Social Research for the Project:

‘Landscape Scale Conservation of Threatened Grassy Woodlands in the Greater Murray Goulburn catchment’

FINAL REPORT

By

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Disclaimer
The views expressed in this report are solely the authors’, and do not necessarily reflect the views of Charles Sturt University, the North East Catchment Management Authority, or any other individual or organisation consulted during this research.

Cover photos
Images of Box-Gum grassy woodland vegetation in the Greater Murray Goulburn catchment (M. Titcumb; S. Dallinger; M. Looby).
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Executive Summary

Overview of the Grassy Woodlands project

The North East, Goulburn Broken and Murray Catchment Management Authorities (CMAs) were successful in securing funding from the Australian Government to work with landholders to enhance and protect areas with naturally-occurring Box-Gum Grassy Woodlands, Buloke and Weeping Myall Woodlands. The Grassy Woodlands (GW) project focused on enhancing these ecosystems, which are listed as ‘critically endangered’ or ‘endangered’ under the national Environment Protection and Biodiversity Conservation Act 1999. The GW project operates across three natural resource management (NRM) regions: the North East CMA and the Goulburn Broken CMA in Victoria, and the Murray CMA in NSW.

This nationally-important project has taken an innovative approach to managing the threatened grassy woodlands ecosystems on private land, by contracting individual landholders to change their management practices to achieve improved ecological outcomes. In exchange for changing their management practices, landholders are reimbursed for costs incurred for installing additional fencing and water points for livestock, pest plant and animal control, and paid an annual management fee for the period of the Agreement.

The activities and objectives of the GW project address six of the targets for the Australian Government’s ‘Caring for our Country’ initiative, including:

- increasing native habitat;
- reducing the impact of weeds;
- increasing landscape-scale conservation;
- improving knowledge and skills of land managers;
- engaging Indigenous communities; and
- increasing community knowledge and skills.

The GW project’s Project Steering Committee contracted Charles Sturt University (CSU) to undertake social research to inform an evaluation of the GW project, in accordance with Australian Government’s Monitoring, Evaluation, Reporting and Improvement (MERI) framework. This report documents CSU’s social research, which was comprised of two distinct parts:

- a literature review of relevant published research and experiences; and
- a survey of, and interviews with, key project stakeholders (e.g. landholders, project staff).
Key findings from the literature review

The literature review analysed the lessons from relevant research and practical experiences reported in international and Australian literature. The key findings from the literature review with relevance to the (GW) project include:

1. There are multiple drivers of change in rural landscapes, with complex and inconsistent interactions and outcomes, which has led to changes in the composition of rural communities, practices of landholders, and the appeal of NRM activities. Some of the current drivers affecting rural landscapes in south-east Australia include:
   - diminishing agronomic potential for small- and medium-sized enterprises;
   - varying climatic conditions;
   - changing socio-demographic composition of rural communities, and the resulting diversity of landholders;
   - evolving perceptions of what is ‘good’ farming; and
   - valuing rural land for its aesthetic features (e.g. riparian frontage, landscape views, remnant vegetation) above its agronomic value [refer to section 1.2].

2. An increasing diversity of rural landholders, particularly in south-east Australia where the GW project is focused, includes many landholders whose land-use is not governed by the demands of a commercially-oriented agricultural business. Understanding the evolving range of rural landholders should assist targeting NRM programs and enhance outcomes [refer to sections 1.2 & 1.3].

3. Investing in engagement and incentive strategies that bring a new cohort of landholders into the wider NRM network (sometimes referred to as ‘conditional non-adopters’) can lead to considerable ‘additionality’ of NRM programs (the added value of the program beyond what might otherwise have occurred). However, typically these strategies will need to be supported over a sustained period (e.g. 5-10 years) if the desired NRM outcomes are to be achieved [refer to section 1.3].

4. Establishing and building trusted long-term relationships is a prerequisite for engaging Indigenous people in a meaningful way with the mainstream NRM community. The approaches used to develop closer ties between Indigenous people and farming landholders may need to be radically re-configured if the potential mutual benefits are to be achieved. For example, many of the customary practices and traditional values of Indigenous people don’t fit easily into the contemporary NRM paradigm, as much of the NRM support is directed to individual landowners [refer to section 1.3].

5. A suite of traditional and innovative NRM programs are – individually and in aggregate – making a positive difference to the ‘health’ of the natural environment. However, the State of the Environment (SoE) (2006) reported that the Australian environment continues to decline in a number of aspects, including the continued loss
of native biodiversity. As such, more needs to be done to encourage and support landholders to improve NRM practices [refer to section 1.4].

6. A variety of policy instruments has been used to improve NRM practices; however not all recommended NRM practices are socially acceptable to landholders. For example, increasing the area of woody native vegetation can lead to concerns among neighbouring landholders about the increased potential for pest plants and animals. Also, some analysts have suggested that ‘purchasing’ short-term behavioural change by landholders may not translate into a long-term commitment to follow recommended NRM practices on a self-sustaining basis. Furthermore, the ‘purchasing’ of environmental services may displace what landholders may otherwise generate voluntarily with community-driven NRM [refer to section 1.4].

7. While currently popular among NRM organisations, the advantages of market-based instruments (MBIs) compared to traditional policy instruments (e.g. single grants) for improving NRM are yet to be fully assessed. For example, it is uncertain whether MBIs are more effective than traditional policy instruments at fostering a long-term commitment by landholders to sustain NRM practices beyond the program’s operating period [refer to section 1.4].

8. Allowing landholders to negotiate and refine long-term contracts for their participation in NRM programs will encourage greater voluntary participation. Investing in human and social capital (e.g. activities for the local Landcare group) is an important part of capacity building for landholders so they can make informed decisions about how best to improve their NRM, and negotiate agreements for land-use changes that they can sustain over the long-term [refer to section 1.4].

Key findings from the survey and interviews

CSU designed a structured survey for two sample populations of landholders – ‘participants’ and ‘non-participants’ in the GW project, with a deliberate overlap in many sections of the two surveys so as to allow direct comparison of data. The sample populations were identified from mailing lists compiled by the GW partner organisations. The list of ‘participants’ included all landholders who had signed project Agreements as participants in the GW project by March 2011 (n = 56). The list of ‘non-participants’ was compiled from landholders who had participated in other NRM programs with GW partner organisations, had expressed interest in the GW project, and were thought to have property with grassy woodland vegetation (n = 70)\(^1\). An overall response rate to the surveys of 57% was achieved (73 surveys returned).

\(^1\) It is important to note that the sample of ‘non-participants’ for this research is not expected to reflect the wider population of landholders, where many may not have participated in any NRM project. Landholders ‘outside’ the current NRM networks of the GW project partner organisations were not sampled in this research.
The key topics explored with landholders via the survey included their:

- values associated with grassy woodland vegetation on their property;
- management of grassy woodland vegetation;
- views on the GW project;
- self-assessed level of knowledge about NRM topics; and
- personal and property characteristics.

The survey data was complemented by in-depth interviews with selected landholders (n = 13) and project staff (n = 4), designed to explore:

- landholders’ recent and future NRM work (e.g. what is the type and scale of investment?);
- the GW project’s influence on landholders’ decisions and behaviour (e.g. how influential was the GW project?); and
- landholders’ long-term commitment to sustaining the changes (e.g. are they capable and willing to maintain changes?).

The key findings from the survey and interviews include:

1. There were strong similarities between ‘participants’ and ‘non-participants’ across a number of attributes: values of grassy woodland vegetation, scale of NRM work undertaken, knowledge of NRM topics, membership of Landcare groups. This suggests that if the GW project was to continue for a second round, many of the ‘non-participant’ landholders (i.e. those already part of the NRM organisations’ network) would be willing to become involved [refer to section 2.2].

2. The values expressed by landholders associated with grassy woodland vegetation were not particularly strong for ‘participants’ and ‘non-participants’, as assessed across a range of utilitarian and environmental statements. This can represent an opportunity for NRM projects, as it can be easier to change land-use practices if recommended practices are not working against strongly held values. In addition, the views expressed by landholders in the survey and interviews revealed that much of the grassy woodland vegetation was an integral part of the farming landscape – not viewed as a separate or particularly iconic part of the landscape. As such, a long-term program is likely to be required to facilitate landholders to undertake land-use changes and foster a long-term commitment to new approaches to the management of grassy woodland vegetation [refer to section 2.3].

3. Survey data revealed ‘participants’ and ‘non-participants’ had undertaken similar NRM work on a commensurate scale, indicating a strong underlying momentum for NRM work by landholders engaged in NRM networks. It is likely that the GW project benefitted from, and contributed to, the aggregate investment in NRM in northern Victoria and southern NSW. However, the survey data alone could be misleading, as interviews with both ‘participants’ and ‘non-participants’ revealed an important difference in the NRM work undertaken by the two sample populations. ‘Participants’
reported that their investment via the GW project was strongly focused on protecting
the ‘endangered’ grassy woodland vegetation on their property, whereas NRM work
by ‘non-participants’ tended to be of a more diffuse nature across their properties or
enhancing vegetation with a lower conservation threat status [refer to section 2.4].

4. The GW project has had a ‘material’ influence on ‘participants’, in that the project
provided the coordination and financial support for landholders to undertake land-use
changes. In doing this, the project appears to have galvanised latent or pre-existing
interest by landholders in NRM into on-ground action. As such, there is strong
evidence that the project directly contributed to a positive change in practice by
landholders in favour of protecting grassy woodland vegetation. There is a degree of
spatial overlap between our social data, and ecological data collected by ecologists
from the Australian National University, that will allow socio-ecological interactions to
be explored overtime [refer to section 2.4].

5. Most ‘participants’ expressed a positive view of the GW project via the survey and
interviews. Of note, no single component was identified as being particularly
influential for landholders, but rather the whole ‘package’ appealed including:

- payments for site management;
- provision of on-ground support (fencing) + applied science;
- provision of experienced extension/field staff;
- involvement of multiple organisations (which added weight to the perceived
credibility of recommended practices);
- integration across regions (which implied the project was broadly accepted)
  [refer to section 2.5].

‘Non-participants’ expressed a range of impediments or constraints to their
involvement in the project, which included:

- a lack of awareness about the project;
- changes in their personal situation, making their participation impractical or
  undesirable;
- concern that the project would increase pest plants and animals [refer to
  section 2.6].

6. Most ‘participants’ reported that they understood the project’s Agreements
(management plans) and felt capable of implementing what was expected. However,
we have some concern about the extent their new management practices will be
sustained over the long-term as landholders expressed a vague commitment to
maintaining the recommended management after the expiry of Agreements. One
possible reason for this doubtful long-term commitment is that in 10 years (the
majority of project Agreements are for 10 years), most ‘participants’ will be older
than 60 years of age and approaching retirement. Again, project managers need to
give careful consideration to the design and resourcing of ongoing extension support
for landholders (e.g. farmer-to-farmer), so as not to jeopardise the initial investment
made by the GW project [refer to sections 2.7 & 2.8].
7. Survey data revealed a similar self-rated knowledge of NRM by ‘participants’ and ‘non-participants’. Given the strong similarity between the samples of ‘participants’ and ‘non-participants’ (noted above), and short period of operation by the GW project (i.e. <2 years), we did not anticipate a substantial difference in NRM knowledge. Our view is that knowledge is profoundly different to information (provision of technical data, documentation of someone else’s experience and opinion). In the NRM context knowledge could be defined as: confidence felt by a landholder that they understand how to manage a site under variable conditions (e.g. changing agronomic and climatic conditions, prevalence of pest plants and animals). While there is considerable evidence that the GW project has provided high-quality information to participating landholders, particularly by employing experienced field ecologists and project managers, improving the level of knowledge among the population of ‘participant’ landholders will take a sustained effort. In our view, if a comparable extension effort is sustained, then it should be possible to improve ‘participants’ knowledge in regard to the management of grassy woodland vegetation over coming years (e.g. a demonstrable increase in ‘participants’ NRM knowledge after 5+ years) [refer to section 2.9].

