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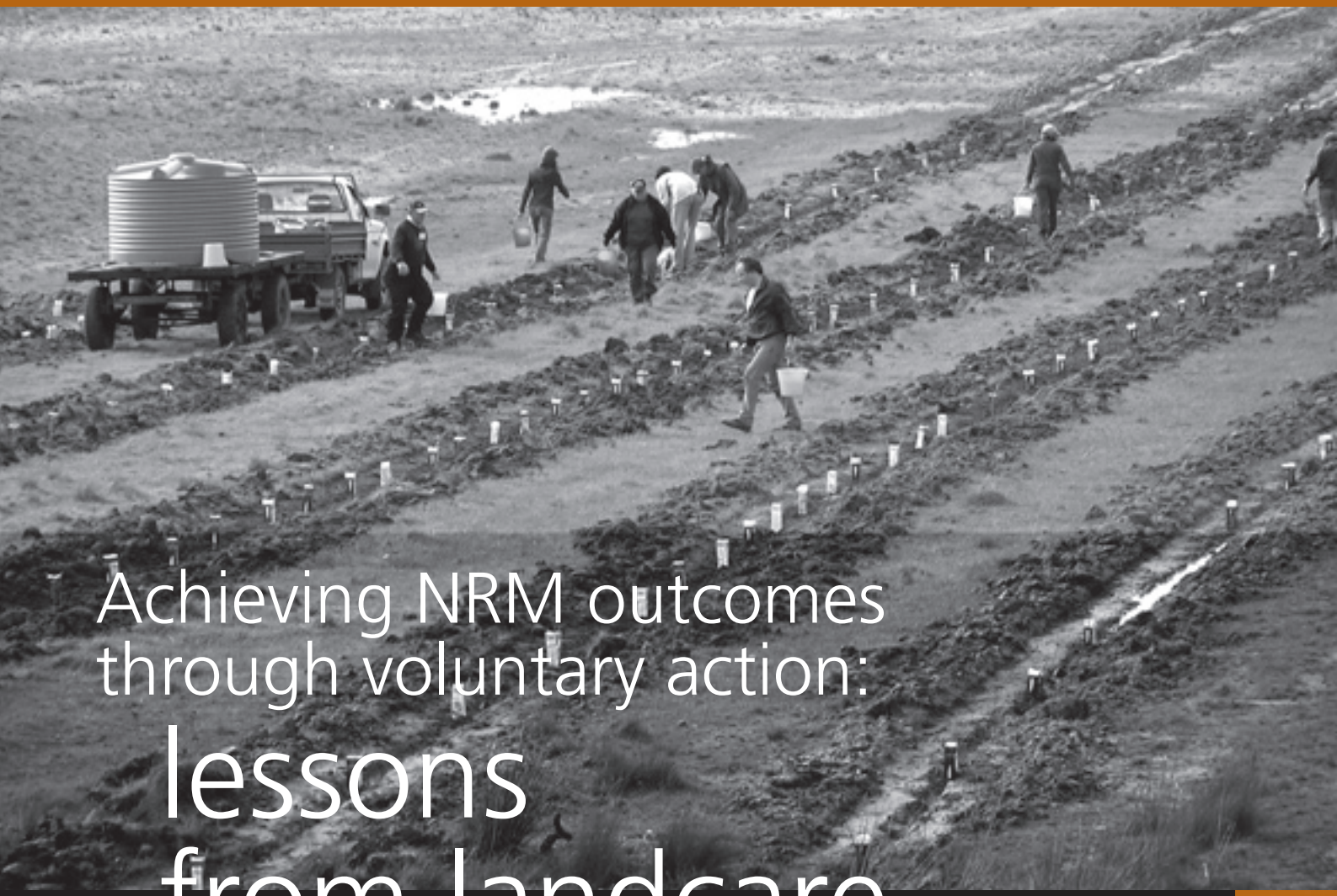

Achieving NRM outcomes through voluntary action: lessons from landcare

DISCUSSION PAPER

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Introduction

Natural Resource Management (NRM) in Australia is characterised by complex issues that occur at landscape scales. The causes and solutions are uncertain and require long-term commitment, and no one organisation has the capacity to secure desired changes. A relatively small tax base and a large urban population, increasingly disconnected from rural and natural environments, have also constrained remediation efforts. Governments have invoked a variety of policy instruments, but there has been heavy reliance on the actions of private landholders and other volunteers to achieve NRM outcomes.

In recent years there has been widespread acceptance of the need to effect change at the landscape scale, adopt integrated approaches and to invest limited resources more strategically to protect key assets. For example, in Victoria, the Land Asset Framework and Ecosystem Services approach from the Millennium Ecosystem Assessment (MEA) underpins government programs employing a range of policy instruments to address the causes of degradation. The move to regional planning and delivery of NRM programs was expected to enhance the goals of integration and strategic investments.

There has also been greater willingness to employ a range of policy instruments, including:

- legislation
- research and development
- taxation rebates and incentives
- direct purchases of land and water entitlements
- the development of economic instruments to engage landholders.

Nevertheless, the voluntary work of landholders and conservation volunteers has remained critical to the achievement of NRM objectives. The formation of networks of volunteer groups, usually in partnership with government and industry groups, has been an important development assisting integration and the scaling-up of NRM interventions.

Over time there has been increased focus on identifying the outcomes of NRM investments. For example, successive Australian National Audit Office (ANAO) evaluations of major national NRM programs have criticised the limited attention given to monitoring and evaluation and the lack of credible evidence of investment leading to NRM outcomes, particularly improved resource condition.

This paper summarises the value-proposition for ongoing investment in voluntary approaches that deliver NRM outcomes. We will draw on the Victorian experience with landcare since 1986 to address questions about the outcomes of previous investments in voluntary action and the future roles for voluntary approaches to NRM. In doing this, we will articulate and critically review the logic of community landcare in Australia

Background

Volunteerism: the policy imperative

Volunteers are the third sector in Australian society, along with business and government. The most recent ABS survey (2006) established that 5.2 million people, or 34 percent of Australians over 18-years-of-age, contributed 713 million hours of voluntary work in 2006. Indeed, the labour input by volunteers was the equivalent of all labour inputs to manufacturing, education and health, and the finance and business sectors (ABS 2007).

Given this scale of input, it is not difficult to understand the public policy imperative for supporting the voluntary sector. Volunteers provide a substitute for direct government expenditure, build social capital (networks, norms, trust and reciprocal relationships that serve collective purposes), and create pathways to civic engagement (a normative goal).

