

BETTER MANAGEMENT OF WOOL BUSINESSES & NATIVE BIODIVERSITY

Jim Moll, Jim Crosthwaite and Josh Dorrrough

Department of Sustainability and Environment, Victoria

Abstract

Better ways of managing native biodiversity and farm business are examined on selected wool properties across the Central Victoria region in Australia, using the Ararat Hills as a case study. Future management options are being developed in close collaboration with each producer in order to enhance native biodiversity while maintaining or improving farm profitability. Detailed vegetation surveys have been carried out on each property, and a set of management options developed that are consistent with regional conservation priorities. The options involve various levels of capital expenditure and outlay of time and resources. The challenge of the project is to come up with solutions that help offset this outlay of resources and minimise the costs involved. Preliminary findings from the biodiversity surveys and the evaluation of the financial position of the farms are reported.

Introduction

In Australia, conserving biodiversity through appropriate management of native vegetation on farms is increasingly viewed as an important aspect of sustainable agricultural management. It is an integral theme for the national Land, Water & Wool (LWW) program, which will focus on sustainable wool production in Australia over five years (<http://www.landwaterwool.gov.au>). This program is a joint investment between Australian Wool Innovation Limited, the wool industry's peak research and development body, and Land & Water Australia, the nation's premier natural resource management researcher.

More than half of wool growers in Victoria have native vegetation on their land, according to a nation-wide survey of 1500 wool growers. The survey, which was commissioned by the Land, Water & Wool initiative, also found that of the 58 per cent of Victorian wool growers with native vegetation on their farm, 62 per cent believed it was useful to production. Productive management of native vegetation is an increasing priority for wool growers in parts of Victoria. Some wool growers are managing their native bush/scrub or native grasslands differently to other areas of their farm because they perceive there are environmental and production benefits.

From an ecological perspective however, more needs to be done. Past actions have led to the loss, fragmentation and degradation of most ecosystems in wool growing areas of Australia. Indicators of the health of the landscape and water are generally showing negative trends (VCMC 2002, Commonwealth of Australia 2002).

In Victoria, conservation management activity on agricultural land is very important. Of the total land mass, 66% is privately owned, and agriculture uses 85% of this. However, over 60% of native vegetation on private land is estimated to be part of threatened ecological communities, such as grasslands and grassy woodlands, and they contain 30% of the populations of threatened species found in Victoria (NRE 2002).

Private landholders in Victoria are important stewards of biodiversity, because significant biodiversity assets are left in their hands. Their role in the protection of these assets is a key direction of Victorian efforts to conserve biodiversity (see for example NRE 2002). The Victorian Government's vision for Victoria to 2010 includes as a key platform that "protecting the environment for future generations is built into everything we do" (State of Victoria 2001). Specifically relating to biodiversity, the *Flora and Fauna Guarantee Act 1988* sets out broad objectives for conserving native biodiversity that is indigenous to Victoria. More specific aims included in *Victoria's Biodiversity Strategy 1997* (NRE 1997) that are particularly relevant in a wool growing context are to:

- enable continued development of partnerships between the community, industry and government in the custodianship of our biodiversity;
- detail strategic frameworks to prevent further loss of habitat, and a focus for better management of existing habitats and the continuation of natural ecological processes; and
- highlight the habitats and environments that require urgent attention.

Typically management of biodiversity is viewed in isolation from the farm business context. Because a large effort will be required to reverse the decline in biodiversity, and engagement of primary producers will be critical, a whole farm business perspective is essential.

Recognising the importance of reconciling private business goals with public conservation priorities, the Native Vegetation and Biodiversity sub-program of Land, Water & Wool is funding a new project called *Marrying Wool Business & Native Biodiversity* (DAV39). Through it, researchers will highlight practical ways of managing native biodiversity across central Victoria while maintaining farm profitability and meeting other goals. Three complementary regional projects are also being funded through this sub-program in northern NSW, Tasmania and South Australia. Together these projects will provide a wealth of information on the management of native biodiversity within a production context.

In this paper, we firstly outline the methods for engaging wool growers, collecting data about farm operation, finances, biodiversity and agronomy, and evaluating possible management and investment options. Then results are presented for work already conducted in the Ararat region. Finally, the implications of these results are discussed and issues identified that have arisen during the first phase of the project.

