable extrapolations for ecology and impacts on production
- There are some tradeoffs – native vegetation goals are harder to meet in intensively managed parts of the farm, current best practice for production will not lead to optimal native vegetation outcomes.

Details:

Working with woolgrowers has provided a rich experience from researchers' perspective, and definitely "worth it". Mutual respect was gained. The potential for uptake of results is better in an industry funded project, due to better credibility and relevance to woolgrowers in each trial region. Woolgrowers sharing results with other woolgrowers was very valuable and the project allowed this to occur. Some excellent woolgrower ambassadors for the project have developed during the course of the 3 year project.

Working with the wool industry (AWI) was harder than with woolgrowers ie.

- Communications protocols were at times lengthy and time consuming
- Trust between industry and researchers took time to develop

The AWI brand definitely improved the credibility of the work to other woolgrowers & the farming community. Woolgrowers have liked the fact that they can see where their money goes.

The wool industry hasn't given the work the exposure it probably deserves (yet) eg.

- In AWI publications such as Beyond the bale etc

Help from Currie Communications & Peter H has been very valuable, and in most cases essential to allow researchers to meet the communication plan requirements. The approval processes of media releases etc has generally been lengthy and time consuming.

As the time period of the project is too short for ecological changes to be observed, ecologists felt that they had to sometimes make uncomfortable extrapolations about the likely impact of various farm management practices on biodiversity. In addition there was pressure to generate communicable results early in the project life, this pressure led to rapid interpretation and analysis of data, and in some cases the early conclusions drawn were not well supported by later more considered analysis. Thus there are some contradictions between the peer reviewed published papers now in press and that of the extension material. A longer project time-frame, and less pressure to communicate conclusions early on would improve the science outcomes and reduce the chance of contradictions.

STRENGTHS

- Credibility
- Access
- Relevance (\$)

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- Recognition
- Contacts

WEAKNESSES

- Profit/production expectation from work
- Short time frames
- Communications procedures clumsy

RECOMMENDATIONS ON THE WAY FORWARD

The research should be taken forward in the following ways:

1. DAFF have funded the further extension of the findings of the Farm business & biodiversity research, in a new “Native vegetation incentives for graziers” pilot program, as part of the Federally funded Native vegetation regional pilot projects initiative. This project will trial incentive payments to graziers to adopt changes to their whole farm management to gain native vegetation outcomes, based on the results from the DAV39 project. If successful, there is potential for this whole farm approach to be trialled in a wider area and across different land types. An MBI application (which is currently being assessed in the final round), is applying for funding to carry this work out. If the whole farm approach is successful in gaining native vegetation outcomes and wide acceptance by landholders, there is potential that NAP/NHT could use this approach.
2. Testing the findings in other regions of Victoria, and more widely in south-eastern Australia. DPI’s Meat & Wool extension program is keen on this, and collaborated in a research proposal that failed on the first attempt.
3. Involvement in the AWI co-funded Evergraze project in NE Victoria. The DAV39 findings are relevant to this project, and the project team has been written into the proposal at a 10% contribution, to provide input into the farm economics and biodiversity component. With more resources, there is potential to make a major contribution to the national Evergraze project – the team contributed on ecological, economic and methodological grounds to the recent national workshop
4. Further research is still required to increase our certainty about the likely impacts of the possible management strategies on native vegetation and other components of native biodiversity. In particular our research has suggested that fertiliser applications have very negative impacts on native plant diversity and cover, but would such outcomes occur if alternative grazing management strategies were adopted? We have predicted that there is considerable spatial potential for eucalypt regeneration in these landscapes but we still have little information to predict when regeneration is most likely to occur. Anecdotally it has been suggested that rotational grazing strategies, particularly when it involves short duration grazing events (days) and long rest periods (months) benefit native vegetation and favour eucalypt regeneration. Such benefits need to be better documented. The project “Understanding the interactions between biodiversity and the management of native pastures in the Murray Darling Basin” funded by MLA and the CRC for Plant Based Management of Dryland Salinity, which involves some of the project team, will start to address some of these issues.
5. Findings need to be incorporated into various programs and policy as follows:
 - Multiple Outcomes projects in the natural resource field that are collaboratively managed by DSE, DPI and CMAs
 - Extension programs across Central Victoria, including whole farm planning courses, EMS programs, and grazing programs.
5. With the demise of many industry and producer groups such as Bestwool groups and Landcare groups, it will be critical for future work to allow time and money to develop new networks and relationships with private industry. Continued collaboration with Elders and Landmark to strengthen the relationship and expand communication pathways to landholders, is seen as very important. Both companies are keen to be involved with relevant research for their clients, and see market advantages of being able to offer their clients the latest relevant industry research. Future projects should continue to develop strong relationships with private companies, with the aim of helping to