ABS uses two measures to track trends in volunteering:

- volunteer rate (number of volunteers in a group in a year as a percentage of all in that group)
- annual hours of voluntary work.

Between 1995 and 2000 the number of volunteers increased, as did the volunteer rate, (from 24 percent to 32 percent to 35 percent). However, the annual hours of volunteer work declined from a median of 74 hours to 56 hours. Volunteerism (on both measures) is higher in non-metropolitan areas. These data suggest that volunteerism will continue to be a critical part of rural and regional life.

In Australia, a volunteer is defined by the ABS (2007) as someone who, in the previous 12 months, willingly gave unpaid help, in the form of time, service or skills, through an organisation or group. Clearly, this definition embraces the volunteer work by participants in a range of NRM groups.

NRM volunteers in Victoria work in groups that are characterised by:

- a strong focus on addressing issues at the community scale
- participation in wider networks that attempt to address regional-scale issues
- partnerships with government, business or philanthropic organisations
- interaction with state and national-scale operations that focus on specific conservation issues.

Assumptions around NRM investment in voluntary approaches

A substantial part of the explanation for the current stressed state of the Australian landscape (VCMC 2007) has been the implementation of agricultural systems that were often ill-suited to Australia's environment (Barr and Cary 1992). Today, a relatively small number of private landholders (120,000 farming families) manage most of the Australian continent. It is, therefore, critical to engage these private landholders in efforts to prevent further degradation of land, water and biodiversity assets and maintain critical ecosystem functions through improved NRM practices.

In this context, we can identify a number of assumptions that have underpinned Australian and state government investments in voluntary approaches to NRM. These assumptions are:

- Given the small tax base, the continental scale of NRM issues, and limited commitment from urban Australia to environmental issues in the agricultural sector, there are not sufficient resources or knowledge for government to directly manage these landscapes.
- It is critical for people to remain on the land as active managers, with NRM investments strongly focussed on supporting the development and implementation of more sustainable practices.

- People's relationships to nature are evolving, influenced by:
  - o heightened awareness of environmental issues
  - o awareness of the declining importance of agriculture in the Australian economy
  - o awareness of the increased proportions of private landholders who are non-farmers by occupation and less focussed on agricultural production and profitability.

There is sufficient expert knowledge (scientific, technical, local, and indigenous) to allow for improved management practices that, if applied within an adaptive management framework, will lead to improved resource condition. These practices can be described as current best practices (CBP). Adaptive management is a way to deal with uncertainty by deliberately setting out to learn from the implementation of NRM management actions.

- Relatively small investments in voluntary programs, where the focus is on coordinated learning and action, can effect changes in landholder and group knowledge, understanding and management skills, and lead to the adoption of CBP.
- Application of more sophisticated monitoring and evaluation techniques and logic models will continue to strengthen our understanding of the causal links between investments in voluntary approaches to NRM, the adoption of CBP and longer-term changes in resource conditions.

There are definite limits to voluntary approaches, particularly where the following circumstances occur:

- There are externalities (costs of degradation are not included in the market price).
- Landholders recognise that actions they are being asked to take will lead to improvements in resource condition that involve substantial public rather than private benefits.
- CBP are complex, expensive to implement or conflict with landholder's management objectives.
- Groups do not have sufficient institutional support (e.g. through a network) to plan and manage integrated NRM activity at scale.
- Action to redress degradation needs to be implemented quickly.
- Few people live in an area, or those that do are already heavily committed to volunteer or paid work.

Given the limits to voluntary action, voluntary approaches must be complemented by other policy mechanisms, in a combination that is best suited to the system's characteristics (social, ecological, and economic) that define any given landscape. The concept of a landholder duty-of-care to the environment has been proposed as a useful next step. This would involve legislation that imposes a responsibility on landholders to take reasonable steps to prevent foreseeable harm to the environment. Such legislation would need to be supported by codes of practice, mostly likely linked to CBP.

Landcare: an important example of voluntary approaches

Over the past twenty years, community landcare has been the principal vehicle for voluntary NRM in Victoria. Such was the early success of landcare that in 1992, the Department of Conservation and Environment (DCE 1992:18) declared that, 'The landcare program will be Victoria's major focus for achieving sustainable land management.'

The Victorian landcare program launched in 1986 was a partnership between the Department of Conservation and Environment and the Victorian Farmers Federation. The essential elements of the program were community involvement, information exchange, financial assistance and, as a last resort, enforcement (Edgar and Patterson 1992). However, the

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proposed Land Protection Bill did not become law, and by 1992, the Decade of Landcare program explicitly stated that 'The Landcare program departs from a regulatory approach …' (DCE, 1992:20).

In 1988, the federal government recognised the potential of voluntary local groups as a potent force for improved NRM when it committed 360 million dollars to the Decade of Landcare program. The program initially had limited government funding available for coordination and project work, instead focussing on education and demonstration activities to be undertaken by groups in collaboration with state agency advisors.

Establishment of the five-year, $1.25 billion Natural Heritage Trust (NHT) in 1997 significantly altered NRM. For example, NHT and its extension employed cost-sharing principles that enabled public and private benefits from specific work on private land to be identified. Under NHT 2 there was a deliberate attempt to make more strategic investments so that critical issues would be addressed more effectively. Local voluntary groups were often involved in NHT programs and have become an important part of the delivery mechanism for Australian and state government programs, including the regional NRM organisations established in most states and territories since the early 1990s (Curtis and Lockwood, 2000).

Edgar, Patterson, Poussard and Pennicuk were key players in the early days of landcare in Victoria and have nominated the development of group conservation projects by the Soil Conservation Authority between 1960 and 1980 as the beginning of group approaches. Despite widespread acceptance of these catchment-based projects, they were top-down and single-issue focussed. Farm tree groups were established from 1981 by the body now known as the Victorian Farmers Federation, before Greening Australia began linking the conservation of biodiversity and agricultural production, representing the next step towards landcare.

Departmental resolve to act was strengthened by rising public concerns about land degradation issues, notably a vast dust storm from the Mallee that blanketed Melbourne during the 1982-83 drought. At the same time, technical advisers within state government agriculture and environmental agencies were able to draw on their experience with groups and their knowledge of emerging theories of rural development that supported group approaches (Chambers 1983; Esman and Uphoff 1984). These emphasised:

- self-help supported by change agents
- human resource development rather than technology transfer
- public participation
- cooperative efforts at the local community scale (Curtis 1998).