8. Interviews revealed that the GW project has consolidated links with a number of Indigenous people who have a strong interest in NRM. The project has supported these Indigenous people to enhance connections within their communities for the purpose of rekindling customary practices and knowledge (i.e. practicing ‘caring for country’). However, survey data indicated that generally there is a low-moderate level of knowledge among ‘participant’ and ‘non-participant’ landholders about Indigenous peoples’ approach to ‘caring for country’. In our view, a widespread interest in Indigenous people’s approach to NRM (‘caring for country’) is yet to be cultivated among the region’s landholders. However, this offers an exciting addition to contemporary NRM and so should be considered in future iterations of the GW project [refer to section 2.9].

Key conclusions

The multiple sources of data were aggregated to inform our judgement about the key questions for this social research. A summary of our key conclusions is provided below:

- **The extent to which the project improved the NRM knowledge of landholders involved in the project**

While the GW project has established a sound foundation with its participating landholders (e.g. evidence of good relationships with participating landholders, provision of helpful management information, emerging awareness among the wider public about the importance of grassy woodland vegetation), most participating landholders are still acquiring the knowledge needed to confidently manage grassy woodland sites under dynamic
circumstances over the long-term. However, the GW project should seek to make, and achieve, an appreciable increase in knowledge among participating landholders within the duration of the existing management Agreements (i.e. within 10 years). The topics on which respondents rated their knowledge most highly included:

- the ability of native grasses to improve the quality of runoff water;
- the effects of unrestricted stock access to water ways; and
- the production benefits of retaining native vegetation on farms.

The topics on which respondents rated their knowledge lowest included:

- how the local Indigenous people traditionally used the native vegetation; and
- the cultural values that the local Indigenous people attach to the natural environment.

**The extent to which the project built/supported the capacity of landholders to undertake the land-use changes recommended by the project**

There is considerable evidence that the project provided important material and technical support for landholders to undertake NRM works focused on the protection of grassy woodland vegetation. While ‘non-participant’ landholders undertook NRM works on a similar scale, ‘participants’ focused their NRM work on the ‘endangered’ grassy woodland vegetation. The GW project extended landholders’ capacity beyond supporting capital works, by also combining technical advice and management payments for the on-going maintenance of sites. The management payments appear to be an important factor in providing the financial capacity for landholders to manage their grassy woodland sites as required under the project Agreement (e.g. off-setting the cost of pest plant and animal control).

**The extent to which the project improved NRM practices by landholders involved in the project**

There is strong evidence that the GW project has supported landholders to undertake recommended NRM practices that both enhance the condition of grassy woodland vegetation (e.g. allowing woody debris to remain in situ to increase wildlife habitat), and reduce degrading factors (e.g. fencing to restrict livestock grazing of regenerating native plants, control of pest plants and animals). For example, all ‘participants’ erected additional fencing around selected sites of grassy woodland vegetation to control livestock grazing. These practices will need to be sustained before the overall condition of grassy woodland vegetation targeted by the GW project will show demonstrable signs of improvement. As discussed above, this is a likely outcome for the duration of the management Agreements.
• The extent to which this project has improved the CMA’s relationship with stakeholders involved in the project

Survey data and interviews indicated strong support among participating landholders for the GW project and the participating organisations. The ‘umbrella’ of organisations involved as project partners (including CMA’s and other NRM organisations) appears to have added weight to the project’s credibility among landholders and other organisations engaged in the wider NRM network. However, organisational relationships can be transient if not renewed and supported by on-going projects of mutual interest. In summary, there is strong evidence that the project has established a solid foundation, including positive relationships between participating landholders and the project organisations, and among the project’s partner organisations.

• The extent to which the anticipated landholders participated in the project

The GW project team has reported that targets for the number of participating landholders and the area covered by the project’s Agreements, have been met or exceeded. The survey data provides a profile of participating landholders with a range of social and agronomic characteristics (i.e. the majority are ‘farmers’, have a strong reliance on farm income, and are actively involved in the wider NRM network). The characteristics of ‘participants’ (survey respondents) are summarised below.

Table E1: Characteristics of ‘participants’ in the GW project

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>‘n’ value</th>
<th>mean</th>
<th>median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property area (ha)</td>
<td>34</td>
<td>1,482 ha</td>
<td>435 ha</td>
</tr>
<tr>
<td>Area of GW veg (ha)</td>
<td>33</td>
<td>55 ha</td>
<td>35 ha</td>
</tr>
<tr>
<td>Age (yrs)</td>
<td>34</td>
<td>51 years</td>
<td>51 years</td>
</tr>
<tr>
<td>Period of Mgt (yrs)</td>
<td>35</td>
<td>20 years</td>
<td>16 years</td>
</tr>
<tr>
<td>Source of income from farm (%)</td>
<td>33</td>
<td>56%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Farmers (%) 33 Yes = 60%
Landcare member (%) 35 Yes = 57%
Recent NRM training (%) 35 Yes = 43%
1. Review of literature

1.1 Summary of the Grassy Woodlands project

Natural resource management (NRM) in Australia continues to face immense challenges – across a broad range of biophysical, socio-economic and policy dimensions. Private and public efforts to achieve sustainable NRM over the past two decades have been considerable and impressive, yet landscape restoration largely remains an elusive national ambition. Evolving and innovative NRM policies and programs continue to be implemented to arrest further decline of threatened native biodiversity, particularly for that occurring on private land.

The Australian Government has provided funding to the Victorian North East and Goulburn Broken Catchment Management Authorities (CMA) and the New South Wales Murray CMA to work with landholders to enhance the protection of remnant Box-Gum Grassy Woodlands ecosystems. The Grassy Woodlands (GW) project is focused on rural properties with naturally-occurring Box-Gum Grassy Woodlands, Buloke and Weeping Myall Woodlands ecosystems, which are listed as ‘critically endangered’ or ‘endangered’ under the national Environment Protection and Biodiversity Conservation Act 1999 – the Australian Government’s core environmental legislation.

The GW project is nationally-important given its innovative approach to managing the threatened grassy woodlands ecosystems on private land, by contracting individual landholders to change their management practices to achieve improved ecological outcomes. The delivery of the GW project has been tailored to each of the participating CMA regions. A suite of programs has been employed to improve NRM around Australia, yet experience and understanding about the relative merits of different program approaches are still emerging, including lessons about the implementation and outcomes achieved by the GW project.

The first part of this report provides a review of published literature and program documents to inform the GW project team about the lessons learnt from research, and practical experience with NRM programs seeking to bring about land-use change on private land. This literature review also informed the subsequent assessment of the GW project’s implementation, particularly the social dimension of engaging landholders, and the extent to which their land-use changes will lead to enduring environmental outcomes.
1.2 Overview of Australia’s NRM context

Drivers of landscape change

Native vegetation is an integral component of healthy landscapes (Department of Sustainability & Environment [DSE] 2009). During recent decades, governments have made considerable investments to encourage landholders to increase, or at least retain, native vegetation on private land. For example, $2.8 billion has been spent via the Natural Heritage Trust on improving Australia’s natural environment since the late-1990s (Australian National Audit Office 2008). Despite this investment, arresting many of the drivers of landscape degradation remains a critical goal (SoE 2006). Human impact on Australia’s native vegetation has fluctuated since European settlement in the late-18th Century, and it is uncertain what the impact of different drivers of change during different periods, has been on the extent of native vegetation – making it difficult to predict and manage future trends.

While a ‘driver’ of change can be simply defined as a source of influence, in the context of determining change in rural landscapes the concept is often more complex. There can be multiple drivers of change to a landscape’s environmental quality originating from different locations, times and dimensions (Batterbury & Bebbington 1999; Seabrook et al. 2006; Braimoh 2009). Sometimes change can be accelerated when multiple drivers work in synergy, and conversely powerful drivers of change may be moderated when different phenomena work in opposite directions (Brook et al. 2008). Furthermore, some drivers may cause impacts on landscapes long after the source of influence has ceased (Mottet et al. 2006), such as previous opportunities for intensive economic development (e.g. high wool prices in the 1950s) leaving a relatively long legacy of decline on native vegetation.

Drivers of landscape change can also have unintended environmental consequences, negative and positive. For instance, retention of remnant native vegetation by farmers for livestock shelter can also be beneficial for conservation of native biodiversity. Also, retaining native vegetation in a landscape is attractive to an increasing number of non-farming landholders, with many valuing the aesthetics of native vegetation (Gobster et al. 2007). The combination of these drivers can result in an increase in vegetation beneficial for native biodiversity, even though biodiversity conservation may not be the main priority of landholders. Beilin and Reichelt (2010, p.3) added "Changes in the social landscape are ongoing and vary spatially, temporally and culturally ... How we ... respond to change is constantly evolving".

Despite the complexity of assessing the relative importance of different drivers of landscape change, and determining the impacts, it remains an essential task for informing environmental policy (Burgi et al. 2004). It is particularly important to identify opportunities to accelerate desirable landscape change, or mitigate factors that compound landscape decline (Brown et al. 2000; Veldkamp & Lambin 2001; Rounsevell et al. 2006). Understanding the drivers of change to landscapes can also help to explain why some
environments face greater opportunities for conservation (Gobster et al. 2007), or threats from the potential for intensifying agriculture (McAlpine et al. 2009), proximity to urban centres (Grimm et al. 2008) and climate change (CSIRO & Bureau of Meteorology 2007). Even understanding ownership patterns can be helpful in predicting the extent and quality of native forests (Gobster et al. 2000; Wimberly & Ohmann 2004; Ohmann et al. 2007), thus offering NRM organisations opportunities for refining policies and programs to achieve desired landscape outcomes.

Several comprehensive studies have reviewed the drivers of environmental change in Australia (Cork & Delaney 2005), and specifically in Victoria (Crosthwaite 2004; Crosthwaite et al. 2004; Campbell 2008; DSE 2009; Martin & Werren 2009). Important drivers include the scale of the challenge to create sustainable landscapes and the implications of predicted trends for NRM. A recent assessment confirmed that most catchments in Victoria continue to show signs of decline in land, water and biodiversity condition (DSE 2009).

In south-east Australia, transformative impacts on natural landscapes followed the expansion of European colonial settlements in the mid-1800s. This was largely driven by the voracious search for gold and as a consequence, the resource demand of a rapidly growing population (e.g. establishment of farming enterprises, use of timber for construction and fuel). Following the demise of the ‘gold rush’, further change to the natural landscapes of southeast Australia were caused by the subsequent proliferation of pests (e.g. rabbits), and continued expansion and intensification of modern agriculture (most notably during the 1950s with the use of superphosphate and introduction of exotic pasture species) (Race et al. 2009). In combination, these activities led to massive loss of native vegetation in south-east Australia. Any further loss would pose a major threat to biodiversity conservation (Vesk & MacNally 2006).

**Creating preferred landscapes**

There is an increasing understanding of the ecological principles for increasing biodiversity in natural and planted forests (Bennett et al. 2000; Salt et al. 2004; Lindenmayer & Hobbs 2007; Lindenmayer 2008), as well as in native grasslands and woodlands (Cole & Lunt 2005; Lunt & Spooner 2005; Lunt et al. 2007). However, achieving sustainable NRM is more than an ecological challenge, particularly on private land. Understanding the synergies and trade-offs for different landholders who manage remnant native vegetation remains a somewhat vexed issue, and can be particularly challenging when attempting to ‘purchase’ improved management by landholders.

While there is considerable knowledge about land-use practices and biodiversity that has informed government programs and industry practices – both in Australia and internationally, it remains difficult to identify the critical ‘ingredients’ of NRM programs that change an individual’s thinking and behaviour towards new approaches to NRM over the long-term. Even for NRM programs with high participation rates, this may not mean that the program
has passed the test of ‘additionality’ – the added adoption of practices or change in behaviour that a program has stimulated, beyond the level of adoption or change that may have otherwise occurred due to other factors (e.g. socio-demographic change leading to ‘aesthetic’ farmland) (Race & Curtis 2011). The socio-demographic change in some parts of south-east Australia has been profound – leading to a range of positive and negative implications for NRM – and a “… re-configured rural space by introducing different land-uses, landscape values and land management motivations” (Beilin & Reichelt 2010, p.5).