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communicate findings to landholders, including gaining access to commercial events such as expo's, wool sales, private industry events such as field days and staff conferences. These commercial avenues have considerable potential to better target key findings and messages to the project target audience. Future project proposals need to allow funding and time to build on existing relationships with Elders and Landmark in particular, and develop formal communications plans with these organisations and potentially others. Eg. CRT, Incitec/Pivot, Resource Consulting Services.

LIST OF ATTACHMENTS:

The CD ROM includes a number of attachments, such as:

- Technical Reports
- Fact sheets
- Management Guidelines
- Woolgrower survey reports
- Evaluation reports/survey forms
- List of woolgrowers involved with experimental trials/'natural experiments'/case studies (I'll need to check the privacy provisions here, but wanted to acknowledge their input where possible)
- Journal articles
- Newspaper/newsletter/ media articles and items
- Conference/Workshop Papers
- Other Publications
- Video/DVDs
- Other

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SUMMARY of MONITORING and EVALUATION ACTIVITIES
(Please cross-reference responses to more detailed reports where available)

Project code and title:
Farm businesses, wool production & biodiversity

Dates (over full life of the project): 2002-2006

Context issues that have affected project progress and outcomes (eg droughts, prices, legislation): These projects were established in the context of continued pressure on farm profitability while loss of native vegetation was recognised as a serious environmental issue resulting in loss of habitat and biodiversity. Much of this vegetation is managed by rural producers. The challenge has been to develop strategies to maintain and enhance biodiversity without impacting negatively on productivity and profitability. This project had strong links with BestWool 2010 groups at the start of the project providing an information sharing and impact opportunity. With the demise of many groups over the life of the project this opportunity became limited.

Activities/outputs and people involved/reached

Activity and Outputs	No.	Woolgrowers involved**	Service providers	Other* stakeholders	Comments
Activities					
Field sites (where research was undertaken)	9	9 growers with a combined total of 11,923 hectares	2 private orgs, 2 gov. depts., 4 CMA's		Case studies undertaken at these sites working closely with growers
Courses					
Workshops	2	3	2	55 extension officers	2 Workshops specifically designed for extension officers
Field days	5	150+ in trial area,	3+ consultants and 1+ staff from related projects	2+ policy makers and 6+ program managers	
Steering Committee	7	0	3	4	Representatives from DSE, LWW, and CMA's
Presentations to groups, extension or program/policy	50+	400+growers in trial area, 400+ outside of trial area	10 consultants and 30 staff in related projects	20+ policy makers and 20+ program managers	
Conference presentations	10	<100	20+	500+	Includes international conference – difficult to estimate numbers and type of participants
Outputs (numbers)					

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Activity and Outputs	No.	Woolgrowers involved**	Service providers	Other* stakeholders	Comments
Conference publications (say if abstracts or full papers)	10 abstracts 7 full				
Journal articles (say if published, in press or submitted)	7				Three published, three in press, one submitted
Fact sheets	3	30 woolgrowers	80 extension officers	50 other landholders	These relate to the series of 3 extension notes printed in Feb 06
Brochures	1	550 – with an extra 700 to be distributed by August 06	280, with an additional 900 by Dec 06	125 to date, with an additional 200 to various stakeholders by August 06	These figures relate to the specific “dog collar brochures – other information sheets have been developed and circulated widely.
Media articles	24	5000+ nationally and statewide	50+ consultants and 50+ staff in related projects	50+ policy makers and 50+ program managers	
Web sites/sections	2				One site in the landwaterwool website, and one site in the DSE website
Tools or guidelines					
Other outputs	3	9 individual case study farm reports	2 display posters, 1 map of area where findings are applicable		
Total people reached by project					Note may be some overlap