Landcare membership is voluntary and open to any local person. While the focus of group activity is usually on privately owned or leased rural land managed by group members, groups also work on roadsides, reserves and other public lands, and an increasing number of urban-based groups have formed in recent years. The success of Landcare in mobilising volunteer efforts is highlighted by the fact that in 2004 there were over 700 Landcare-type groups in Victoria, with 23,220 members and a further 30,282 volunteers involved in their activities (Curtis and Cooke, 2006).

Groups frequently operate at small sub-catchment or community scales and are encouraged to view their activities holistically, using a systems approach. Groups have no legislative backing and are only informally linked to local government and regional planning bodies. Given that Landcare group modus operandi is not prescribed, there is a great variety in the activities of groups. Campbell's (1994) text provided a number of informative case studies. The rural development activities of groups which facilitate learning and action include:

- meetings to discuss issues, identify priorities, liaise with agency staff, prepare funding submissions and debate resource management
- workshops to develop property and catchment plans and enhance management and planning skills
- field days, farm walks and demonstration sites to identify and refine CBP
- education and promotional activities such as tours, conferences, workshops, community planting days, newsletters and field guides, to facilitate dialogue and information exchange
- on-ground actions such as revegetation, building salinity and erosion control structures, pest plant and animal control, and erecting fencing to manage stock and feral animal access to habitats, including water courses.

The benefits of participation for landholders are seen as being:

- sharing problems and ideas
- working more effectively to address common problems
- learning about land management
- planning at the property and catchment scale so that resource management is based upon a shared understanding of important physical, social and economic processes operating within and beyond the farm gate
- accessing financial and technical assistance from government
- having greater opportunities for social interaction (Campbell 1994; Curtis and De Lacy 1995).

Evaluating Landcare using program logic

Program evaluation is an important but challenging undertaking with many expert opinions about how this should be accomplished. There is a substantial body of literature that identifies the unravelling of program logic or underlying theory as the critical first step in program evaluation. Making the program logic explicit is seen as the first step in identifying objectives that can be employed to assess program effectiveness.

Evaluators can turn to a number of sources in their efforts to unravel program logic, such as:

- approaching program staff, clients, and other stakeholders for their views
- reviewing literature on the program under scrutiny or similar programs
- examining program documentation
- observing the program in action (Curtis et al. 1998).

Evaluating landcare programs provides particular challenges due to the large number of stakeholders, considerable variation in program implementation, and, in the beginning, little documentation about the logic underlying the programs. There is also the issue of what could reasonably be expected of volunteer groups, typically operating with limited resources, who are attempting to address complex issues where there are discontinuities or long timeframes between actions and impacts, and high levels of uncertainty about cause and effect. As might be expected, there has been much debate about these issues and a variety of approaches adopted. At least in the first decade of Landcare, evaluations of these volunteer groups have focussed on their contribution to learning and action, including the adoption of CBP expected to lead to improved resource condition (Campbell 1997; Curtis and De Lacy 1996a, Ewing 1995; Lockie 1995).

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While working in the Department of Agriculture, Fisheries and Forestry, Cary and Webb (2001) published a review of Landcare that drew heavily on the Landcare program logic first articulated by Curtis and De Lacy (1996a). At least from the Australian government perspective, the NLP was a small-budget (less than $30 million per year) catalytic program intended to engage a large proportion of rural landholders and produce more informed, skilled, and adaptive managers of privately owned land. It was also assumed that these managers would develop a stronger stewardship ethic where they placed a higher value on the long-term health of the environment over short-term economic gain. Stronger environmental values were expected to be reinforced by locally developed norms that supported cooperative action. In turn, it was assumed that these changes would lead to increased adoption of CBP that would assist the move to more sustainable agriculture and biodiversity conservation [Figure 1].

There is a substantial body of Australian research linking landholder awareness and concern about issues, knowledge of land and water degradation processes and management options, and confidence in recommended practices, with higher levels of adoption of CBP (Vanclay 1992; Curtis et al. 2001; Cary et al. 2002). There is also abundant evidence that the work of Landcare groups leads to substantially increased levels of onground work (Curtis and Cooke 2006).

Landcare, as envisaged and implemented, was grounded in sound rural development (Chambers 1983; Esman and Uphoff 1984) and extension theory and practice (Roling 1988), in that Landcare:

- provided opportunities for participation at the local scale where there were 'ties that bind' and was therefore easier to mobilise a large section of the community
- brought landholders together so that they could learn with their peers and learn by doing
- provided access to government funding for projects to support onground work, particularly where there were substantial public rather than private benefits
- provided access to coordinators (change agents) who facilitated access to local and scientific knowledge, catchment and property planning and onground action
- established processes in groups that were likely to lead to the establishment of norms and the use of peer pressure to encourage the adoption of more sustainable farming practices
- enabled the discussion and experimentation at the local level that was critical to the development and adoption of sustainable farming practices.

Landcare group activity is therefore an investment in the capacity-building of both human and social capital. Human capital embraces the attributes of a population, its training and skills, health and cultural diversity. Social capital refers to the attributes of relationships established in a community that enable participants to act together more effectively. These attributes include the networks, rules and reciprocal relationships that predispose people to cooperative behaviour and reduce transaction costs (Sobels et al. 2001). Strong human and social capitals are vital characteristics of any community's capacity to respond to the challenges of sustainability.

Successive ANAO evaluations of major national NRM programs have criticised the absence of credible evidence that investments have contributed to NRM outcomes, particularly improved resource condition. As a result, there is now increased focus on identifying the impact that investment has had on achieving NRM outcomes, in particular reduced threats and rates of degradation and improvement in resource condition.

As we will demonstrate, there is substantial evidence that community landcare has accomplished the intermediate program objectives identified in Figure 1, with the exception of developing a stewardship ethic as envisaged at that time. Australian researchers have

demonstrated that most landholders already have a strong stewardship ethic and the hypothesised links between a stewardship ethic and adoption have not been observed (Curtis and De Lacy 1998). This research suggests that NRM policy should focus on effecting behavioural change. In recent years government policy documents and agency staff have come to view improvements in resource condition as evidence of improved stewardship by landholders [Figure 2]. In this context, stewardship describes the desired behaviour of landholders rather than a desired ethic or value orientation.

In recent years there have been calls for voluntary approaches to demonstrate their contribution beyond knowledge and awareness-raising and practice change, to achieving resource condition outcomes [Figure 2]. A number of factors have been responsible for this 'shifting of the goal posts' for the evaluation of landcare, including:

- the substantial increase in resources from NHT/ NAP post-1995 that have been delivered through landcare
- the increased sophistication of community landcare, particularly as a result of the development of networks of groups
- the state-wide and regional strategic coordination of landcare investments and activity in Victoria
- the passage of time (more than 20 years) that has enabled the tracking of outcomes from action.