Public investment in many NRM programs, including the National Landcare Program (Curtis & De Lacy 1996), is often made on the basis that a small public investment will lead to more widespread and long-term changes in the management practices of rural landholders. This logic has considerable appeal for governments in Australia where there is a large land mass, a large number of seemingly intractable environmental threats, a limited tax base, and wavering commitment from a largely urbanised society to address problems in distant rural landscapes (Curtis & Lockwood 2000). The challenge for policy-makers is to design and implement policy instruments that are effective in stimulating a long-term commitment by landholders to additional or new management practices, beyond their immediate participation in an NRM program. While there are some impressive examples of positive landscape changes (Piggot 2006; Performance Story Report (PSR) 2008; Williams & Goodacre 2008), and innovative use of market-based instruments (Knight & Whitten 2008; Miles 2008; Steel 2008), in general there remains a pessimistic trajectory of continuing decline for the Australian environment (SoE 2006).
1.3 Factors that influence landholders’ adoption of conservation practices

Designing effective policy instruments to enhance NRM on private farmland should not be under-estimated, as it is not just an ecological process that must be addressed, but also a socio-cultural and economic process as well (Packham 2011). For instance, landholders and NRM agencies don’t always share the same views on how best to repair the ecological functions of degraded landscapes, and what are the desirable outcomes. In many cases, widespread revegetation of farmland with species-rich native flora is not a socially acceptable option for landholders. The challenge is to find the policy instrument (or mix of instruments) that is both socially acceptable, and builds the capacity of landholders (Coutts & Roberts 2011) to undertake NRM work beyond the capacity and scale of what either landholders or governments can directly fund. Enhancing landholders’ long-term commitment to NRM is thought to be vital if the public investment via different policy instruments is sustained beyond governments’ direct action and investment period (Curtis & Lefroy 2010). That is, NRM programs need to consider whether the ‘purchase’ of short-term behavioural changes by landholders will be sustained so that the desired environmental outcomes are achieved – beyond a program’s period of operation.

There has been a sustained call to achieve multiple benefits from native vegetation, largely to achieve a balance between conservation and production interests (Noble & Dirzo 1997; Lindenmayer & Hobbs 2004). Yet understanding the synergies and trade-offs between how landholders manage native vegetation remains a somewhat contested issue, and can be particularly challenging when attempting to achieve public benefits from private land. In south-east Australia community concerns about uncontrollable bushfires in re-forested landscapes is adding to the challenge of encouraging landholders to sustain their long-term commitment to enhancing native vegetation. In addition, new issues that counter the intent of NRM programs may emerge in the public’s consciousness (e.g. native vegetation increasing the fire risk and harbouring pest plants and animals), undermining a landholder’s long-term commitment to their earlier view of ‘best practice’ NRM. That is, participation in an NRM program may not guarantee a landholder’s long-term commitment to the intent of policy instrument, particularly if the context changes and the NRM practices become undesirable to a large proportion of landholders.

Engaging diverse landholders in NRM programs

There has been considerable research into socio-demographic change in rural Australia – with some rural landscapes de-populating and others re-populating (Hugo 1996; Curtis et al. 2000; Smailes 2002; Alston 2004; Barr 2005; Lawrence et al. 2006; Luck et al. 2010). In many rural areas, the socio-economic composition and property ownership patterns are becoming more diverse as populations increase (Bekessy et al. 2006; Curtis et al. 2006; Mendham & Curtis 2010). This phenomenon in south-east Australia is consistent with change
in parts of Europe (Antrop 2004) and North America (Boody et al. 2005). A heterogeneous group of landholders presents a challenge for NRM policy-makers and program staff in terms of identifying the critical ingredients of programs that effectively engage a diverse mix of landholders (Dwyer et al. 1993; Smith & Weinberg 2006).

Understanding the relevant characteristics of the target population for an NRM program is essential for achieving a ‘close fit’ between landholders and NRM programs (Kabii & Horwitz 2006). Indeed, some researchers have argued that better differentiation of landholders prior to implementation will improve the efficiency and effectiveness of programs. For example, Ferraro (2008) discusses the value of differentiating landholders into ‘low-cost’ and ‘high-cost’ landholders, with these labels referring to the cost level for programs to gain the participation of different landholders.

‘Low-cost’ landholders are those who are likely to undertake land management that provides a similar environmental outcome, regardless of payments for environmental services (e.g. fixed grants, MBI). That is, their land management is providing environmental services similar to that sought by an organisation’s environmental program, so little additional investment is required by the agency (i.e. low-cost). By contrast, ‘high-cost’ landholders are those who are not likely to provide the desired environmental outcome without investment by an organisation’s environmental program. In terms of exhibiting a long-term commitment to new NRM approaches that endure beyond or after an agency’s intervention, Dwyer et al. (1993) suggest it will only be those landholders who have modified their NRM for personal reasons, not for external rewards (e.g. financial payments, penalties), who are most likely to possess a long-term commitment. That is, ‘low-cost’ landholders are those most likely to have a long-term commitment to new approaches to NRM; however the challenge is that they may provide little ‘additionality’ of environmental services.

Positive or pro-environmental attitudes held by landholders that are similar to the goals of an NRM agency increase the probability that landholders will participate in agency-sponsored environmental programs (Luzar & Diagne 1999), and that their NRM will be enduring (Dwyer et al. 1993). However, effective implementation relies on getting all the components right—the combination of incentives and support to enhance a landholder’s capacity, and alignment between the program’s goals with that of the landholders. Particularly for commercial farmers, finding the balance between environmental and farm income objectives is needed (Claassen et al. 2004). Even when landholders clearly express attitudes that are aligned with NRM programs, understanding their willingness and capacity to be actively involved in a specific program, or adopt recommended practices, can be complex with many factors involved (Blas & Chapman 2003; Vanclay 2004; Kabii & Horwitz 2006; Pannell et al. 2006; Beilin & Reichelt 2010) [refer to Box 1, below].
Box 1: Factors linked to the adoption of new practices by landholders

- Landholders’ personal characteristics (e.g. dependence on farm business for household income, opportunities for off-farm income, age and stage of life, engagement in local networks and organisations, proximity to other adopters and the source of information, trusted relationship between landholder and promoter of innovation).
- Operating context for landholders (e.g. commercial conditions, prevailing community views, policy and regulatory environment, climatic conditions).
- Relative advantage of the innovation/technology (e.g. improved viability of business/system, impact on other aspects of farm business and lifestyle, consistency with lifestyles, beliefs and values).
- Ease of trialling and adopting the innovation/technology (e.g. complexity of innovation, costs and risks of innovation, familiarity of innovation).
- Nature of any intervention to enhance adoption (e.g. economic incentives, education and training, one-to-one extension).

*Source:* Adapted from Pannell et al. 2006.

While most landholders already have a strong ‘land care’ ethic (land stewardship), at times there can be a tenuous link between their ethic and actions (Vanclay & Lawrence 1995). Costly, difficult, onerous or risky changes in land management are less likely to be adopted by landholders, even if the long-term benefits of such changes reflect their aspirations and attitudes. Changes that can be made easily by landholders have a far greater likelihood of being adopted; however landholders don’t always have the same capacity and interest to undertake land-use change. Identifying broad categories, or types, of landholders based on characteristics relevant to particular NRM practices can be useful when interpreting data to understand patterns of behaviour and design effective NRM programs. Previous research has found it helpful to categorise landholders to simplify large quantities of complex data and communicate findings to NRM professionals (Vanclay et al. 1998; Curtis et al. 2006; Emtage et al. 2006; Piggot 2006; Emtage et al. 2007; Race et al. 2007; Strachan 2011).

Whether a landholder was a ‘farmer’ or ‘non-farmer’ often corresponded to the type and scale of NRM practices adopted (Curtis et al. 2002, 2006, 2008). When a landholder’s primary occupation, property size, and proportion of on-farm income – variables likely to influence their NRM practices (Curtis et al. 2008a) – was taken into account, a more detailed classification of landholders could be developed. For example, a recent study found it useful for understanding native vegetation management on private land to classify landholders as either ‘full-time farmers’, ‘part-time farming landholders’, or ‘lifestyle landholders’ (Race et al. 2010). While it may seem counter-intuitive to focus on ‘lifestyle landholders’ in NRM, given their typically small property sizes, in some catchments they constitute a large proportion of
rural landholders, with their land-use practices having an substantial impact on neighbouring farmers and the wider catchment (Hollier et al. 2007; Barr 2009). Given different capacities and interests among a diverse landholder population, NRM policies and programs "... may need to become ever-increasingly customised to cater for varied and unique land management interests" (Beilin & Reichelt 2010, p.5).

**Does participation in NRM programs reflect a long-term commitment?**

Even with high participation rates by landholders in an NRM program, this may not confirm the ‘additionality’ (i.e. added adoption or change due to the program) or success of the program, particularly if the program was designed to stimulate long-term commitment of new land-use practices beyond or outside a program’s immediate scope (i.e. the extent to which there is an enduring voluntary commitment) (Morris & Potter 1995). Lobley and Potter’s (1998) evaluation of environmental programs in the United Kingdom (UK) found that while having relatively undemanding entry conditions is likely to encourage a high level or rate of participation, these typically require little from farmers in terms of behavioural changes. As such, programs can achieve a high level of participation and compliance but deliver little environmental ‘additionality’ (Lobley & Potter 1998).

Although the guaranteed financial payments were important, the key determinant of participation in an NRM program for UK landholders was the ‘goodness of fit’ between the program and the landholder’s farming system and plans (Lobley & Potter 1998). However, more critical inquiry suggests that even if an incentive is sufficient to appreciably change landholders’ short-term behaviour, when the incentive (e.g. financial payment) is removed the risk is that landholders may revert to their original behaviour (Beilin & Reichelt 2010). Adding to this complexity is the concern that financial payments to landholders can merely displace voluntary community-driven NRM, perhaps diminishing landholders’ motivation to continue with their own (independent) NRM activities beyond the duration of programs (Morrison et al. 2008; Beilin & Reichelt 2010). This supports the finding of Dwyer et al. (1993) that program mechanisms may be effective in changing individual’s short-term behaviour, but achieve little in terms of building a long-term commitment to NRM after the program ceases. Furthermore, in the Australian context, having NRM programs that strive to get landscapes back to the ecological conditions of pre-1788 may be both incredibly expensive and unachievable (e.g. due to profound structural changes and species extinctions in some landscapes) (Curtis & Lefroy 2010).

Furthermore, there can be wide variation in commitment to NRM programs among participants, with some analysts talking about a ‘participation spectrum’ (Morris & Potter 1995). That is, participation per se in a program may not provide much insight into landholders’ strength of commitment to the program and its environmental goals, or intended behaviour after the program ceases. Underlying passive participation (i.e. 'low input' by landholders) can be much higher than realised by program managers, and ‘... may conceal wide variations in the level of commitment of those actually enrolled’ (Morris &
Potter 1995, p.60) [refer to Box 2]. Radical changes in land-use are likely to require higher investment by programs, compared to subtle changes in land-use. As such, complicated and expensive approaches to NRM may require ongoing support, such as financial payments in perpetuity, and may need periodic adjustment to ensure payments maintain the relative competitiveness against other conflicting land-uses. Others have applied the concept of having ‘active’ and ‘passive’ landholders, suggesting the landholders who adopt a ‘passive’ (i.e. low-input) approach to NRM are more likely to maintain such an approach (Erickson et al. 2002).

Box 2: The participation spectrum

<table>
<thead>
<tr>
<th>Non-Adoption</th>
<th>Passive Adoption</th>
<th>Active Adoption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistant non-adopters</td>
<td>Conditional non-adopters</td>
<td>Passive adopters</td>
</tr>
<tr>
<td>Would not participate under any circumstances</td>
<td>Decided not to participate under existing circumstances but persuadable provided subsidy is made more commensurate with scheme conditions and/or a change in farmer/farm family circumstances</td>
<td>The ‘new conservationists’ – participants attracted by the financial inducements on offer and able to stay inside the ‘green box’ at minimal cost and inconvenience</td>
</tr>
</tbody>
</table>

Source: Morris & Potter (1995, p.58)

Passive participation may not be a problem for a program, particularly if it acts as a ‘stepping stone’ to encourage landholders to participate in more ambitious programs that might be offered in the future. However, there can be some uncertainty about whether ‘passive’ participants are simply ‘trying out’ (trialling) the system, rather than having ‘adopted’ a more enduring land-use (Morris & Potter 1995; Curtis et al. 2008a). ‘Active’ participants may be valuable to programs beyond their own properties in that they could act as promoters or recruiters of other landholders for the program. Also, ‘active’ participants may also be targeted for more challenging or innovative land-use changes in favour of recommended NRM practices – with initial program participation the ‘stepping stone’ to further change (Morris & Potter 1995; Race et al. 2010).