**Please list other stakeholder groups included in the table:*
 Bestwool 2010 coordinators, Landcare coordinators, LWA & LWW program staff, consultants who contributed to project

***Please comment on interaction with/numbers of “influencers” involved at any level:*

Key outputs or products to emerge from project of direct value to woolgrowers

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Key findings, information or product developed through project	Level of relevance to woolgrowers in project region or state (numbers of groups, hectares of land that could be impacted on)	Level of relevance to woolgrowers beyond region or state (numbers of groups, hectares of land that could be impacted on)
Dog Collar Brochure	Highly relevant to all woolgrowers in central Victoria—up to 6 million ha.	Relevant to woolgrowers managing hill country in south eastern Australia—Tasmania, South Australia, New South Wales, Victoria—up to 10 million ha.
Website	Relevant to all woolgrowers in central Victoria—up to 6 million ha	Relevant to woolgrowers managing hill country in south eastern Australia—Tasmania, South Australia, New South Wales, Victoria—up to 10 million ha.
Series of 3 extension notes	Relevant to woolgrowers across Central Victoria who want more detailed information—up to 6 million ha.	Relevant to woolgrowers managing hill country in south eastern Australia—Tasmania, South Australia, New South Wales, Victoria—up to 10 million ha.

Stakeholder Reactions – to the project and LWW in general

Stakeholder group	Summaries and examples of reactions (for example perceived usefulness or value of activities or products)
Woolgrowers	Overall, there was a high level of interest in the project and its activities amongst all groups. Early concerns were expressed about the implementation costs and potentially negative implications (such as pest build up) – which were addressed over the life of the project. Woolgrowers in the trial areas and/or who attended presentations of the project and its findings at grower meetings showed a high level of interest in the information presented (especially in low cost options, deferred grazing and the inherent value of biodiversity) while showing a preference for improved pasture, raising concerns about fuel build up and pests and the need to be profitable. There was an early need expressed for strong economic data – which later emerged out of the project. Case study growers were generally supportive of the activities and recommendations emerging from the project.
Service Providers	Extension officers, project leaders and regional program managers are comfortable with results. This has been demonstrated by repeated requests for the DAV39 project leader from CMA and other agency staff for him to give presentations to Implementation Committees, field days and Landcare group meetings. Most Extension Officers who attended presentations involving findings from both projects have recognised the relevance of the recommendations to landholders in their local district although some were of the opinion that the recommendations had limited relevance to landholders in flatter districts). Elders and Landmark have expressed much interest in being involved in the project, and have been very willing to help distribute project findings through their client networks. Both these private organisations have made commitments to help with future promotion of project findings at various events such as wool sales, conferences and sheep shows.

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Stakeholder group	Summaries and examples of reactions (for example perceived usefulness or value of activities or products)
	Reactions from regional program managers (CMA, DSE, DPI) at meetings and field days indicate that there is a very positive feeling about the contribution that an approach that addresses farm business issues could make to achieving regional biodiversity targets.
Researchers	Two science publications published through this project have been described as extremely important and valuable contributions by science peers. Presentations to economics audiences have been very well received, and regarded as making important linkages between farm business analysis and environmental management. A presentation of research results at an international conference was well received and led to invitation for publication in a special issue of science journal.
Media reaction/ interest	The LWW media day held at Ararat, generated considerable media interest, with at least 3 stories/media articles written in response. The media has been interested in the project findings over the life of the project, and stories have appeared in a wide range of media such as, ABC radio, Weekly Times, Stock & Land, ABC television, VFF newsletter, Ararat Advertiser etc
Other stakeholders	Policy and program management responses from statewide program managers in DSE and DPI were very positive to findings emerging from the projects with follow-up actions following a Melbourne based forum on the issues. DAFF have shown a lot of interest in the results and subsequently funded a 1 year pilot project trialing incentive payments to graziers to make whole farm change so as to improve native vegetation outcomes. There has been positive reactions from Len Stephens (CEO AWI), Jim Shovelton (consultant MS&A), and various woolgrowers not directly involved in the project. Further to this, the changes in practice (see below) actually occurring provides evidence of important change in this area