Peter Cullen, John Williams and Allan Curtis (Cullen et al. 2003) attempted to respond to the challenge of demonstrating links between landcare activity and improvements in resource condition for Landcare Australia in their report on landcare farming. Their view was that this test should only be applied to sub-catchments where there had been substantial investments over timeframes sufficient to lead to improvements or at least amelioration in the rate of decline in resource condition. Key findings from the Cullen et al (2003) report are discussed later.

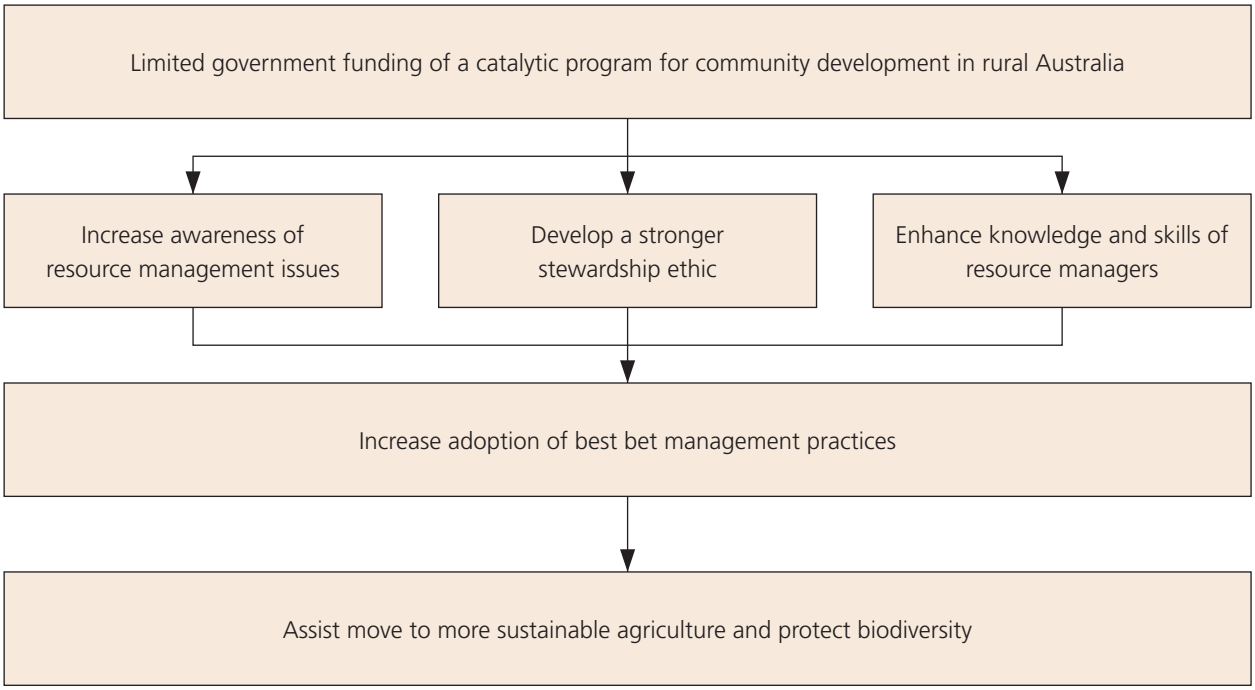
However, it is important to highlight the extent that their task was hindered by the fact that there has been very limited benchmarking of resource condition against which to evaluate the impacts of investment in voluntary action. This has been acknowledged by governments, and reflected in the establishment of the Land and Water Audit(s). More recently, the Commonwealth Environment Research Facilities (CERF) program funded a research hub (Landscape Logic) comprising Victorian and Tasmanian agencies and universities to examine assumed links between CBP and resource condition.

In the next section we use the program logic articulated above [Figures 1 and 2] to structure our synthesis of available data to present what we see as a compelling case for the value of voluntary approaches to NRM.

Background

Figure 1

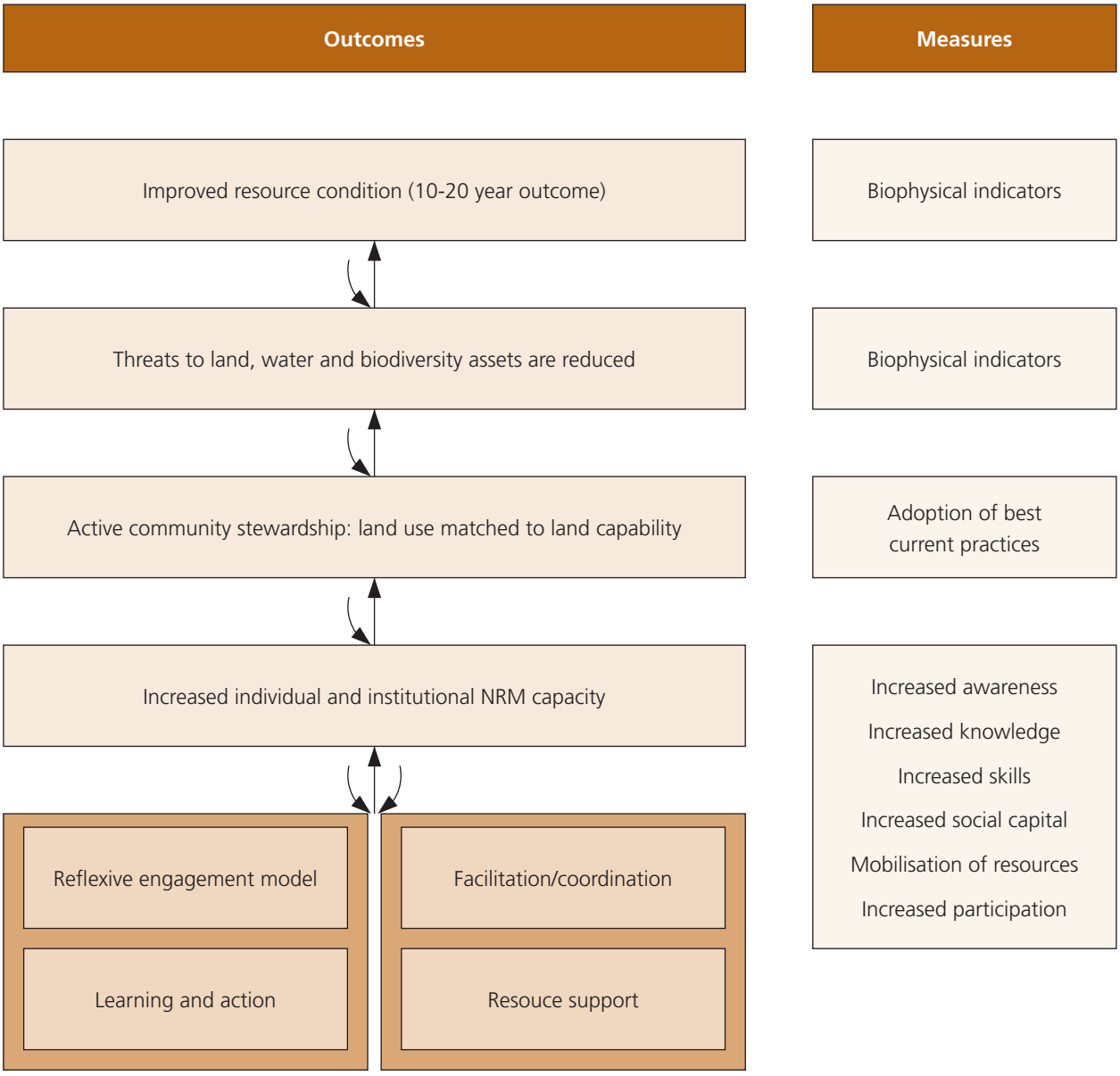
Model of the program logic for community landcare in Australia up to 2000