Learning from, and working with, Indigenous land managers

There is an increasing desire within the government policy domain to see private landholders benefit from the Indigenous knowledge, and for this to grow into a mutual collaboration between Indigenous communities and farming landholders (Australian Government 2010). However, to date there has been little evidence reported that genuine and substantive
collaboration of this nature has occurred, beyond relatively isolated examples. Several significant barriers have been reported, such as the failure to understand that "... when seeking to engage Indigenous people in NRM projects, customs relating to gender, kinship and law are significant” (Roughley & Williams 2007, p.3). Indeed, many mainstream Australians lack the 'literacy' to appreciate the social customs, structures and norms of Indigenous communities – heightening the risk of crossing a taboo and offending local Indigenous people. However, despite the exciting potential of closer engagement between the mainstream NRM community and Indigenous people, progress has been slow and somewhat hesitant for a number of reasons.

There is not necessarily a single value or perspective held by Indigenous people about a landscape feature or an area more generally. Knowledge and values can vary about: customary foods (e.g. wild game, fish and plants); use of materials for customary tools, arts and crafts; settings for Dreamtime stories; burial and religious sites; physical evidence of habitation (e.g. campsites, middens, scarred trees); places for ceremonies; and boundary markers (Venn & Quiggin 2007). Establishing, building and maintaining a trusted relationship between local Indigenous people, NRM agency staff, and farming landholders is central to having this information shared beyond local Indigenous communities. Therein lies a key challenge for Australian NRM, in that "... many current policies and programs ... (have) short timeframes, piecemeal approaches, shifting eligibility criteria, heavy reporting requirements and the lack of recurrent core funding” (Roughley & Williams 2007, p.4). Notwithstanding legal requirements, mutually beneficial and trusted relationships between Indigenous people and farming landholders need to be developed and negotiated on a case-by-case basis (Jackson & Langton 2006).

However, Indigenous knowledge and customary practices may not fit easily into NRM practices framed by physical or scientific evidence. For example, a major advancement in NRM in Australia during the past decade has been the development and community acceptance for 'environmental flows' to maintain the ecological health of rivers systems and wider catchments. Yet there has been little development and understanding in the mainstream NRM discourse about 'cultural flows' to maintain the integrity of cultural practices and sites of Indigenous people. Considerable challenges arise when Indigenous people try to communicate this concept into "... a management context dominated by scientific language and philosophy, and increasingly geared towards market-based solutions” (Jackson & Langton 2006, p.14). While there are opportunities to develop synergies between 'maintaining culture, connecting to country, and economic advancement' for Indigenous people based on primary industries (Feary 2007), it can be difficult 'terrain' to navigate when practices and outcomes are inconsistent with the expectations of NRM advocates, policy-makers and scientists. Jackson and Langton (2006, p.11) reported "Indigenous systems of customary law dictate that traditional land-owners have a substantive role in land and water management and resource regulation. Hence, Indigenous people expect to fully participate in management decisions".

10
Some doubt whether the NRM sector has appropriate methods for analysing and incorporating the cultural values of Indigenous people. For instance, Venn and Quiggin (2007, p.335) argued that "... the central focus on prices, which is characteristic of standard methods of non-market valuation, is unlikely to be appropriate in indigenous cultural contexts". They added:

"Even in the context of a developed market society, economists, ecologists and environmentalists have expressed doubts about the degree to which non-market valuation techniques can estimate total economic value. It is likely that members of indigenous cultures hold many more non-use and indirect-use values than non-indigenous people. In this context, sacred values are particularly important and particularly resistant to price-based trade-offs. ... If the value of indigenous cultural heritage cannot be captured by price-based valuation approaches, then indigenous values will be systematically under-represented relative to non-indigenous values in price-based economic analyses of alternative resource management policies. Therefore, it is important to consider whether these methods are applicable in indigenous cultural contexts" (Venn & Quiggin 2007, p.335-6).

In a recent Victorian review of Indigenous peoples’ participation in Landcare, many aspects of Landcare were viewed to be a 'natural fit' with aspirations of Indigenous people in regard to land stewardship – "Landcare provides a practical forum for Indigenous communities to share traditional knowledge in the community and across generations and in turn learn about non-Indigenous approaches to managing the land" (McTernan & Scully 2010, p.9). However, there has been little progress at a state-wide level to capitalise on the mutual opportunities for landholders and Indigenous people under the Landcare umbrella, beyond relatively isolated case studies of success (e.g. engagement between the Warby Ranges Landcare group and the Bangerang people) (McTernan & Scully 2010). While Indigenous people have been employed by Victorian CMAs as Landcare facilitators since 2004, generally there remain significant barriers to close engagement between Indigenous people and farming landholders (McTernan & Scully 2010). These constraints include:

- landholders’ lack of confidence and understanding about how to appropriately engage Indigenous people (e.g. lack of knowledge of cultural protocols);
- concerns by Indigenous people that cultural information will be misused by non-Indigenous people (e.g. ascribing an economic value to sacred sites and cultural practices); and
- concerns by landholders that awareness of culturally significant sites may lead to limitations to their land-use practices and 'ownership' (under Victoria’s Aboriginal Heritage Act 2006).

However, the potential collective benefits for Indigenous people, farming landholders and the wider community, and NRM agency staff and scientists, remain persuasive – particularly if cultural heritage is to become an explicit and integral component of sustainable landscape management (McTernan & Scully 2010). Close engagement with farming landholders would expand opportunities for Indigenous people to rekindle a variety of cultural practices (e.g.
traditional weaving, making axes and spears) and, in doing so, be a catalyst for strengthening a reconnection within the local community and with country.

At a more general level, Roughley and Williams (2007, p. 4) concluded "... there is a need for more effective resource governance arrangements, management models and engagement approaches", if we are to build relationships that will lead to the anticipated mutual benefits between Indigenous communities and farming landholders [refer to Box 3].

<table>
<thead>
<tr>
<th>Box 3: Key messages for Australia’s future response to Indigenous engagement in NRM</th>
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<tbody>
<tr>
<td>• Establishing, building and maintaining relationships must be adequately resourced because relationships are central to Indigenous values, and the trust gained through participatory projects is critical to success.</td>
</tr>
<tr>
<td>• More effective governance arrangements, management models and engagement strategies are needed. At present, Indigenous people are expected to articulate their cultural relationship with land and water in policy development, program design and project implementation.</td>
</tr>
<tr>
<td>• Indigenous values are mostly non-market in nature. This poses critical management challenges in a policy environment that emphasises ‘market’ solutions. Priorities set by Indigenous land managers tend to be well integrated across social, environmental and economic factors and could add significant value to current models of sustainability.</td>
</tr>
<tr>
<td>• The core aspect of sustainability for Indigenous natural resource managers is inter-generational equity/continuity. It is only through application that Indigenous knowledge will retain its relevance and thus be perpetuated by future generations.</td>
</tr>
<tr>
<td>• Land, law, culture and language are inseparable for Indigenous peoples. Each language links specifically to country.</td>
</tr>
<tr>
<td>• New culturally-appropriate designs developed through participatory processes are needed for Indigenous business. One model will not fit all emergent Indigenous natural resource-based enterprise developments.</td>
</tr>
</tbody>
</table>

*Source: Roughly and Williams (2007, p.48)*
1.4 Programs that enable landholders to undertake improved land-use practices

**Instruments used to influence NRM in Australia**

A variety of NRM policy instruments has been applied in Australia, with a mix of voluntary and compulsory, financial and technical, individual and group-oriented approaches (Vanclay & Leach 2011) [refer to Table 1]. In most regions of Australia, several instruments can be operating simultaneously, making it complex to identify the influence of individual instruments on a landholder’s long-term commitment to maintain the intent of an earlier NRM investment.

**Table 1: Characteristics of different policy instruments**

<table>
<thead>
<tr>
<th>Policy instrument</th>
<th>Nature of engagement</th>
<th>Time of operation</th>
<th>Influence on landholder’s NRM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation/legislation (e.g. controls on clearing native vegetation)</td>
<td>Compulsory</td>
<td>Ongoing</td>
<td>Prescribes actions that are permissible or not permissible, and sometimes states a minimum NRM standard</td>
</tr>
<tr>
<td>Covenant (i.e. binding agreement on land title)</td>
<td>Voluntary</td>
<td>Ongoing</td>
<td>Enforces agreed NRM standards that are binding on all future property owners</td>
</tr>
<tr>
<td>Fixed incentives (e.g. support for capital works)</td>
<td>Voluntary</td>
<td>Short- to medium-term (e.g. 3-5 years)</td>
<td>Encourages changes to NRM by offering financial support for initial capital works</td>
</tr>
<tr>
<td>Market-based incentives (e.g. stewardship payments determined by tender)</td>
<td>Voluntary</td>
<td>Short- to long-term (e.g. 3-10 years)</td>
<td>Encourages on-going changes to NRM by offering financial support for capital works, &amp; stewardship payments for on-going management for up to 10 years</td>
</tr>
<tr>
<td>Education/training (e.g. completion of Property Management Plan)</td>
<td>Voluntary</td>
<td>Short-term</td>
<td>Engages landholders in property diagnosis &amp; design</td>
</tr>
</tbody>
</table>

*Source: Race and Curtis (2011)*

Where multiple instruments and NRM programs are operating simultaneously in a region, the impact of one policy instrument can dilute or mask the contribution of another. For example, knowledge of NRM and trust in agencies gained by landholders in an area through
involvement in Landcare or a property management course, may provide them with sufficient confidence to express interest in an MBI advertised through the media. While it may appear advantageous to offer a suite of mechanisms to landholders, it can also lead to unintended outcomes – not always positive. For example, the introduction of restrictions on the use of mature native vegetation (e.g. livestock grazing in remnant bush) may undermine voluntary efforts by landholders to allow native vegetation to mature, so they don’t forgo potential grazing rights in the future.

While there is evidence of links between many policy instruments and implementation of improved management practices (Blias & Chapman 2003), there is continued uncertainty about the capacity of different policy instruments to engender long-term commitment among landholders to new NRM approaches. Adding to this uncertainty is that the process and quality of implementation of policy instruments is also likely to influence the NRM outcomes achieved. That is, the extent to which agencies have achieved best-practice program implementation may be a more critical factor, than the specific attributes of individual policy instruments.

In every NRM region across Australia, a mix of these instruments is operating simultaneously. Yet managing this mix is complex, with multiple interactions between the different instruments – not all having a consistent outcome. For example, it may be difficult for government agencies to simultaneously enforce regulations that prevent clearance of native vegetation and encourage landholders to enter into voluntary long-term management agreements, with landholders uncomfortable with working closely with a single agency that has both the ‘carrot and stick’. Indeed, Dwyer et al. (1993) suggested that programs that provide external penalties (e.g. fines), or rewards (e.g. financial payments), to modify landholders’ NRM may actually impede the development of a long-term commitment to agency-preferred NRM, as these undermine landholders developing intrinsic (personal) modifications to their behaviour.

In addition, the operating environment for landholders typically has other influences beyond a government’s suite of NRM instruments, with some influences much stronger than policy instruments (e.g. agricultural commodity markets, land prices, prolonged drought, demographic change) (Race et al. 2007; Race et al. 2009; Mendham & Curtis 2010). Aside from the individual instruments themselves, several authors have argued that integrating spatial data, particularly when referenced with ecological or biophysical data, with demographic information will improve the targeting of instruments or programs – including improving the efficiency of payments for environmental services (Curtis et al. 2005; Wunscher et al. 2008). Nonetheless, careful assessment of the value of different instruments, including specific components or elements, is needed if we are to better understand how to foster the long-term commitment by landholders to adopt the preferred approach to NRM.
Also, Ferraro (2008) suggests that in a spatially concentrated region, it is more efficient and effective to have a single mechanism on offer. This approach would ensure that the promotion of NRM programs was not too confusing for landholders, particularly those who have a low level of interest. Similarly, NRM programs that focus on a single ecological asset, such as improving water quality, which can act as a proxy or surrogate for a suite of environmental services, are likely to be easier to promote and implement (Wunscher et al. 2008). However, ultimately others have argued that targeted, funded technical assistance with ‘rental’ payments (similar to stewardship or management payments) for conservation is what is required for landholder participation (Kraham 2005).