Improvement in understanding or skills in relation to program objectives

Stakeholder group	Summaries and examples of gains in understanding or skills
Woolgrowers	Case study growers reported that they made changes as a result of interaction with the project in the areas of fencing, rotational grazing and financial records. There is some evidence of practice impact from other growers and landholders in line with key recommendations from the project. Most practice change in this broader group would be expected to occur over the medium term post-project.. Case study growers also expressed an improvement in understanding of the financial costs and benefits to their business of adopting strategies to manage native vegetation. The improved ability to identify native grasses was also considered a benefit by many woolgrowers involved in the project. Identification of native grasses was carried out at all field days, and the level of interest from attendees was high.
Service Providers	The information presented at the workshops had a positive influence on Extension and CMA staff perceptions of the importance of taking a whole farm approach towards conservation of biodiversity. The targeted use of fertiliser to correct soil nutrient status was the strategy most likely to be extended within the next year,

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Stakeholder group	Summaries and examples of gains in understanding or skills
	<p>intensive rotational grazing of productive areas was the next most likely to be extended, followed by improved stock shelter through natural regeneration, and finally deferred grazing of hilly areas.</p> <p>They increased their capacity to place their advice in a whole farm context, while also knowing when to call in expertise (eg. production or conservation) that they do not have. They increasingly have the skills to incorporate aspects of the approach into their other work eg. whole farm planning, regional biodiversity planning.</p>
Other stakeholders	<p>An improvement in the understanding of the financial costs and benefits involved in adopting strategies to manage native vegetation and biodiversity. A better appreciation of the farming skills required to be able to successfully adopt the project findings.</p> <p>The changes in practice (see below) actually occurring provides evidence of important change in this area</p>

Changes in attitudes or motivation in relation to project objectives

Stakeholder group	Summaries and examples of changes in attitudes or motivation
Woolgrowers	<p>Studies by UNE associated with the project indicated that that graziers' attitude towards native grasses is changing (positively).</p>
Service Providers	<p>The changed motivation of extension officers and program managers is demonstrated by the considerable upwards communication occurring at managers meetings and program team meetings about the results and how the programs can change as a result (eg. whole farm planning). This is now occurring independently of the DAV39 project team members.</p> <p>The potential of the farm business approach to contribute to achieving regional biodiversity targets motivated Tim Barlow, regional biodiversity manager for Goulburn-Broken CMA, and Geoff Park, knowledge broker for the CMAs in northern Victoria, to take an active interest in the project and specifically to facilitate regional field days for extension officers.</p> <p>Program managers have also been motivated to become actively involved in developing the new DAFF-funded project.</p>
Other stakeholders	<p>The changes in practice (see below) actually occurring provides evidence of important change in this area</p>

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Changes in practice or information demand in relation to project work area as a result of project information or activities