From Curtis and De Lacy, 1996b

Figure 2

Model of the program logic for community-based NRM in Australia, post 2000



Landcare Outcomes

Increased NRM capacity

Participation is an important step in the process that leads to learning and action

While there are differences between the characteristics of participants and non-participants, Landcare has successfully mobilised a wide cross-section of the rural population to address land and water degradation issues. There are now around 4,500 Landcare groups involving around 37 percent of the broadacre and dairy farming community across Australia (ABARE 2003). Surveys in Victoria, Tasmania and South Australia suggest that there is a Landcare participant in almost half the rural households in areas where a group operates (Curtis and De Lacy 1996b). Australia-wide surveys reveal a mean group membership of 29 people (Curtis and De Lacy 1996b), suggesting that at any one time, Landcare has around 120,000 members. Engagement of rural landholders through landcare has clearly moved beyond the small 'expert farmer' group of up to 15 percent of landholders engaged by traditional one-to-one extension programs. Landcare groups have also been successful in engaging members of the wider public in their activities, including onground work. Australia-wide surveys suggest that in excess of 100,000 non-members are engaged in landcare group activities each year (Curtis and De Lacy 1996b).

There were 721 landcare-type groups operating at the time of the most recent state-wide survey of groups (Curtis and Cooke 2006). As noted earlier, there were 23,220 group members and an additional 30,282 volunteers engaged in landcare group activities. Almost all groups reported new recruits in the past year, with the rate of recruitment at 12 percent of membership. Where groups operated in rural areas, landholders from 41 percent of properties were group members. The extent of landcare-participant engagement varies, but about a third of these participants attend all or most group activities and a further third attend about half of all activities (Curtis and Van Nouhuys 1999).

There is also evidence that Victorian landcare groups have adopted inclusive approaches to membership recruitment (Curtis and Cooke 2006) in that they have been successful in engaging women and non-farmers. Women comprise around 30 percent of all landcare participants and have taken on leadership roles in many groups. Landcare participation has been a positive experience for most female participants (Curtis et al. 1997). Data from the 2004 survey showed that 40 percent of all members were non-farmers.

Research investigating membership of catchment management organisations suggests that Landcare participants are making important contributions to the decisions of these groups. This research also indicates that Landcare is bringing 'new blood' into NRM fora, in that Landcare members participating in these regional planning processes were less likely than other appointees to have been members of previous advisory boards (Curtis et al. 1995).

There is strong evidence that **participation is a precursor to the accomplishment of NRM outcomes**. For example:

- There is a significant positive relationship between the proportion of landholders in a district who are in Landcare, and the amount of onground work accomplished by groups (Curtis et al. 2000).
- Groups with larger memberships accomplish more onground work (Curtis and Cooke 2006).
- Groups with a higher proportion of members participating accomplish more onground work (Curtis and De Lacy 1996b; Curtis and Cooke 2006).
- Landcare members with higher levels of participation in their group's activities accomplish more onground work on their properties (Curtis and De Lacy 1996b).
- Landcare members have significantly higher levels of adoption of sustainable farming practices than non-Landcare members (Curtis and De Lacy 1996a; Mues et al. 1998; Alexander et al. 2000; ABARE 2003; Scarlett Consulting 2005) [see below].

- Landholders in districts where there is a landcare group have significantly higher levels of adoption of sustainable farming practices than those in areas without a landcare group (Curtis and De Lacy 1996a).
- When market-based instruments have included a payment to landcare groups where aggregate targets have been met, higher levels of participation in program activities has occurred than would be expected under individual-based approaches (Proctor et. al. 2007).

Increased awareness, skills and knowledge

There is very **strong evidence that landcare participation leads to significantly higher levels of awareness and concern** about a range of land and water degradation issues (Curtis and De Lacy 1996a). For example, landcare participants in north-eastern Victoria are significantly more likely to be aware of dryland salinity, soil acidity, tree decline, and soil compaction. Landcare participants are also more concerned about the economic, social and environmental impact of land and water degradation issues (Curtis and De Lacy 1996a). At the same time, all landholders in landcare areas are significantly more likely to report awareness of the less obvious issues such as dryland salinity, soil acidity and soil compaction than those respondents from non-landcare areas that had similar land and water degradation issues (Curtis and De Lacy 1996a).

Recent research in two large catchments in Victoria (Wimmera and Goulburn Broken) suggests that **landcare group activity has increased awareness of dryland salinity and contributed to action to address this issue**. Contrary to conventional wisdom, in both catchments, landholder knowledge of the extent of dryland salinity matches that of the expert maps developed by state agencies and consultants. There is also a significant positive relationship between increased awareness of dryland salinity and adoption of sustainable farming practices. For example, those who report dryland salinity on their property are 3.4 times more likely to plant trees than those landholders the expert maps suggested were unaware of dryland salinity on their property (Curtis et al. 2003).

Landcare participants report significantly higher levels of knowledge of land and water degradation processes and sustainable farming practices recommended to mitigate or prevent these issues (Curtis and De Lacy 1996a; Curtis and Byron 2002). For example, landcare participants in north-eastern Victoria are significantly more likely to report on or know about:

- high or very high knowledge of processes leading to soil erosion
- processes leading to soil acidification
- the impact of tree removal on water tables
- how to collect samples for soil tests
- how to develop property management plans using land classes
- how to establish perennial pastures (Curtis and De Lacy 1996a).