**Learning from market-based instruments**

There is strong support for market-based instruments (MBI) in Australia (Eigenraam et al. 2005; Cutbush 2006; Whitten et al. 2007) with, for instance, market-based auction systems viewed as achieving more efficient environmental outcomes than the traditional fixed-grant mechanisms [refer to Box 4]. The support for MBIs is primarily because there is an incentive for both parties to truthfully disclose accurate costs and actions they are willing to undertake (otherwise risk non-participation in the program). In addition, MBIs allow the level of incentive payments to be tailored to individual properties and actions. In this sense, NRM agencies can maximise the participation of landholders with the target environmental asset/service, by avoiding ‘over-payment’ to landholders that a fixed-grant may do. There are a range of programs delivered by state agencies, CMAs and non-government organisations that employ an MBI approach to achieve biodiversity outcomes on private land. Examples of these programs include the Land Management Tenders in New South Wales; BushTender and its successor EcoTender in Victoria; and the Vegetation Incentive Program in Queensland (Cutbush 2006), among many other programs.

<table>
<thead>
<tr>
<th>Box 4: Features of NRM programs for landholders using MBIs</th>
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<tbody>
<tr>
<td>• Agreements between agencies and landholders are negotiated at an individual level – with works and payments tailored to site and landholder requirements.</td>
</tr>
<tr>
<td>• Landholders nominate the required level of payment for them to adopt alternate NRM practices.</td>
</tr>
<tr>
<td>• Landholders’ management time can be incorporated into payments.</td>
</tr>
<tr>
<td>• Payments are made over the period of the contract (e.g. 3 to 10 years).</td>
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</table>

There is increasing experience in Australia with programs using MBIs within the NRM context (Knight & Whitten 2008; Miles 2008; Steel 2008). However many of these programs are in a formative stage with the long-term changes still to be assessed, particularly in terms of enhancing landholders’ sustained commitment to alternate land-use. Despite the recent popularity of the MBI approach, some doubts have emerged about the effectiveness and
efficiency of this mechanism (Morrison et al. 2008; Beilin & Reichelt 2010). For instance, MBIs assume that landholders will want to form a contractual agreement with the agency promoting the MBI, and participate in the ‘market’ for environmental services – a market that typically has few competing purchasers. Some have suggested that one reason MBIs aren’t always effective is that landholders may not trust market forces to produce fair and beneficial results. This concern can be heightened if they sign a binding long-term management agreement or contract (Luzar & Diagne 1999).

Also, markets change, and these changes can alter the opportunity cost of long-term contracts, restricting landholders’ ability to pursue more financially-rewarding land-use options. The time needed to increase biodiversity may also be much longer than the contract/program period, and this may lead governments to take action that impinges on property rights. Other concerns focus on whether landholders’ behaviour might simply return to a pre-program state once the incentives cease, or whether financial payments via NRM programs might establish a new expectation for undertaking NRM practices to the point where programs actually erode landholders’ motivation to undertake independent NRM activities (Beilin & Reichelt 2010).

In new and evolving markets for environmental services, landholders and agencies typically don’t have the same type or level of information (i.e. as an asymmetric market) to negotiate an efficient and effective MBI (Ferraro 2008). Ecological systems are typically complex and it is very difficult for landholders to predict and calculate the full value of changes in their land-use practices (Eigenraam et al. 2005). If a landholder’s lack of knowledge leads them to ‘under-bid’ for their provision of management services, they are more likely to be disappointed in the arrangements they have entered into, and this may undermine their long-term commitment to improve NRM, or work with the same organisation in the future.

Programs that have some flexibility and allow landholders to negotiate details of MBIs are likely to be more effective, but may cost more to implement per landholder and per hectare. To overcome this ‘inefficiency’, Lobley and Potter (1998) suggested there might be merit in a localised group of landholders forming their own association or cooperative, devising their own arrangements and negotiating an agreement with the contracting NRM organisation, providing an MBI with an ‘economy of scale’. This might also achieve greater cooperation between neighbouring landholders, and be more likely to achieve NRM change at the landscape-level, rather than at a smaller and more fragmented property-level. Some preliminary analysis of this dynamic has been undertaken in Western Australia, indicating it can be more effective when "... providing incentives as a community venture rather than to individual landholders, especially when the aim is to enhance cooperation to achieve larger scale landscape change" (Beilin & Reichelt 2010, p.24). However, caution is required when a greater degree of ‘ownership’ is transferred to local voluntary groups for landscape change, as the attendant requirements for inclusive community participation and responsibility for thorough accountability and good governance may overwhelm the very value of voluntary community-driven NRM (Farrelly 2009).
Contracts and long-term commitment

Substantial changes in property ownership are occurring, and future owners may have different values and plans to existing owners (Curtis et al. 2006). Long-term agreements can be a disincentive for some landholders to be involved in NRM programs, particularly if they have plans to sell or undertake inter-generational transfer of the property, as the agreement would then place a burden on the new owners (Luzar & Diagne 1999). However, for other landholders the prospect of securing their personal effort and investment in conservation works, such as via long-term contracts or perpetual covenants (legally-binding), can be an added attraction of NRM programs (Kabii & Horwitz 2006).

Contracts between landholders and biodiversity conservation organisations are complex (Mavhunga 2007, Vermeulen & Sheil 2007) – offering both benefits and risks to all partners. Long-term contracts, whether for commercial enterprises or environmental works, carry some risks for investors – NRM organisations and landholders – such as when major changes in the operating context alter the opportunity costs. A risk is that one partner is left contractually-obliged to maintain their contribution for several years despite incurring higher costs than originally envisaged (e.g. increase in costs to control pests plants and animals that originate from neighbouring properties). Nonetheless, successful contracts are more likely when all parties make informed decisions prior to committing to specific arrangements.

Voluntary or compulsory participation

The extent to which a new NRM practice is promoted for voluntary adoption, or compulsory adoption, appears to make a difference to the level of commitment landholders show towards maintaining the NRM investment. Walford’s (2002) research showed that commercial farmers had contrasting responses to policy measures depending on whether these were compulsory or voluntary. Even among farmers who are generally supportive of conservation measures, there can be a reaction against approaches that are compulsory. However, the costs and scale of change required by new regulations also makes a difference. For example, if new regulations require all landholders to achieve a minimum standard of NRM (e.g. control of farm pollutants from entering waterways), but most landholders already exceed this standard, then the introduction of the regulation may be of little concern. Where a more substantive change is required, using a stepwise or adaptive adoption approach is thought to be more effective, where landholders can adopt change in a transitional way – either over an extended period or by incremental change in practices (Earl et al. 2010).

Some research indicates that landholders can influence how a program is implemented, via their relationship with NRM staff (York et al. 2006). However, government programs tend to be less adaptive than non-government organisation [NGO] equivalents (York et al. 2006). While diversity among landholders can create different niches for programs, it can also make implementation difficult (e.g. varying agreements) and expensive (e.g. NRM staff needing to
consult more widely with landholders on a one-to-one basis). York *et al.* (2006) suggested that many environmental programs tend to be designed for a context where landholders are more homogeneous.

**Building human and social capital in NRM**

Given the considerable investment in NRM by Australian governments over recent decades via the National Landcare Program (NLP) and parallel NRM initiatives, agencies have provided considerable financial and technical support to local groups of landholders/community groups. Much of this support has been aimed at enhancing the skills and knowledge of individual landholders (human capital) to adopt new approaches to NRM. In addition, the support via the NLP has been aimed at strengthening the local networks of landholders to undertake group activities (e.g. neighbouring landholders cooperating for pest plants and animals control), and to establish constructive partnerships with agencies (social capital) – the essence of Landcare. The logic of investing in human and social capital is that combined effort and resources would lead to landscape-scale improvements in NRM.

Investment through Landcare in the human and social capital of landholders (e.g. enhancing skills and knowledge, strengthening networks) appears to be an important contributing factor in the achievement of substantive changes to land management that occurs over a period of 5-10 years (Blias & Chapman 2003; Curtis *et al.* 2008b; Curtis & Mendham 2010). That is, it seems there is some evidence that investment in relevant human and social capital leads to longer-term commitment. Of course, involvement in on-ground work can also lead to the development of human and social capital, as landholders ‘learn by doing’ – a reinforcing and iterative process. For example, Curtis *et al.* (2008c) reported that Landcare members were more likely to participate in group meetings, workshops and other training than non-members. In turn, this translated into Landcare members undertaking more on-ground work consistent with ‘best practice’ NRM (e.g. fenced areas of native bush to control livestock access, control of pest plants and animals, planted trees and shrubs), than non-members (Blias & Chapman 2003; Curtis *et al.* 2008b).

Higher levels of social capital contribute to a cooperative, resilient and prosperous community, and are thought to be strongly linked to the implementation of sustainable NRM (Pretty & Ward 2001; Sobels *et al.* 2001; Pretty 2003; Love *et al.* 2011). Knowing how social capital is created and expressed allows a clearer understanding of practical strategies that can be developed to increase this aspect of a community – for NRM or any other community-based initiative. For example, NRM organisations may choose to invest in:

- activities and processes that recognise and support members to attend regular meetings of a community;
- encouraging members to visit each other’s properties or sites of interest to exchange experiences and develop new ideas (within a community, or to a neighbouring community);
organising forums where members develop shared ‘action’ plans; and
organising ‘outside’ people and organisations to establish meaningful connections with the community (e.g. raise awareness of new policies and programs, undertake trials of new management approaches or products, or increase knowledge of commercial markets).

Much of the literature discusses social capital in relation to the management of communal or public resources. However the concept can also be applied to the management of private resources in pursuit of a collective interest or objective, such as participation in NRM groups organised at a local or community level (e.g. Landcare groups) (Sobels et al. 2001; Curtis & Cooke 2006). Local Landcare groups have developed in capacity and number since the early-1990’s in Australia, and are now generally recognised as one of the most effective ways of working with groups of landholders to address NRM issues.

In summary, Landcare has mobilised a large proportion of rural landholders and successfully engaged the wider public in group activities with a high focus on the public good. Landcare engages rural landholders in activities where they learn with their peers, learn by doing, and learn by reflecting on experience, including from the results of monitoring environmental conditions. There is evidence that participation enhances landholder awareness, knowledge and management skills, and leads to the adoption of practices expected to lead to improved environmental conditions (Blias & Chapman 2003; Curtis et al. 2008b). There is also evidence that activity by Landcare groups affects the management practices of non-members (Curtis & Sample 2010), yet the positive ‘spill-over’ effects of NRM programs can be hard to achieve and limited in scale (PSR 2008).

**Reporting and communicating progress**

Communication can be defined as the exchange of information so it creates a shared understanding – it is more than simply providing information. People absorb information and learn in different ways. Also, people may want to know about different aspects of NRM programs, and so need different information. Generating the right type of information and using appropriate modes of communication can be a challenge for NRM project members – particularly when programs have a wide range of stakeholders (e.g. national funding agencies, regional NRM organisations, local farmers) (Race & Millar 2008).

Even when different stakeholders ask the same question of a project (e.g. was the project successful in improving NRM at the farm-level?), the information may need to be delivered via different modes to suit a variety of stakeholders (e.g. written report, brochure, farm visit). The frequency and scale of the communication process will also influence the best mode for information exchange. For example, a large public meeting may be suited to an infrequent gathering of a large number of people (e.g. more than 30), while an informal discussion group may be suited to regular meetings of a small number of people (e.g. 6-8).
Effective communication characteristically occurs when information is:

- expressed using a familiar language (i.e. avoiding unnecessary technical terms or jargon);
- delivered in a mode that is accessible (i.e. freely available and convenient);
- made locally relevant (i.e. focuses on local topics and issues, uses local case studies);
- comprised of actively listening and sharing of experiences (i.e. demonstrating people understand each other); and
- delivered by someone credible (i.e. trusted, reliable) (Race & Millar 2008).