Methods

Three regions of central Victoria - Ararat Hills, Maryborough-Lexton and Springhurst – are the focus for this project. Case study methodology (Crosthwaite *et al.* 1997) is being used as a basis for generalising results to other wool growers across Victoria and south-east Australia. Nine commercial wool properties have been selected against criteria such as commercially-run wool enterprise, producer credibility, management approach, attitudes to biodiversity and capacity to invest. This paper focuses on the Ararat Hills region, where data collection is most advanced.

The project team has been working with three wool growers in the Ararat Hills, since November 2002. Data collected from each producer includes: personal goals and visions for the property, fertiliser and cultivation history, finances, pasture and livestock production, and grazing systems. Experienced local agronomists are visually estimating yield of both native and introduced pasture species. They will give advice on pasture productivity and current carrying capacity, and areas where changes in grazing management may provide productivity and biodiversity benefits. As well as providing a background to the farm business, this information about the property helps pinpoint parts of the business that are under performing and identify the capacity of each farm to invest in biodiversity conservation. This will enable the project team to make recommendations, in consultation with the growers that address both biodiversity issues and productivity issues.

Detailed assessments of native and introduced vegetation and fauna are being made on each farm. Existing information about topography, aspect and soils have been used to generate a stratified survey design to guide site selection. Using this procedure in the Ararat region, 167 sites have been sampled on the three properties and nearby public land, which is being used as a benchmark. As well as collecting information about species composition and abundance, vegetation quality has been scored using the habitat hectares method (Parkes *et al.* 2003). This data was used to build models of vegetation quality across the farm landscape. Detailed maps have been generated that show areas of the farm by vegetation type and quality. The maps are aiding discussion with the wool growers about biodiversity values on the property, and where and how to target conservation efforts.

As relevant biodiversity issues and farming issues are identified, management options will be identified and developed with each wool grower, to also meet regional conservation priorities as set out in regional catchment strategies and biodiversity action plans. The options are then appraised using partial budgeting, with sensitivity and risk analysis techniques applied (Malcolm & Makeham 1993). This will help predict the effect of each management option on the profitability and cash flow of the farm business. Ideally, some management options will be trialed on-farm and be the focus for field days.

Extension staff in the Wool Program of the Victorian Department of Primary Industries, as well as Landcare coordinators and other extension officers are helping expose the project to wool producers and the wider community. Bestwool 2010 (www.nre.vic.gov.au/bestwool/) and Landcare groups (www.landcareaustralia.com.au/), are being utilised as “assessment panels” for open discussion of project results and issues. This feedback in an informal environment is important in shaping the project’s results, so that recommendations are realistic and relevant to the majority of wool producers. A survey about wool growers’ attitudes to conservation of biodiversity is currently being delivered on a face to face basis at various meetings; it will be repeated again at the end of the project to assess any change in attitudes over the project period.

Results

The case study farmers chosen are diverse but typical of wool growers in the hill country of Central Victoria. The interviews with the three producers at Ararat revealed a strong production focus with varying environmental interests; one couple have recorded over 150 bird species on their property. Biodiversity is generally not a familiar word in the vocabulary of the selected growers, but most are willing to learn more about it. Their interest in being involved in this project stems from trying to solve problems on their own places, such as managing their vegetation to help prevent wind and water erosion and salinity. They hope to gain knowledge that will help them solve some of their problems, as well as make them some money down the track. One says, “we have everything to gain and nothing to lose!”. Another, “it’s all about continuous improvement”.

As shown in Table 1, gross farm income and operating profit vary significantly over the participating farms, which is reflected in the differences in return on capital amongst the farms. Differences in cash flow, equity and return on capital provide some indication of the capacity to invest in environmental management, however personal goals also have to be taken into account.

The profitability of the sheep enterprise itself was also analysed, and gross margins are shown to be extremely variable (Table 1). Dry seasonal conditions, stock purchases and other farm enterprises competing for the same land, all have a hand in explaining some of the variations observed in enterprise performance.

Table 1 Financial performance of the three farms compared to regional averages – 2001-02

Financial Summary	Low \$	High \$	Average 2001- 2002 (SW Farm Monitor)
Gross Farm Income	267 /ha	738 /ha	\$532 /ha
Operating Profit (net income)	123 /ha	375 /ha	\$286 /ha
Off-farm income	0	26,000	
Annual Deficit/Surplus (disposable income)	109,000	260,000	
Net Cash Flow	14,097	38,858	
% Return on Capital	6.51%	13.48%	7.7%
Equity	53%	100%	89%
Wool Production Figures			
Wool Production (kgs)	15,800	41,000	
Gross Margin /DSE	\$4.70	\$ 24.20	\$ 23.08
Gross Margin /ha	\$55	\$ 234	\$ 290

Analysis of the mapping (and survey?) data shows that approximately 98% of original woodland and forest cover have been cleared on the Ararat case study farms. This is typical of the region. Of the 13 ecological vegetation classes once thought to occupy the Ararat area, 9 are thought to have been reduced to less than 95% of their previous distribution (Table 2). Only heathy dry forests are believed to still occupy >50% of their prior range. All remaining vegetation present on farms in the Ararat areas are therefore of conservation concern.