Stakeholder group	Summaries and examples of practice changes (including numbers and areas of change where applicable and known)
Woolgrowers	<p>Case study growers reported that they made changes as a result of interaction with the project in the areas of fencing, rotational grazing and financial records. There is some evidence of practice impact from other growers and landholders in line with key recommendations from the project. Most practice change in this broader group would be expected to occur over the medium term post-project.</p>
Service Providers	<p>Regional program managers (CMA, DSE, DPI) are incorporating the thinking behind the project into their project planning for meeting regional biodiversity and NRM targets. They are also including information from the project into other programs.</p> <p>The focus of extension officers and project leaders in related projects (eg. Bush Returns) has changed focus, especially in the CMA's. Rather than just concentrating on the back paddock where remnant vegetation is found, a whole farm approach is increasingly being taken.</p> <p>Project leaders and extension officers are also using their own networks and meetings to communicate the approach and the findings. This is happening within the Landcare Coordinator's Network and the North-East Native Grasses group; the network is now initiating presentations to groups. Extension officers are reporting on the findings at field days, without DAV39 project team members being present.</p> <p>UNE studies noted that extension agents who attended presentations intended to extend all four strategies to landholders in their district in the next year. The author concluded that the workshops for production extension staff have, and will continue to have, a significant impact on their extension activities.</p> <p>Surveys of extension officers who attended workshops on project outcomes showed that half were currently using information and ideas from the project in their own work. Extension officers who met with case study growers developed a set of key messages (and rules of thumb) from the information emerging from the projects. This included such things as "Wool properties with stocking rates <8 DSE/ha, have more scope to improve both profits and manage 15% area for biodiversity" and "Landclass fencing in hill country can improve both biodiversity & wool profits by allowing deferred grazing management". Surveys of extension officers who attended workshops on project outcomes showed that half were currently using information and ideas from the project in their own work.</p>
Other stakeholders	<p>DAFF are funding a pilot project to examine whole farm incentives delivery, based on the approach taken in DAV39 and DAV40.</p> <p>DPI and DSE policy branches have been very receptive to the work, and it is percolating into programs and potential funding initiatives.</p> <p>DPI Meat & Wool extension program initiated a funding bid to do further R&D building on DAV39 and Dav40. They have a strong presence in north-east Victoria, in and around the project areas. It is likely that they will incorporate findings into their existing programs.</p> <p>The North-East regional component of the national Evergraze program has invited</p>

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Stakeholder group	Summaries and examples of practice changes (including numbers and areas of change where applicable and known)
	<p>the DAV39 project leader to be part of the program.</p> <p>The EMS pathways program (managed by VFF's Greg Smith, based in north-east Victoria) have expressed strong interest in being linked to the DAFF project, and hence indirectly to the farm business approach, and its roll-out.</p>

DAV39 Broader productivity, environmental or social impacts and potential impacts of project

Key findings, information or product developed through project	Productivity benefits to date and potential benefit over the next 5 years (where possible include figures and assumptions made)	Environmental benefits to date and potential benefits over the next 5 years (where possible include figures and assumptions made)	Social benefits to date and potential benefits over the next 5 years (where possible include figures and assumptions made)
<p>It has been shown, via a farm business approach, that there are opportunities to make significant changes on wool growing properties that are a good investment and that deliver biodiversity outcomes that will make an important contribution to regional catchment targets.</p> <p>Stakeholders are taking these findings up, and incorporating them into programs and extension messages to landholders.</p>	<p>Small productivity benefits achieved over life of project from adoption of project findings, by a relatively small number of woolgrowers including the nine case study farmers. On conservative assumptions, there has been an increase of 2 dse/ha at \$20/dse across 500ha (on 4 farms) – an increase in net profit, assuming no capital costs, of \$20,000. A more optimistic assumption would be for such an increase over 5,000 ha (greater adoption on 10-20 farms) – an increase in net profit of \$200,000. Given the numbers of extension officers now interested in the findings, and extent to which they are promoting them, such an increase is likely within one or two years, if it has not already occurred.</p> <p>Over a longer time period, and more fully accounting for capital costs, an extra net profit of \$1.2 million per annum can be expected across Victoria, and \$2.0m across south-eastern Australia.</p> <p>This is based on the following analysis. The findings are relevant</p>	<p>Small environmental benefits have been achieved over life of project. Ecological responses to management can be slow and difficult to distinguish from inherent variation, particularly owing to climate. For this reason environmental benefits can only be coarsely estimated at this stage.</p> <p>Within five years we predict that there will be adoption of management that has the potential, given appropriate climatic conditions, for the following environmental outcomes within Victoria:</p> <p>a) A small increase in perennality and ground cover on between 50,000 ha and 100,000 ha (2.5% - 5% of 2 m ha). This has the potential to improve native vegetation condition, salinity, water quality and carbon sequestration.</p> <p>b) A small increase in condition (increased native</p>	<p>The social benefits from the project are considerable, at least for the landholders involved. The response from other woolgrowers at project presentations suggests that others will respond in the same way. Industry and region-wide, the benefits will be significant.</p> <p>The following overview of the benefits is based on an assessment by the project leader of his dealings with the case study woolgrowers and with other woolgrowers (over 100) at meetings and presentations. It is supported in a general way by the results of the woolgrower interviews undertaken by UNE (although the questions were not framed directly to elicit this information).</p> <p>Woolgrowers involved in the project have a greater sense of 'doing the right thing for the environment'. It gives them satisfaction, and relief, to know that wool production can go hand in hand with environmental management. They like to think that their</p>