**Lessons from some selected NRM programs**

The key lessons from recent NRM and agricultural improvement programs are increasingly being published, such as the regionally-focused revegetation project – *Heartlands* [refer to Box 5] and the national pasture improvement project – *Sustainable Grazing Systems* [refer to Box 6], with both projects active in south-east Australia. Also, a review of a suite of regionally-focused NRM projects designed to improve landholders’ management of native vegetation in north-central Victoria distilled the features of effective projects [refer to Box 7].

**Box 5: Key lessons from ‘Heartlands’**

The *Heartlands* project developed strategies for targeting land-use change to improve NRM in selected catchments in southern NSW and northern Victoria during the early-2000s. Key lessons of the approach used include:

- discovering the values, attitudes, aspirations and concerns of local communities is a fundamental step in the process of land-use change;
- providing effective local implementation staff is a key element in achieving improved NRM;
- technical support for catchment coordinators (e.g. interpreting research) is required to ensure that on-ground works are targeted for maximum effectiveness;
- a participatory research approach engenders community interest and support for improved NRM;
- a diverse but complementary set of approaches is required to encourage well targeted land-use change;
- the use of a variety of methods is appropriate for communicating and engaging with local communities; and
- efforts to promote land-use change that require long-term commitment from landholders are put at serious risk when financial assistance and other commitments by government are limited to short-term projects with inflexible delivery timelines.

*Source: Earl and Cresswell (2005)*
Box 6: Key lessons from ‘Sustainable Grazing Systems’

The management team identified critical factors behind the reported success of the national Sustainable Grazing Systems project were the:

- combination of research, a producer network, and a training program proved highly effective;
- whole program achieved a critical mass, which allowed allocation of sufficient resources;
- program goal based on the delivery (implementation) of services and activities;
- stability of personnel throughout the 5-year program;
- well-defined baseline information at the commencement of the program;
- broadly-based steering group (e.g. included farmers, researchers);
- strategic reviews (e.g. external evaluation at mid-term).

Source: Meat and Livestock Australia (2002)

Box 7: Features of native vegetation projects preferred by landholders

Landholder perspectives on native vegetation projects in north east Victoria suggest that the most appealing program would characteristically:

- offer appropriate incentives – financial and/or materials (e.g. fencing);
- be easily accessible (e.g. readily available, clearly understood purpose and process, even a ‘one-stop shop’ with a single NRM staff member);
- be delivered by credible and experienced staff (practical advice);
- be conveyed in the landholder’s ‘language’;
- use an holistic approach to native vegetation (NRM integrated with overall farm management);
- be tailored to the local context (e.g. climate, events, land values);
- allow landholders to adapt the implementation of the program to suit their farm management;
- include a short and long-term management plan;
- have a 3 to 5-year ‘work’ agreement; and
- have staff return annually to discuss level of achievement and seek feedback about the program (including future management of site).

Source: Race et al. (2010)

Research has also identified the importance of the relationship between landholders and the project staff and organisation, and indicated that the arrangements for engaging landholders need to be designed and implemented with care. Simpson and Chudleigh (2006) identified a
range of elements for effective arrangements between agencies and landholders that is informative for the Grassy Woodlands project [refer to Box 8].

**Box 8: Agency-community arrangements to enhance NRM**

- Institutional arrangements for delivering incentives must recognise the diversity among land managers, and their particular needs and preferences.
- Where appropriate, and opportunities arise, ‘brokering’ group activities and encouraging collective responsibility approaches will assist in working towards landscape-scale change.
- Institutional arrangements for delivery of incentives should ensure that information on incentives and their applicability to particular situations is available to land managers.
- Community engagement and feedback mechanisms are essential elements in modifying the delivery of incentives and associated institutional arrangements. Early detection of negative community reaction to incentives allows for incentives to be adapted so they are locally relevant.
- Community engagement in incentive programs is more likely to be effective if the local community trusts the agency and personnel.
- Institutional arrangements for delivering incentives should encompass strategies and resources for capacity-building, including management and technical skills of land managers, to ensure that local actions contribute to regional NRM targets.
- To ensure committed staff and a sense of security in the community, institutional arrangements for incentives must include adequately paid professionals with employment security and professional development opportunities.
- Effective coordination between government agencies and among regional groups is essential to ensure land managers receive accessible and accurate information.
- Adequately resourced, rigorous monitoring and evaluation of incentives, and their impact is essential to ensure incentives are having the intended outcomes in relation to regional NRM targets.


Given the GW project is about landscape restoration (improving the management of ‘threatened’ ecosystems) it might be worth reflecting on Lindenmayer’s (2008) ten principles for landscape management. Yet, the GW project is more than a simple ecological restoration project, as it must work largely outside a regulatory framework with private landholders – attracting landholders to participate on a voluntary basis. In this sense, reflecting on the seven Tamar Principles (Lloyd *et al.* 2008, p.238) which focus on the social/community dimension of landscape restoration may be instructive. These Principles are summarised as:

- Respect – for the natural ecology and human inhabitants;
- Consider the future – a duty of care to future generations;
- Set goals – articulate clear goals that are supported by actions;
• Be open – to new ideas and approaches;
• Learn – from the experience and understanding of others;
• Demonstrate – record and reflect on success and failure; and
• Share – across the whole community the costs and benefits of improved NRM.
2. Social research

2.1 Methods used in this research for survey and interviews

The mail survey

A mail survey was designed to collect a range of data covering the socio-demographic, financial and agronomic characteristics, knowledge of selected natural resource management (NRM) topics, and land-use practices, from selected samples of landholders – both ‘participants’ and ‘non-participants’ in the GW project.

The objectives of the survey were to:

- measure the extent of works to improve vegetation management practices of landholders with grassy woodland vegetation (e.g. fencing, tree planting);
- better understand the characteristics, land management practices and future intentions of landholders currently engaged in the GW project (referred to as ‘participants’);
- better understand a cohort of landholders who have undertaken NRM works in the past, and who are thought to have grassy woodland vegetation on their property, yet are not currently engaged in the GW project (referred to as ‘non-participants’); and
- collect baseline data about ‘participants’ in the GW project so that subsequent surveys can be conducted to gauge changes over time – in vegetation management practices, views and knowledge of NRM topics (e.g. in 5 and 10 years time).

The key topics explored in the survey included landholders’:

- values associated with grassy woodland vegetation on their property;
- management of grassy woodland vegetation;
- views on the GW project;
- self-assessed level of knowledge about NRM topics; and
- personal and property characteristics.

A structured survey was designed for both the ‘participant’ and ‘non-participant’ sample populations, with a deliberate overlap in many sections of the two surveys so as to allow direct comparison of data. The sample populations were identified from mailing lists compiled by the GW partner organisations. The list of ‘participants’ included all landholders who had signed agreements as participants in the GW project by the 1st March 2011 (n = 56). The list of ‘non-participants’ was compiled from landholders who had participated in other NRM programs with GW partners, had expressed interest in the GW project, and were thought to have property with grassy woodland vegetation (n = 70).
Surveys were posted with an accompanying covering letter in late-April 2011, and sought landholders’ responses on key topics. A reminder letter was posted to all landholders who had not responded to the survey by mid-May (about a 40% response rate was received at this time). The survey was closed on the 31st May. An overall response rate of 57% was achieved for both surveys (72 surveys completed and returned), with a response rate of 63% for ‘participants’ and 53% for ‘non-participants’. There was some variation in the proportion of survey respondents across the three regions, as detailed below [Table 1, below].

Table 1: Proportion of survey respondents across regions

<table>
<thead>
<tr>
<th></th>
<th>Goulburn Broken</th>
<th>North East</th>
<th>Murray</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘participants’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 35)</td>
<td>23%</td>
<td>40%</td>
<td>37%</td>
</tr>
<tr>
<td>(n = 8)</td>
<td></td>
<td>(n = 14)</td>
<td>(n = 13)</td>
</tr>
<tr>
<td>‘non-participants’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 37)</td>
<td>22%</td>
<td>40%</td>
<td>38%</td>
</tr>
<tr>
<td>(n = 8)</td>
<td></td>
<td>(n = 15)</td>
<td>(n = 14)</td>
</tr>
</tbody>
</table>

The individual interviews

Our methodology included undertaking in-depth interviews with a small sample of ‘participants’ (n = 10) and ‘non-participants’ (n = 3) to explore some of the interesting, or ambiguous, results from the survey. Interviews were also held with a small number of project staff (n = 4). The in-depth interviews were conducted using a semi-structured approach framed by pre-determined key questions, outlined below (Minichiello et al. 1995; Bryman 2008). The interviews were conducted on a one-to-one basis and typically of half to 1-hour duration, with information recorded via hand-written notes taken during each interview. Interviews were held between May and July 2011.

The key themes discussed with landholders related to:

- their experiences with the Grassy Woodland project (positive and negative);
- changes made to their management of grassy woodland vegetation on their property;
- the extent they would sustain the management of grassy woodland vegetation as recommended by the project after the agreement had expired.

The themes from all interviews were compiled and aggregated manually, to obtain an understanding of the range of experiences across all interviewees. Some direct quotes from interviews are included in this report to illustrate particular experiences or opinions, and are coded according to the broad category of the interviewee (e.g. ‘participant’ landholder).
2.2 Social and property characteristics of survey respondents

There is strong homogeneity in terms of personal and property characteristics of the two sample populations, with no significant difference in personal and property characteristics between ‘participants’ and ‘non-participants’ [Table 2, below]. The median data is presented as a measure of the central tendency for each characteristic. The majority of ‘participants’ and ‘non-participants’ reported they are primarily farmers by occupation, who rely on agriculture for a considerable proportion of their household income. No respondents reported being of Aboriginal or Torres Strait Island decent.

Table 2: Social and property characteristics of survey respondents

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>‘participants’</th>
<th>‘non-participants’</th>
<th>significant difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>‘n’ value</td>
<td>median</td>
<td>‘n’ value</td>
</tr>
<tr>
<td>Property area (ha)</td>
<td>34</td>
<td>435 ha</td>
<td>37</td>
</tr>
<tr>
<td>Area of GW veg (ha)</td>
<td>33</td>
<td>35 ha</td>
<td>32</td>
</tr>
<tr>
<td>Age (yrs)</td>
<td>34</td>
<td>51 years</td>
<td>35</td>
</tr>
<tr>
<td>Period of Mgt (yrs)</td>
<td>35</td>
<td>16 years</td>
<td>36</td>
</tr>
<tr>
<td>Source of income from farm (%)</td>
<td>33</td>
<td>80%</td>
<td>33</td>
</tr>
<tr>
<td>Farmers^2 (%)</td>
<td>33</td>
<td>Yes = 60%</td>
<td>33</td>
</tr>
<tr>
<td>Landcare member (%)</td>
<td>35</td>
<td>Yes = 57%</td>
<td>36</td>
</tr>
<tr>
<td>Recent NRM training (%)</td>
<td>35</td>
<td>Yes = 43%</td>
<td>35</td>
</tr>
</tbody>
</table>

^2 ‘Farmer’ was self-identified by respondents of the survey.
2.3 Values expressed by landholders about grassy woodland vegetation

Most survey respondents expressed moderate views across a range of statements that reflect ecological and utilitarian (productive/economic) values. There was strong similarity in the views reported by ‘participants’ and ‘non-participants’, with responses to just one statement revealing a significant difference [Table 3, below]. For each statement in the table below, the mean rating is provided.