Table 2. Percentage cover of sown and cultivated land (disturbed) and woodland on three wool producing farms in Ararat, SW Victoria

Property	% Disturbed	% Woodland
1	64	2
2	46	2
3	76	2

From a biodiversity and land management perspective, there are three distinct areas on each farm. Firstly, the majority of low-lying, or undulating sedimentary and alluvial landscapes have been sown to exotic perennial pastures. These areas comprise 45-75% of the farm areas and tend to be managed for high pasture production.

Secondly, although less productive, extensive areas of native pastures and volunteer exotic annual grasses dominate steep sedimentary and metamorphic slopes. Such areas generally had low to moderate vegetation condition scores (between 10 and 40) (Table 3) and all of these areas supported some native vegetation and were typically dominated by native perennial grasses with some scattered trees.

Thirdly, only a small percentage of each farm supported vegetation with high condition scores (>40) (Table 3). Such areas have, to varying degrees, a tree layer, an under-story with shrubs, grasses and herbaceous native plants, and also logs and litter on the ground. Areas with high scores were typically isolated and their persistence is dependent on increasing their effective area, increasing connectivity to other vegetation patches on the farm and in adjoining public lands and reducing the impact of potential threatening factors such as weed invasion and overgrazing. In all cases these areas had already been fenced and in some cases revegetation was being undertaken to increase connectivity.

Table 3. Distribution of vegetation condition scores at survey sites on three farms in the Ararat district.

Property	0-10	10-20	20-30	30-40	40+	Total
	%	%	%	%	%	%
1	47	12	19	21	1	100
2	28	30	29	12	2	100
3	85	7	6	1	1	100

Vegetation with scores less than ten are highly modified and generally dominated by exotic pasture species. Those with scores >40 support a high diversity of structural habitat components and often have limited weed cover.

Discussion

The majority of case study properties lie in hill country that has been largely cleared. Nevertheless, the survey found that some important biodiversity assets remain – more so than was expected by wool growers or researchers. These areas included small patches of high quality remnant vegetation and more extensive areas dominated by native perennial grasses with scattered trees. Some growers have been pro-active in fencing some of these areas out. Beyond this, grazing management, controlling of stock access and weed management are the most likely methods of gaining improvements to biodiversity. Using fencing to control stock access to areas of native vegetation is an option to conserve biodiversity, while also managing for some production. Fencing on the three properties may need to be modified to allow strategic grazing for weed control and carried out at times and grazing intensities when regrowth of sensitive (and often very palatable) native species is not vulnerable to severe setback from stock. Costs would involve fencing, watering and labour costs, both in establishment and ongoing.

Native pasture is more widespread at Ararat than was expected, particularly on the hill country that is generally more difficult to cultivate and develop. This increases the management options available to wool growers to both increase production and enhance biodiversity. Rotational grazing which involves more active pasture assessment and calculation of carrying capacity, is one potential method that will help match stocking rate to carrying capacity, eliminate over-grazing and encourage greater diversity of pasture regrowth. The length of the grazing period and more importantly spelling period between grazing, is critical for both introduced and native pasture species to establish and grow vigorously. This has been identified in grazing trials in South Australia and Tasmania, in projects supported by Land, Water & Wool. The costs of this approach include labour and time, and potentially refencing and watering costs to enable an efficient rotation.

All farms have large areas of introduced pasture as expected on the majority of commercially operating wool enterprises in Victoria. Opportunities to increase income from these areas, as part of a package of changed management for areas of remnant vegetation and native pastures, are still to be explored within the project.

The project is purposefully working with a range of wool growers who have had very little to moderate exposure to biodiversity issues, and who typify the majority of wool growers across Victoria. The focus on farm profitability and business performance is a unique part of the study and will help quantify the direct farm costs and benefits of conservation of biodiversity to wool producers. Clarifying the effect of various management options on the bottom line of the farm business will allow wool producers to decide themselves if they have the capacity to invest in biodiversity conservation, or if they need external help. As shown for the Ararat farmers, this capacity will vary.