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Key findings, information or product developed through project	Productivity benefits to date and potential benefit over the next 5 years (where possible include figures and assumptions made)	Environmental benefits to date and potential benefits over the next 5 years (where possible include figures and assumptions made)	Social benefits to date and potential benefits over the next 5 years (where possible include figures and assumptions made)
	<p>to farms in Victoria that manage approximately 6m ha , and to 10m ha in south-eastern Australia. The area within these farms to which the findings about managing native pasture and remnant vegetation apply is approximately one-third – ie. 2m ha in Victoria and 3.3m ha across south-eastern Australia.</p> <p>If the approach were adopted on just 5% of the 2m ha in Victoria (100,000 ha), or 3.3 m ha in south-eastern Australia (165,000 ha), it would it would require an average extra investment of \$12m or \$20m respectively (based on \$120 /ha in fencing and water)). With an average 10% return on this investment, net farm profits would increase by an extra \$1.2m or \$2.0m respectively per year.</p> <p>This is an approximate analysis. A more sophisticated economic analysis, using well-defined methods, is required if the potential net benefits are to be determined accurately.</p> <p>An expectation over five years is for such productivity gains to occur over 25,000 to 50,000 ha (this is a rough estimate based on the above assessment).</p>	<p>understorey cover, improved structure, increased regeneration of overstorey) of native vegetation (apart from native pastures) across 15,000 ha (5% of the predicted 300,000ha of remnant vegetation).</p> <p>c). Signs of a future increase in the area of remnant vegetation due to natural regeneration on the perimeter of existing areas. This might be across 7500 ha (2.5% of farm area on 5% of properties).</p> <p>d) Signs of natural regeneration occurring around isolated trees and patches of paddock trees in paddocks. This might be across 7500 ha (2.5% of farm area on 5% of properties).</p> <p>These are at best guesstimates by the project team. We have endeavoured to be realistic.</p> <p>In the long-term, much more significant gain across 2m ha in Victoria and 3.3m ha across south-eastern Australia can be expected. If they occur such gains could make a significant contribution to catchment targets.</p>	<p>industry is on the right path. They sense that their credibility as good managers is increased.</p> <p>It has given some of them improved confidence in existing farm practices, where they are consistent with the project findings.</p> <p>These woolgrowers have more confidence now about investing in environmental management in future. They are happier that environmental management is not out of their reach. It also gives them hope for the future.</p> <p>The woolgrowers involved in the project are very interested in the financial outcomes. Positive business improvement helps them to become more positive about environmental management.</p>

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Other outcomes/benefits

Alliances developed with other projects	CRC/MLA Grazing and biodiversity in native pastures project (DSE, CSIRO); BushReturns implementation and research (with GBCMA and Uni Melb); LWW projects in Tasmania, NSW and SA; EVERGRAZE DPI Meat & Wool extension program
Examples of innovative activity stimulated by the project	<ul style="list-style-type: none"> - private sector involvement in communicating conservation management - new pilot project investigating application of delivery of incentives at a whole farm level - production-orientated extension officers incorporating biodiversity conservation messages into their work
Emerging funding opportunities to build on project activities and outputs	<p>DAFF native vegetation pilot project</p> <p>National Market based instruments initiative – funding bid passed the first round.</p> <p>Multiple Outcomes projects in Victoria potentially based on the approach</p> <p>Evergraze 2 in north-east Victoria</p>
Other projects or agencies that have picked up on findings	<p>DPI programs, including Meat & Wool extension program but also extension officers in other programs</p> <p>DSE and CMA regional programs delivering extension in northern Victoria</p> <p>DAFF in identifying value of the work, and funding the native vegetation pilot</p> <p>Evergraze nationally, and in Victoria, have been very responsive to the approach and findings</p> <p>DPI and DSE policy branches have been very receptive to the work, and it is percolating into programs and potential funding initiatives</p>
Other demand for information or outputs	