Research by ABARE suggests that up to 75 percent of broadacre and dairy farmers use landcare groups as a source of farm management information (Mues et al.1998). **Non-landcare participants also rate Landcare highly as having an important impact on their knowledge** of land and water degradation processes and more sustainable farming practices. For example, 36 percent of non-participants rate Landcare as having a high or very high impact (Curtis and De Lacy 1996a).

Landcare accommodates a range of learning styles, including 'learning by doing' that embraces adaptive management, where participants set out to learn by reflecting on their actions (Allan and Curtis 2008). The Bass Coast Landcare Network provides an important illustration of the outcomes of this adaptive approach. Members of this network have developed locally

Landcare Outcomes

appropriate recommended practices for riparian vegetation management. Beginning with narrow fence-line plantings of 2–3 metres that include a small number of native species, the network has refined its best-practice recommendations to the extent that they now advocate 15–80 metre corridors that connect with existing remnants and use local provenance species (ground cover, shrubs and trees) that replicate the local vegetation community (Paul Spears, Bass Coast Landcare Network, pers. comm. 2008).

Opportunities for learning that lead to onground outcomes

Landcare participation is motivated by a desire to address important land and water degradation issues, to learn about sustainable farming, and to gain greater social interaction (Curtis and Van Nouhuys 1999).

Groups are typically involved in a **variety of activities facilitating learning**, including onground work, such as:

- meetings held to discuss issues, identify priorities, liaise with agency staff, prepare funding submissions and debate resource management issues
- workshops conducted to develop property and catchment plans and enhance management and planning skills
- field days, farm walks and demonstration sites to identify and refine best practices
- education and promotional activities such as tours, conferences, workshops, newsletters and field guides to facilitate dialogue and information exchange
- onground actions such as tree planting and seed collection, building salinity and erosion control structures, pest plant and animal control, and erecting fencing to manage stock and feral animal access to habitats
- monitoring changes in the physical environment (Curtis and Cooke 2006).

In 2004, of the 721 Victorian Landcare groups:

- 46 percent conducted field days or farm walks
- 25 percent had active demonstration sites or trial plots
- 45 percent were involved in developing or updating a catchment or group area plan
- 53 percent were involved in monitoring changes in the physical environment (Curtis and Cooke 2006).

There is strong evidence that **participation in these activities is a precursor to the accomplishment of NRM outcomes**. For example:

- Groups involved in field days and demonstration sites undertake significantly higher amounts of onground work related to tree planting, fencing to manage stock access to waterways, and pest animal and weed control (Curtis and De Lacy 1996b; Curtis 1999).
- Landcare members are significantly more likely to be involved in property planning (Mues et al. 1998). Such involvement is linked to higher adoption of CBP by landholders (Curtis et al. 2008).
- A higher proportion of group members engaged in property planning is linked to groups undertaking significantly higher amounts of onground work (Curtis and De Lacy 1995).
- Groups involved in establishing annual priorities and developing catchment plans accomplish significantly higher amounts of onground work (Curtis et al. 2000; Curtis and Cooke 2006).
- Landcare members involved in field days and demonstration sites undertake significantly higher amounts of perennial pasture establishment than members who are not involved in these activities (Curtis and De Lacy 1996a).
- Landcare groups engage non-members in their activities through newsletters (Curtis 1999) and attendance at field days or demonstration sites (Alexander et al. 2000). Non-Landcare members

rate Landcare as an important source of information about sustainable farming practices and there is evidence that adoption of these practices is higher amongst non-Landcare participants in Landcare areas compared to non-Landcare areas (Curtis and De Lacy 1996a).

- Landcare participants are significantly more likely to be involved in training activities (Mues et al. 1998). In a recent study in the Wimmera region of Victoria, individuals involved in short courses relevant to property management, including those run by landcare groups, were significantly more likely to adopt seven of ten recommended sustainable farming practices. Such individuals were:
  - 1.8 times more likely to have planted trees or shrubs
  - 1.7 times more likely to have reduced machinery and stock traffic on seasonally wet soils
  - 2.2 times more likely to have fenced areas of native bush to manage stock access
  - 3.1 times more likely to have paddocks where there were records of soil test results
  - 1.7 times more likely to have paddocks where stock were watered from a trough
  - 2.2 time more likely to have cropped using minimum tillage practices
  - 2.7 times more likely to have spent time and money to control pest animals and non-crop weeds (Curtis and Byron 2002).

Participation in these activities does make a difference but is only one of the critical ingredients for achieving successful NRM outcomes. Effective group leadership, investment from government and the private sector, and support of agency extension staff and from group coordinators are also significant factors affecting the onground work accomplished by groups (Curtis and Cooke 2006).

Building social capital (linkages, norms, trust, reciprocity)

Social capital is both an important ingredient in explaining Landcare's success and an outcome of landcare group and network activities. Social capital generated by landcare is then available to contribute to the achievement of NRM and other social objectives (Sobels et al. 2001).

Much of the focus of landcare has been on learning by working with peers and in partnership with government and industry. In-depth studies of the work of groups and their networks suggest that **landcare has built social capital and that this social capital has in turn, enhanced landcare outcomes**.

For example, studies of the Holbrook, Ovens Valley and Woady Yaloak Landcare networks found that landcare had successfully established new relationships or built on existing relationships amongst neighbours, and between landholders and industry and landholders and government, and that these relationships had established or involved:

- increased levels of trust that reduced transaction costs amongst leaders, between leaders and agency staff, and between leaders and members
- enhanced communication that enabled complex and difficult issues to be explored with little conflict, and that lead to the adoption of more sustainable farming practices
- new norms of behaviour, particularly in trialling new practices, monitoring and documenting key learnings from trials, adopting more professional approaches to the management of finances, and accepting the need to demonstrate project outcomes
- reciprocal relationships where landholders, leaders and agency staff could expect support to access money or materials, labour or information (Curtis et al. 1999; Sobels et al. 2001).

Landcare Outcomes

Recent experience suggests that **landcare networks** represent another level of organisational capability that, in turn, contributes to increased social capital, organisational effectiveness and NRM outcomes (Sobels et al. 2001; Curtis and Cooke 2006). Over 70 percent of Victorian landcare groups are now part of a larger network. The experience of landcare networks such as Hindmarsh, Upper Wimmera, Bass Coast and Woady Yaloak is that these networks have greater capacity to successfully engage agencies, non-government organisations such as Greening Australia and Australian Conservation Volunteers, and large corporate investors, as is the case with the Upper Wimmera and Rio Tinto, and Bass Coast with BHP. The development of landcare networks has been an important, albeit unintended outcome of landcare participation, one that suggests landcare has the potential to operate at the landscape-scale and deliver improvements in resource condition.