Table 3: Values expressed by landholders about grassy woodland vegetation

<table>
<thead>
<tr>
<th>Rating scale:</th>
<th>Not important</th>
<th>Minimal</th>
<th>Some</th>
<th>Important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Why ‘grassy woodland’ vegetation is important to you?</th>
<th>‘Participant’ rating (mean)</th>
<th>‘Non-participant’ rating (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvesting timber for fence posts and firewood</td>
<td>2.1</td>
<td>2</td>
</tr>
<tr>
<td>A place for general recreation for me, my family and friends</td>
<td>2.8</td>
<td>2.4</td>
</tr>
<tr>
<td>Provides additional land for grazing stock, particularly in summer</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Adds to the market value of the property</td>
<td>2.4</td>
<td>2.2</td>
</tr>
<tr>
<td>Provides important shade and shelter for livestock</td>
<td>2.7</td>
<td>2.6</td>
</tr>
<tr>
<td>Provides vegetation to prevent/reduce soil erosion</td>
<td>3.0</td>
<td>1.8 (sig. diff.)³</td>
</tr>
<tr>
<td>Adds to the natural environment of the district</td>
<td>2.2</td>
<td>1.8</td>
</tr>
<tr>
<td>Provides a place for native birds to live</td>
<td>1.5</td>
<td>1.6</td>
</tr>
<tr>
<td>Allows me to achieve a balance between conservation &amp; production on the property</td>
<td>2.4</td>
<td>2.1</td>
</tr>
<tr>
<td>Is part of a habitat corridor (allowing wildlife to move between areas)</td>
<td>2.6</td>
<td>2.1</td>
</tr>
<tr>
<td>Is an attractive area of the property</td>
<td>2.7</td>
<td>2.2</td>
</tr>
<tr>
<td>Provides a place where native animals live on land</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

³ Significant difference using the Wilcoxon rank sum test (P < 0.001).
2.4 Work undertaken by ‘participants’ and ‘non-participants’ on grassy woodland sites

‘Participants’ were asked to report the extent and nature of NRM works they had undertaken on sites covered by the GW project. ‘Non-participants’ were asked to report the extent and nature of NRM works they had undertaken on all(any) sites with grassy woodland vegetation over the past 16 months (January 2010 – April 2011), with the area over which the works were implemented left undefined.

‘Participants’ reported undertaking considerable NRM activity on sites covered under their contract (Agreement) as participants in the GW project [Table 4, below]. Some survey respondents said they had been unable to complete all of the NRM work intended under the Agreement for the first year due to difficult seasonal conditions (it was often too wet to access sites at the appropriate time). As such, the reported NRM activity completed on GW sites would have been greater if more favourable conditions had ensued. ‘Non-participants’ reported undertaking considerable NRM activity related to grassy woodland vegetation on their property [Table 4, below]. Somewhat surprisingly, there was no significant difference in the amount of NRM work undertaken by ‘participants’ and ‘non-participants’ (except for the number of days spent controlling pest plants and animals), although ‘participants’ reported erecting slightly greater lengths of fencing and making a larger financial contribution to NRM works as part of their involvement in the GW project. By contrast, ‘non-participants’ reported a greater number of days spent controlling weeds and pest animals, than was reported by ‘participants’.

Table 4: NRM work completed by ‘participants’ and ‘non-participants’ on sites with grassy woodland vegetation

<table>
<thead>
<tr>
<th>NRM activity</th>
<th>‘participants’</th>
<th>‘non-participants'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees and shrubs planted (median)</td>
<td>350 trees/shrubs</td>
<td>400 trees/shrubs</td>
</tr>
<tr>
<td>Fencing erected (median)</td>
<td>1,400 metres</td>
<td>1,000 metres</td>
</tr>
<tr>
<td>Your cash outlay GW works (median)</td>
<td>$3,898</td>
<td>$1,500</td>
</tr>
<tr>
<td>Number of days you/your family spent in controlling weeds and pest animals (median)</td>
<td>4 days</td>
<td>10 days*</td>
</tr>
</tbody>
</table>

At this stage, it appears that the GW project has not leveraged significantly greater NRM works by ‘participants’ compared to ‘non-participants’ over the short-term. The extent to which the GW project had leveraged greater, or different, NRM activity by ‘participants’ was explored further via interviews with a range of ‘participants’. Although all respondents had undertaken NRM works of a similar nature and scale, it is important to note that during interviews ‘participants’ revealed that their investment in the GW project was strongly

* Significant difference using the Wilcoxon rank sum test (P < 0.002).
focused on protecting the ‘endangered’ grassy woodland vegetation on their property. In contrast, NRM work by ‘non-participants’ tended to be of a more diffuse nature across their properties or enhancing less ‘threatened’ vegetation. This is an important element of ‘additionality’ of the GW project, in that the NRM investment was focused on an ‘endangered’ vegetation type – NRM work that was otherwise unlikely to occur. Some illustrative comments by ‘participant’ landholders included:

‘… it’s pretty good country what we fenced out for this project, normally we wouldn’t have done that …’ (‘participant’ landholder, Murray region),

‘… although the cattle like hanging around the trees (for shelter), this project should work well for us by fencing out the trees … we were a bit reluctant at first, but it should take us less time to muster the cattle …’ (‘participant’ landholder, Murray region).

Both ‘participants’ and ‘non-participants’ reported that they intended to undertake further substantial NRM work during the next 18 months [Table 5, below]. At a future time it would be worth exploring with a range of ‘participants’ and ‘non-participants’ the extent to which planned works were implemented, and the relative importance of support from the GW project.

Table 5: NRM work planned by ‘participants’ and ‘non-participants’ on sites with grassy woodland vegetation

<table>
<thead>
<tr>
<th>Future plans for work during May 2011 to December 2012</th>
<th>’participants’</th>
<th>’non-participants’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant additional trees &amp; shrubs to revegetate areas (median)</td>
<td>750 trees/shrubs</td>
<td>500 trees/shrubs</td>
</tr>
<tr>
<td>Erect additional fences to manage livestock (median)</td>
<td>800 metres</td>
<td>1,000 metres</td>
</tr>
<tr>
<td>Install additional off-stream water points for livestock (median)</td>
<td>Additional water points: 1</td>
<td>Additional water points: 2</td>
</tr>
<tr>
<td>Further control of weeds &amp; pest animals (median)</td>
<td>10 days</td>
<td>13 days</td>
</tr>
</tbody>
</table>
2.5 ‘Participants’ views about the Grassy Woodlands project

This set of questions was only posed to ‘participants’. Respondents tended to rate favourably (mean score >3) a majority of statements about the GW project (19 of 23 statements) [Table 6, below]. For each statement in the table below, the mean rating is provided.

It appears reasonable that most respondents would rate the project highly given they have only recently agreed to participate in the project. However, from previous studies the lack of follow-up communication with landholders is a common short-coming to achieving long-term outcomes. As such, the GW project managers should consider how they can provide on-going follow-up communication with, and support for, participating landholders. The lowest rating was received about the level of flexibility landholders felt they had to nominate the amount of work they wanted to be paid for. Project staff may want to consider increasing the scope for negotiation about the level of payments to landholders for the work they agree to undertake in future rounds of the GW project.

Table 6: Participants’ views of the Grassy Woodlands project

Rating scale:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Not sure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statements about the Grassy Woodlands project</th>
<th>Your view (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was provided with sufficient technical advice to understand the agreement I signed to participate in the Grassy Woodlands project</td>
<td>3.5</td>
</tr>
<tr>
<td>I was provided with sufficient technical/practical advice to submit my application to participate in the Grassy Woodlands project</td>
<td>3.4</td>
</tr>
<tr>
<td>I was provided with sufficient technical advice to undertake the work I agreed to do</td>
<td>3.7</td>
</tr>
<tr>
<td>The share of the project costs that I had to contribute was fair</td>
<td>3.4</td>
</tr>
<tr>
<td>The project staff were accessible by phone or through on-site visits</td>
<td>3</td>
</tr>
<tr>
<td>The project staff were approachable and responsive to my needs and interests</td>
<td>2.9</td>
</tr>
<tr>
<td>The project staff were flexible when negotiating work to be undertaken</td>
<td>3.1</td>
</tr>
<tr>
<td>I felt I could nominate the type and extent of work undertaken</td>
<td>3.2</td>
</tr>
</tbody>
</table>
I felt I could nominate the amount I wanted to be paid for the work I agreed to do  |  2.7  
Payments for on-going management of the area were an important reason for my participation in the Grassy Woodlands project |  3.1  
I was responsible for ensuring the work on my property for the project was completed, rather than it being someone else's responsibility |  2.9  
Work undertaken for the project closely matched what I wanted to do in that area |  3  
The Agreement clearly spelled out my responsibilities for the work to be done |  3.1  
The Agreement clearly spelled out my responsibilities for longer-term management of the site |  3.3  
The size of the project on my property allowed me to handle the work without being stretched or stressed |  3.3  
The size of the project on my place meant that the work completed should make a difference to the health of the local natural environment |  2.9  
The work completed represented good value for money for me |  3.3  
Participation in the Grassy Woodlands project has given me more confidence that I can improve the condition of my property |  3.3  
I understand the ecological reasons why the Grassy Woodlands project is working with landholders to change land management in the district |  3.1  
The changes in land management recommended/required by the Grassy Woodlands project were similar to my existing property plans |  3  
I agree with the approach used by the Grassy Woodlands project to get landholders involved |  3.1  
I am confident that the changes I've made to land management will achieve the objectives of the Grassy Woodlands project |  3.1  
The Grassy Woodlands project made a fair contribution to the overall cost involved in changing my land management |  3.3  

'Participants' who were interviewed expressed a similar view to that reported in the survey, in that they generally had a very positive view of the GW project. Of note, no single component was identified by interviewees as being particularly influential for landholders but rather it was the whole 'package' that appealed including:
• payments for site management;
• on-ground support (fencing) + applied science;
• experienced extension/field staff;
• involvement of multiple organisations (which added weight to recommended practices); and
• integration across regions (which implied the project was broadly accepted).

Some comments by landholders indicating the value of the GW project included:

‘... it came along at the right time for us, it fitted in nicely with our long-term plan …’
(participant’ landholder, Goulburn Broken region),

‘... this project gave me the resources to get done [fencing] what I’d wanted to do for a while ...’
(participant’ landholder, North East region),

‘... we certainly appreciate the management payment ... it wasn’t the only reason we got involved but an important part of it ...’
(participant’ landholder, Murray region).

A member of the GW project team reported a similar view of the value of the project’s package:

‘... because the project is working on the agricultural zone, where farmers are making their money, we knew we had to offer a pretty competitive package ... it’s not all about the money [management payments], but that’s an important part of what the project can offer landholders ...’
(GW project member).
2.6 ‘Non-participants’ views about the Grassy Woodland project

This set of questions was only put to ‘non-participants’. As it aimed to explore why these landholders decided not to participate, some statements were phrased in negative terms (i.e. why they chose not to participate) [Table 7, below]. Readers interpreting the scores for the items in Table 7 need to take this into account. To assist readers, we have colour coded the mean scores to indicate where a lower mean score actually indicates a negative (red) or positive (yellow) assessment. For each statement in the table below, the mean rating is provided. Some caution is required when interpreting the following data as some/many ‘non-participants’ may have had little direct contact with the project.

Overall, most ‘non-participants’ reported a favourable view of the GW project. The mean rating was negative for only two statements (14% of statements), suggesting that many in this cohort of landholders may be willing to participate in the project in future years. The most concerning aspects of the GW project for ‘non-participants’ were the level of information about the project (mean = 2.8), and support for preparing proposals, which was considered to be insufficient (mean = 2.8).