Participating wool producers are already learning from the project. Some have been surprised that there is more native biodiversity on their properties than what they expected, and has re-enforced they are already “doing something right”. The changes in farm management to accommodate biodiversity may not be as drastic as some may think, and have the potential to be low cost, with the major cost being labour and time. If this is the case, wool producers will be more likely to adopt the results, especially if there is a chance of improved wool production and business performance. The key will be to prove to wool producers that some low cost changes to their farm management will produce benefits to native biodiversity and have no detrimental effect on (and perhaps improved) productivity and profitability in the future.

Moving down this path may lead to growers to consider other more costly options that have significant biodiversity benefits. Issues still to be explored in the study include whether there are investment possibilities for generating the cash flow to fund biodiversity works, and other grower goals. The role for government is still to be investigated. Will capacity building initiatives, such as training in business management and pasture management be enough? Is there scope to reduce the risk of adopting a new farm plan that pays for biodiversity management through more intensive management elsewhere on the farm? Or should government simply invest directly in biodiversity conservation? The research findings will help address these questions.

Acknowledgements

Thanks to the wool growers participating in this project, including Landcare and Bestwool groups who are providing advice and feedback as the project progresses. Thanks to Louise Thomas and Darren Keating from the Victorian DPI who have helped with the selection of case study farms in the Ararat region, to the Land Water & Wool team for their support, and to the team of ecologists from the Arthur Rylah Institute who carried out the biodiversity field work at Ararat.

By and large, the wool growers at Ararat are taking some positive actions to maintain biodiversity and are to be congratulated for managing their farms the way they do. We are seeking a partnership with them to maintain the biodiversity assets on their properties, based on new knowledge, while working out steps to possibly move further forward.

References

Commonwealth of Australia (2002), *Australia's Natural Resources: 1997 – 2002 and Beyond*, National Land & Water Resources Audit, Canberra.

Crosthwaite, J., and B. Malcolm (2000). 'Looking to the Farm Business : Approaches to Managing Native Grassland in South-Eastern Australia'. National Research and Development Program on Rehabilitation, Management and Conservation of Remnant Vegetation Report 5/00. Land and Water Resources Research and Development Corporation: Canberra.

Crosthwaite, J., N. MacLeod and B. Malcolm (1997). 'Case Studies: Theory and Practice in Natural Resource Management' in F. Vanclay and L. Mesiti (eds) *Sustainability and Social Research*, Centre for Rural Social Research, Charles Sturt University, Wagga Wagga.

Dorrough, J., V. Turner, A. Yen, S. Clark, J. Crosthwaite and J. Hirth. (2002) Managing for biodiversity conservation in native grasslands on farms, *Wool Technology and Sheep Breeding*, Vol 50 No.4, pp. 760-765.

Makeham, J.P. and L.R. Malcolm (1993) *The Farming Game Now*. Cambridge University Press: Cambridge.

NRE. (2002), *New Approaches, Better Future: Ecologically Sustainable Agriculture Initiative*, Department of Natural Resources and Environment, East Melbourne. Available at www.nre.vic.gov.au under "Farming and Agriculture", then select "ESAI projects" under A-Z index.

NRE (1997), *Victoria's Biodiversity: Directions in Management*, NRE, East Melbourne. Available at www.nre.vic.gov.au under "Conservation & Environment",

Parkes D, Newell G, Cheal D (2003) Assessing the quality of native vegetation - the habitat hectares approach. *Ecological Management and Restoration*.

State of Victoria (2001), *Growing Victoria Together: Innovative State, Caring Communities*, Department of Premier and Cabinet, Melbourne

VCMC (2002), *The Health of Our Catchments. A Victorian Report Card 2002*, Victorian Catchment Management Council, East Melbourne.

Biographical details

The authors work for the Department of Sustainability and Environment in Victoria.

Jim Moll is an agribusiness analyst. He is working as a project leader on two similar projects that are closely working with farmers across Victoria. Both projects focus on the impact on farm business viability, of investing in conservation of native biodiversity.

Jim Crosthwaite is a policy economist working in the production/conservation area. He runs several projects that bridge the production/conservation frontier. His PhD examined farm businesses and natural resource management.

Josh Dorrough is an ecologist at the Arthur Rylah Institute. He is currently undertaking research on the management of native vegetation and threatened plant species in temperate agricultural landscapes. His PhD examined the impacts of livestock grazing and competition from exotic plants for persistence of native grasslands in the Monaro Tablelands of NSW.