Active community stewardship: land-use matched to land capability

Apart from the substantial onground work undertaken by groups (see section below), there is a large body of evidence indicating that **landcare has contributed to changes in the management practices of landholders** (Cullen et al. 2003). National surveys by ABARE (Mues et al. 1998; Alexander et al. 2000) have established that the adoption of sustainable farming practices is much higher if the landholder is a Landcare participant. For example, landcare group participants were:

- 88 percent more likely to exclude stock from agricultural areas affected by land degradation
- 77 percent more likely to undertake formal monitoring of pasture or vegetation conditions
- 30 percent more likely to protect or enhance areas of conservation value
- 20 percernt more likely to maintain vegetation along drainage lines
- 46 percent more likely to undertake other preventative or control practices (Alexander 2000).

The Ovens network in North East Victoria played a critical role in establishing and coordinating the activities of the North East Salinity Working Group (NESWG). Network members chaired the NESWG, formed much of its steering committee, helped organise salinity awareness activities and coordinated much of the survey work on private land. With strong landholder participation, salinity mapping was completed for over 10,000 hectares in the Ovens Valley.

The benefits of network activity were summed up by one participant who recounted learning about important findings from revegetation trials through participation in network activities:

'I was unaware of [trial use of saline ground water on cash crops] going on until I heard it discussed at a network meeting. Did you know that we've had that revegetation trial at Springhurst for nearly twelve years and we are finding that some salinity levels are now lowering? We wouldn't have known that if some groups were just out there in isolation, doing their own thing without the interchange of ideas. That was happening for many years.' [Landcare coordinator] (Curtis et al. 1999)

There is also evidence that landholders in districts where there is a landcare group have significantly higher levels of adoption of sustainable farming practices than those in areas without a landcare group. For example, all landholders in landcare areas in north-eastern Victoria are significantly more likely to establish perennial pastures, plant trees, undertake soil tests, apply lime to combat soil acidity; and erect fencing to control stock access to sensitive areas, than those in similar areas without a landcare group (Curtis and De Lacy 1996a).

Resources mobilised, action beyond the property scale and assets protected

In 2004, 45 percent of Victorian Landcare groups had, or were developing, a documented catchment plan that linked individual property management plans to protect important catchment assets or address key issues (Curtis and Cooke 2006). Most groups reported that they had met to establish an annual action plan that set out the group's priorities and ways to achieve them (Curtis and Cooke 2006).

The Mallee Land Stewardship Project covers 430,000 hectares in the east of the Mallee region, is linked to regional biodiversity action planning and waterways management programs, and is targeting many endangered, depleted or vulnerable Ecological Vegetation Classes (EVCs). It is coordinating threat-reduction work at a landscape scale, particularly soil erosion and salinity, working across 120 individual properties around a high priority asset – the Tyrell Basin.

This landscape-scale project is led by the Mallee CMA and jointly funded by both State and Commonwealth Governments. The project is closely linked to nine groups in the Mallee Landcare Network which serve as the main platform for engagment with the local community. Landcare group areas include Sea Lake, Waitchie, Ultima, Manangatang, Berriwillock, Mallee and Tempy. Key achievements since 2005 include:

- participants initially identifying 900 hectares of biodiversity works to undertake. This figure is remarkable given the annual target of the entire Mallee biodiversity program is 750 hectares per year
- the project area increasing from properties covering 88,000 hectares in 2005 to over 430,000 hectares in 2007, spanning around 65 percent of the Tyrell Basin/Ouyen sub-region. The project is now so large that it takes in three towns (Manangatang, Ouyen and Sea Lake)
- the project successfully engaging a significant proportion of landholders in the Tyrell Basin, who manage 75 percent of the land in this area
- over 55 percent of the Ouyen Salinity Area (which covers 235,000 hectares) is now under revised farm planning and planned actions.
- Over 110 landholders have completed an Environmental Management Action Plan (EMAP).

These planning activities are linked to significantly improved group outcomes in the amount of onground work accomplished (Curtis et al. 2000; Curtis and Cooke 2006). With input from experienced farmers, consultants, landcare coordinators and CMA and state agency technical advisors, these planning activities could be expected to ensure that work is implemented in a strategic and effective manner. Indeed, in 2004, 73 percent of Victorian groups reported they had a designated CMA contact officer and over half of all groups said that establishing the CMA had increased the support their group receives from government (Curtis and Cooke 2006).

Landcare Outcomes

With support from government and industry, **landcare groups have demonstrated a strong track record of accomplishing onground work in a cost-effective manner**. For example, during 2004, landcare groups in Victoria:

- planted 7,900 hectares to trees and shrubs (mean 16.4 hectares per group and direct seeded 950 hectares (mean 6 hectares), for a total of 8,850 hectares or 2.2 million trees or shrubs
- erected 3,100 kilometres of fencing (mean 8.6 kilometres) to prevent and repair degradation of vegetation, soil and water resources.

87 percent of all groups had also undertaken work to manage at least one of the problems of rabbits, weeds, erosion or salinity (Curtis and Cooke 2006).

The onground work of individual groups is illustrated by an example of a 'more active' group that responded to the 2004 survey [refer to the box below].

Group C
– highly active (rank 299/343)

This rural/ urban fringe group has been operating for nine years and has fifteen members, of which four are farmers. In 2004 the group erected 11 kilometres of fencing and planted seven hectares with trees or shrubs. The group also organised activities to address soil erosion, water quality and river health, salinity, rabbits, foxes and weeds. The group established three demonstration sites and held two field days and was involved in monitoring water quality and vegetation health, including the survival of plants the group had established. The group received $3,000 in cash and material from government, is part of a network, and has a designated CMA contact officer and a part-time group coordinator who works across the network (Curtis and Cooke 2006).