Table 7: ‘Non-participants’ views about the Grassy Woodland project

Rating scale: Strongly disagree Disagree Not sure Agree Strongly agree

<table>
<thead>
<tr>
<th>Statements about the Grassy Woodlands project</th>
<th>Your view (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I received sufficient information to understand how I could participate in the Grassy Woodlands project</td>
<td>2.8</td>
</tr>
<tr>
<td>I received sufficient technical/practical advice about how to submit my application to participate in the Grassy Woodlands project</td>
<td>2.8</td>
</tr>
<tr>
<td>The financial costs I had to contribute to participate in the project weren’t fair</td>
<td>2.1</td>
</tr>
<tr>
<td>The site I selected on my property was assessed as ineligible to be involved in the Grassy Woodlands project</td>
<td>2.5</td>
</tr>
<tr>
<td>The project staff were difficult to access by phone or to arrange for them to visit my property</td>
<td>1.5</td>
</tr>
<tr>
<td>There was little flexibility in the type and scale of work to be undertaken if I was to participate in the project</td>
<td>2.1</td>
</tr>
</tbody>
</table>
The payment by the project for my on-going management of the area was too low compared to the loss in production I would incur

2.8

I would be left with a greater workload after the project had finished

2.6

The scale of work I would have to undertake to participate in the project would have been too big for me to handle at the moment

2.5

Participating in the project wasn’t a high priority for me/my family at the moment

2.5

The changes in management recommended by the project would not have improved my property

1.9

The changes in land management recommended/required by the Grassy Woodlands project were incompatible with my existing property plans

1.8

I don’t agree with the approach used by the Grassy Woodlands project to get landholders involved

2

I don’t think the changes recommended by the project would improve the health of any ‘grassy woodland’ vegetation

1.5

Interviews with a small number of ‘non-participants’ (n = 3) expressed a range of barriers or constraints to their involvement in the GW project, which included:

- lack of awareness that the project was available;
- changes in their personal situation, making their participation impractical or undesirable; and
- concerns that the project would result in increased pest plants and animals.
2.7 ‘Participants’ views about the management recommended for ‘grassy woodland’ vegetation

The following section was only posed to ‘participants’ and explored their interest and willingness to follow the practices recommended for the management of grassy woodland vegetation [Table 8, below]. For each statement in the table below, the mean rating is provided, with mean negative assessments colour coded (red).

Our data indicates that ‘participants’ are generally confident that they will be able to follow the management practices recommended by the GW project. One aspect that could be addressed by project staff is facilitating greater exchange of information among landholders (e.g. sharing landholder experiences about site management under different seasonal conditions).

**Table 8: Participants views about the recommended management of grassy woodland vegetation**

<table>
<thead>
<tr>
<th>Rating scale:</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Not sure</td>
<td>Agree</td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statements about future management of grassy woodland vegetation on your property</th>
<th>Your view (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will be able to easily maintain the site covered by the Grassy Woodlands project over the long-term (including after the agreement has expired)</td>
<td>3.1</td>
</tr>
<tr>
<td>I don't expect the long-term management of the grassy woodland vegetation on my property will be expensive (e.g. can fit easily into the farm's budget)</td>
<td>3.2</td>
</tr>
<tr>
<td>The project staff provided relevant and practical technical information about how I can manage my Grassy Woodlands site over the long-term</td>
<td>3.5</td>
</tr>
<tr>
<td>I don't think the project's recommended management of grassy woodland vegetation will increase pest plants and animals on my property</td>
<td>3.2</td>
</tr>
<tr>
<td>I am interested to learn more about how local Indigenous people value and manage grassy woodland vegetation</td>
<td>2.7</td>
</tr>
<tr>
<td>I don't think the project's recommended management of grassy woodland vegetation will increase the fire risk for my property</td>
<td>2.7</td>
</tr>
<tr>
<td>I consider the changes I've made to my property due to the Grassy Woodlands project have been very successful</td>
<td>3.6</td>
</tr>
<tr>
<td>I learnt useful information about managing the grassy woodland vegetation on my property from other landholders involved in the project</td>
<td>2.5</td>
</tr>
<tr>
<td>I would consider expanding the area covered by the Grassy Woodlands project sometime in the near future (within 5 years)</td>
<td>2.8</td>
</tr>
</tbody>
</table>
2.8 ‘Participants’ long-term management of ‘grassy woodland’ vegetation

This set of questions was only posed to ‘participants’ as a way of exploring their future management practices of the site covered by the GW project [Table 9, below]. For each statement in the table below, the mean rating is provided, with the one mean positive assessment colour coded (yellow).

Given participants have only recently undertaken NRM works as part of the GW project, not all statements were rated as highly as anticipated. Our data suggest that the management of project sites should be monitored over coming years, to ensure landholders are able and willing to achieve the desired vegetation outcomes. One possible reason for this doubtful long-term commitment is that in 10 years (most project agreements are for 10 years), most ‘participants’ will be greater than 60 years of age and approaching retirement. Again, project managers should consider how best to provide on-going extension for landholders (e.g. farmer-to-farmer), so as not to jeopardise the initial investment made by the GW project.

Table 9: Participants’ long-term management of Grassy Woodland sites

Rating scale:

<table>
<thead>
<tr>
<th>Highly unlikely</th>
<th>Unlikely</th>
<th>Not sure</th>
<th>Likely</th>
<th>Highly likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Long-term management of the Grassy Woodlands project site</th>
<th>Your view</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will actively manage weeds in the area where work was undertaken after the agreement ends, without additional payment</td>
<td>2.7</td>
</tr>
<tr>
<td>I will maintain fences erected under the agreement after the agreement ends, without additional payment</td>
<td>2.8</td>
</tr>
<tr>
<td>I will manage stock access to enhance the condition of native vegetation of the area after the agreement ends</td>
<td>2.6</td>
</tr>
<tr>
<td>I will manage the area in ways that will help retain all standing native trees</td>
<td>2.7</td>
</tr>
<tr>
<td>I will manage the area in ways that will help retain all fallen logs</td>
<td>2.9</td>
</tr>
<tr>
<td>I will manage the area in ways that will help the native vegetation self-regenerate</td>
<td>2.3</td>
</tr>
<tr>
<td>I expect I will alter the management of other areas of grassy woodland vegetation on my property, based on what I learn from the project site</td>
<td>3.2</td>
</tr>
</tbody>
</table>
2.9 Landholders’ self-assessed level of knowledge of different NRM topics

We asked both ‘participants’ and ‘non-participants’ to provide an assessment of their own knowledge of a number of different NRM topics [Table 10, below]. For each statement in the table below, the mean rating is given for ‘participants’ and ‘non-participants’. Responses revealed strong homogeneity between ‘participants’ and ‘non-participants’. Responses revealed strong homogeneity between ‘participants’ and ‘non-participants’ in their self-assessed level of knowledge across a range of NRM topics. There was no significant difference between the mean responses for any statement between ‘participants’ and ‘non-participants’.

Arguably, it is too soon for the GW project to have contributed to increased knowledge (more than simply providing information to landholders), although increasing landholders’ knowledge is an important aspect of the project. Our view is that knowledge is profoundly different to information (provision of technical data, documentation of someone else’s experience and opinion). In the NRM context knowledge could be defined as: confidence felt by a landholder that they understand how to manage a site under variable conditions (e.g. changing agronomic or climatic conditions, or prevalence of pest plants and animals).

While there is considerable evidence that the Grassy Woodland project has provided high-quality information to participating landholders, particularly by employing experienced field ecologists and project managers, improving the level of knowledge among the population of ‘participant’ landholders will take a greater effort. Project managers should consider which NRM topics they seek to increase ‘participants’ knowledge about. If a comparable extension effort is sustained, then it should be possible to improve ‘participants’ knowledge in regard to the management of grassy woodland vegetation (i.e. an assessable difference should be evident after 5+ years).

One aspect of the GW project that warrants further discussion relates to engaging Indigenous people in the mainstream NRM activities and networks of the three CMA regions. Interviews revealed that the GW project has consolidated many of the nascent links among local Indigenous people who have a strong interest in ‘caring for country’. However, the project’s work with Indigenous people has largely occurred separately from the work with landholders with project sites. Our survey data indicated that most landholders (‘participants’ and ‘non-participants’) have a low-moderate level of knowledge about, and interest in, Indigenous land management. Future iterations of the GW project (or equivalent) should continue to galvanise the interest by Indigenous people in ‘caring for country’ activities and cultivate the interest in Indigenous land management among mainstream NRM participants, although a sustained effort is required. A GW project member reported:

‘... if we really want Aboriginal people involved in Landcare, our effort has got to be ongoing, not a 2-year project ... Elders want to pass on their knowledge to the younger ones, but it takes time ... ’(GW project member).
Table 10: Landholders knowledge of different NRM topics

Rating scale:

<table>
<thead>
<tr>
<th>No knowledge</th>
<th>Very little knowledge</th>
<th>Some knowledge</th>
<th>Sound knowledge (sufficient to act)</th>
<th>Very sound knowledge (could give a detailed explanation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TOPICS</th>
<th>Participants (mean)</th>
<th>Non-participants (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How to identify the features of grassy woodland vegetation</td>
<td>3</td>
<td>3.1</td>
</tr>
<tr>
<td>The ability of native grasses to improve the quality of runoff water</td>
<td>3</td>
<td>3.3</td>
</tr>
<tr>
<td>Techniques for stimulating the regeneration of the local native vegetation</td>
<td>2.9</td>
<td>3</td>
</tr>
<tr>
<td>The cultural values that the local Indigenous people attach to the natural environment</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>The effects of unrestricted stock access to waterways</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>The habitat requirements of local native birds and fauna</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>The production benefits of retaining native vegetation on farms</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>The potential impact of climate change on the health of native vegetation in the district</td>
<td>2.5</td>
<td>2.6</td>
</tr>
<tr>
<td>The ability of groundcover along waterways to maintain water quality</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>How the local Indigenous people traditionally used the native vegetation</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>The proportion of native bush (as tree cover) remaining in the district as a percentage of what existed before European settlement</td>
<td>2.8</td>
<td>2.7</td>
</tr>
<tr>
<td>How to prepare a farm or property plan that allocates land use according to different land classes</td>
<td>2.9</td>
<td>3.1</td>
</tr>
</tbody>
</table>
3. Conclusion

After its initial two-year period, the Grassy Woodlands (GW) project has made a positive contribution to the social dimension of its objective, to work with landholders to enhance the protection of the ‘endangered’ grassy woodland vegetation in the Goulburn Broken, North East and Murray CMA regions of south-east Australia. The GW project has invested in a variety of activities – establishing partnerships with relevant stakeholders, building on existing ecological monitoring, adding to existing knowledge about ‘best practice’ NRM, and developing plans for effective site management and landscape-scale change. In this research we used a mixed-method approach (Roberts & Coutts 2011) to ‘triangulate’ the experiences and perspectives of the project’s multiple stakeholders, as a way of gauging progress of the project towards achieving its relevant targets. A summary of our key conclusions are discussed below.

While the GW project has established a sound foundation with its participants (e.g. good relationships with participating landholders, provision of management information, emerging awareness among the wider public about the importance of grassy woodland vegetation), most landholders are still acquiring the knowledge that will enable them to confidently manage grassy woodland sites under dynamic circumstances over the long-term. However, the GW project should result in an appreciable increase in knowledge among participating landholders within the duration of the existing Agreements (i.e. within 10 years).

There is considerable evidence that the project has provided important material and technical support for landholders to undertake NRM works focused on the protection of grassy woodland vegetation. The GW project enhanced landholders’ capacity beyond support for capital works, by also combining technical advice and management payments for the ongoing maintenance of sites. The management payments appear to be an important factor in providing the financial capacity for landholders to manage their grassy woodland sites as required under the project Agreements (e.g. covering the cost of pest plant and animal control). The GW project has also made a key contribution to ‘additionality’, not recognised in other NRM projects. While ‘non-participant’ landholders undertook NRM works on a similar scale, importantly GW ‘participants’ focused their NRM work on the ‘endangered’ grassy woodland vegetation.

There is strong evidence that the GW project has supported landholders to undertake recommended NRM practices that both enhance the condition of grassy woodland vegetation (e.g. allowing woody debris to remain in situ to increase wildlife habitat), and reduce degrading factors (e.g. fencing to restrict livestock grazing of regenerating native plants, control of pest plants and animals). These practices need to be sustained before the overall condition of grassy woodland vegetation targeted by the GW project will show demonstrable signs of improvement. As discussed above, it appears likely that participating landholders will maintain recommended NRM practices for the duration of the management Agreements.
Survey data and interviews indicated strong support among participating landholders for the GW project and the participating organisations. The ‘umbrella’ of organisations involved as project partners (including CMA’s and other NRM organisations) appears to have added weight to the project’s credibility among landholders, and other organisations engaged in the wider NRM network. However, organisational relationships can be transient if not renewed and supported by ongoing projects of mutual interest. In summary, there is strong evidence that the project has established a solid foundation, including positive relationships between participating landholders and the project organisations, and among the project’s partner organisations.
4: References