As explained above, the development of **landcare networks, or groups of groups**, was largely unforseen by those developing landcare programs and is one of the most substantial achievements of landcare. These networks have facilitated the emergence of more professional, strategic landcare planning and action. Recent studies confirm that groups in a network are more likely to:

- be engaged in whole-of-catchment planning
- adopt professional management approaches, including those related to the accounting of funds invested by government, the monitoring of resource condition, and documenting group decisions and project outcomes
- attract substantial amounts of funds and in-kind resources to address on-ground issues
- provide effective communication between groups and members
- offer effective leadership as they draw from a wider leadership pool and build leader competency
- undertake large-scale onground work and effect significant changes in the practices of landholders
- influence the priorities of regional catchment groups (Curtis et al. 1999; Sobels et al. 2001; Cullen et al. 2003)

Researchers investigating landcare groups and networks suggest that there are examples where **landcare activity has made a positive, impact on farm economics and resource condition** (Sobels et al. 2001; Cullen et al. 2003). Those examples where there has been an observable positive impact on resource condition are invariably where there has been a large investment of public and private resources over at least ten years, mostly in smaller catchments. Examples include the Woady Yalloak, Warrenbayne Boho, Bass Coast, Hindmarsh, Upper Wimmera and Huon Creek catchments in Victoria. In the next section we draw selectively on these case studies to substantiate the case that **landcare activity has improved resource condition on a landscape scale**.

Landcare Outcomes

Case study 1:

The Bass Coast Landcare Network's Powlett River Project has resulted in the revegetation of 500 hectares a along a 100 kilometre stretch of the Powlett River frontage (Paul Spears Bass Coast Landcare Network, pers. comm., April 2008). The Anderson Inlet, Bass Valley, French Island and Phillip Island groups have also revegetated and protected 550 hectares over a ten-year period (Moragh McKay, Bass Coast Landcare Network, pers. comm, May 2008). When combined with work that has led to the fencing of 1,200 hectares of roadside remnants, this network has conservatively protected (fenced) and restored (rehabilitated to match original ecosystem service values) 2,250 hectares, mostly high value riparian areas.

Case study 2:

As part of Project Platypus, the Upper Wimmera Landcare Network has restored the Six Mile Creek and rehabilitated Aston's Scour (a large-scale soil conservation project). In 2006-07, the network protected a 530-hectare water catchment, planted 41,000 indigenous plants and completed 1.25 kilometres of erosion control works (Upper Wimmera Landcare Network Annual Report 2006–07).

Case study 3:

The Hindmarsh Landcare Network and partners have created an uninterrupted 2,000-kilometre, more-than-40-metres-wide, corridor of indigenous vegetation from the Wimmera River to the South Australian border and from Little Desert National Park to the Big Desert. The deserts are now linked to other vegetation communities, including Glenlee Flora and Fauna Reserve and the Lake Hindmarsh Reserve. This work has involved both revegetation and the protection (fencing) and enhancement (restoration to natural ecosystem service function) of over 2,000 hectares of high value remnant vegetation. Over 500 hectares of this vegetation has been established from locally collected seed sourced from the network's seed bank (VCMM 2007).

Case study 4:

The Woady Yalloak Catchment Group comprises 220 full-time and part-time farmers and 1,000 small holders who collectively manage 120,000 hectares of rural land. Since 1993 this network has treated 165 hectares of saline-affected land by revegetating discharge and recharge sites, enhanced water quality by erecting fencing to manage stock access and then revegetating 40 kilometres of waterway banks, and enhanced biodiversity by establishing 345 hectares protected by 6.5 kilometres of fencing (Woady Yalloak Landcare Network Five-Year Action Plan 2008–12).

Landcare as a platform for leveraging investment and action

Landcare groups have now been operating in many districts for between ten and twenty years and have established themselves as credible local organisations. Landcare involvement predates NHT, NAP and state government investment, and there is strong evidence that Landcare has been an important platform for landholder involvement in these larger NRM programs. In a recent study in the Wimmera region, Landcare participants were four times more likely to be undertaking work through the NHT/ NAP and other government programs than non-Landcare participants (Curtis and Byron 2002). In an examination of three Landcare networks for this paper, two of the networks (upper Wimmera and Bass Coast) had been able to undertake sub-catchment-scale projects through significant investment from the private sector (Rio Tinto and BHP respectively) to complement government funds. Woady Yalloak Catchment Protection group has attracted external funding of $1.95 million with an additional landholder contribution of $1.96 for every external dollar secured. Evaluations of the NHT suggest that government investment through Landcare has been more than matched by community contributions (Hill 2000). Indeed, Australian Government programs have required cost share ratios, with landholder contributions from half to double the government contribution to projects.

Conclusions

In writing this paper we have drawn upon the example of community landcare to provide the value proposition for ongoing investment in voluntary approaches to achieving NRM outcomes. In doing this, we have examined the context in which Landcare emerged as a key policy instrument, articulated a contemporary program logic to describe the theory of action for community-based NRM groups in Australia, and discussed ways Landcare might appropriately be evaluated. As part of the latter discussion we agreed that the 'goal posts have been moved' and it is now reasonable to assess Landcare against the criterion of impact on resource condition. There are important caveats here, in that most groups focus on dialogue, learning and action, with limited direct investment of public resources in their activities. There is also the issue of limited monitoring of resource condition change or evaluation of the assumed links between best current practices and resource condition change. On the other hand, a quarter of Victorian Landcare groups have been operating for ten to twenty years, with many receiving substantial government funds each year. The development of networks of groups represents a step up in organisational sophistication and effectiveness. Most Victorian groups are now part of Landcare networks.

The logic of community landcare is underpinned by sound theory and empirical evidence from Australian research. Landcare has mobilised a large proportion of rural landholders and successfully engaged the wider public in group activities. Landcare engages landholders in activities where they learn with their peers, learn by doing and learn by reflecting on experience and the results of monitoring environmental condition. There is evidence that participation enhances landholder awareness, knowledge, management skills and the adoption of practices expected to lead to improved environmental condition. There is also evidence that landcare activity affects the management practices of non-members. Landcare groups operate at the scale where there are 'ties that bind' and through the rules, norms and reciprocal relationships they establish, they create social capital that enhances group outcomes, including the ability to deliver large-scale onground work in a cost-effective manner. Working through groups and networks, landholders are able to integrate property and catchment planning in ways that ensure that their activities address the causes of land degradation and the protection of high value environmental assets.

Most of the underlying NRM context we described in our introduction remains unchanged:

- NRM issues are mostly 'wicked' problems (complex, with uncertainty about causes and solutions, and with no single agency capable of effecting a solution on its own.
- Private landholders manage most of Australian land and many of our critical habitats.
- There are limited resources to protect critical assets.

In addition, about half of all Victorian rural properties are expected to change hands in the next decade as an ageing cohort of baby-boomer farmers retires. Most of the new land managers will come from outside local districts and many will not be farmers by occupation (Mendham and Curtis 2008). Landcare provides an established, effective and efficient platform for engaging these new landholders in NRM.

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