



Landholder Participation in Loddon River Health Projects

A research summary

A report to the North Central Catchment Management Authority

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Introduction

The North Central Catchment Management Authority (North Central CMA) contracted Charles Sturt University's (CSU) Institute for Land, Water and Society (ILWS) to examine landholder participation in two long-term river health protection and enhancement projects covering the entire length of the Loddon River [Figure 1]:

1. the Upper Loddon and Campaspe Priority Reaches (ULCPR) project; and
2. the Loddon Stressed River (LSR) project.

Together, these projects are referred to as the Loddon river health projects and in the rest of this summary, as the river health projects.

The Victorian Government-funded Upper Loddon and Campaspe Priority Reaches (ULCPR) project has been implemented along the upper, unregulated section of the Loddon River (70 km) from the headwaters to Cairn Curran Reservoir since 2008-09. As one of the region's most 'ecologically intact' waterways, the project aims to address the key threats of vegetation removal, habitat loss and invasive plants. The Loddon Stressed River (LSR) project is also funded by the Victorian Government and is managed by the North Central CMA. The LSR project has the broad aims of working towards a fully-fenced Loddon River; improving fish passage in the Loddon; and engaging the local community in river improvement activities.

Landholders have been engaged in these two river health projects through a variety of communication and learning tools and processes, supported by strong public contributions to the costs of implementing work to improve river health. The North Central CMA has funding to continue supporting work along the Loddon to improve river health; however, the level of funding beyond 2011/2012 is uncertain.

Discussions between North Central CMA staff and the CSU research team established three broad objectives for this evaluation:

1. Assess the effectiveness of the river health projects.
2. Identify constraints to implementation of recommended practices, which are expected to lead to improved river health outcomes, by landholders who have not been engaged in the river health projects.
3. Identify factors influencing the extent of long-term commitment by landholders to river health project outcomes.

Figure 1: Location of the North Central Catchment Management Authority region and the Loddon river health projects



Map supplied by SPAN CSU

Data collection included a survey mailed to all the 223 landholders with licensed or freehold frontage in the river health project areas. Survey respondents were asked to provide information about their management practices in the past year, the past five years and for the period of their management. The five-year period closely matches the length of time that the river health projects have been operating. The mail out process was closed with 108 useable surveys returned and a 57% response rate (after accounting for the non-useable surveys).

Data collection also included semi-structured interviews with key informants, including landholders and agency staff (a total of 30 people were interviewed). Informants were identified through discussion with North Central CMA staff to achieve a mix of participants, non-participants and Natural Resource Management Committee (NRMC) members of the North Central CMA. These informants included 15 landholders who were participants in the river health projects, five landholders who had not participated in the river health projects, and ten key stakeholders (e.g. agency staff, NRMC members).



Loddon River revegetation at Laanecoorie. Photo: R.Sample

Key findings

Background property and personal data for respondents

The focus of this research was a comparison of river health project participants and non-participants. To set the context for that comparison, it is important to provide a very brief overview of the background property and personal characteristics of all respondents [Table 1].

These data might surprise some readers, but are generally consistent with the findings from the research team's studies of river frontage landholders in Victoria and Tasmania. Most properties are relatively small (median 125 ha), almost all have river frontages (median of 1,000 m with over half (63%) managing both sides of the river, over two-thirds (74%) have a licensed Crown river frontage, just over a third irrigated last year (39%), with a variety of on-property enterprises, including livestock, some cropping, dairy, viticulture and horticulture.

Almost all respondents were men (90%) with a median age of 55 years (and 63% aged between 46 and 65 years with similar proportions older and younger). A small majority (53%) of respondents identified themselves as having a non-farmer occupation. Only 37% said the property had been previously owned operated by a family member and a substantial minority (45%) indicated that their

principal place of residence was off the property. Most of those that lived in the district where their property was located had done so for many years (median of 30 years). Most respondents (58%) don't have a family member interested in taking on the property in the future. Thirty-six per cent of respondents said they were Landcare members, and 34% said they had completed short course related to property management in the past five years. Most (64%) respondents said their property did not return a net profit (income from your property exceeded all paid expenses before tax) last financial year (2008/2009). The median profit for those that were profitable was \$15,000. At the same time, most respondents said they or their partner received a net off-property income over the same period, with the median income \$35,000.

**Table 1: Property and social information for all respondents
Loddon river health projects 2009 landholder survey (N=108)**

Property data	n	% or median
Property size	105	125 ha
Distance the Loddon River runs along/through the property (one side)	99	1,000 m
Total length of Loddon River frontage, including both sides	46	2,500 m
Have a riparian right for some part of the river frontage	86	56%
Have a Loddon River Crown Water Frontage	99	74%
Time property owned or managed by respondent	105	15 yr
Property owned or operated by others in their family	105	37%
Time property has been in their family	57	60 yr
Property is the principal place of residence	106	55%
Time respondent has lived in the local district	93	30yr
Social data	n	% or median
Age	100	55 yr
Respondents who are males	104	90%
Farmer occupation	103	47%
Grazing as the main farming enterprise	97	33%
Irrigated some part of the property last year (2009)	104	39%
Hours per week worked on farming/property related activities over the past 12 months	99	25 hr
Days that landholders worked (paid) off-property in the past 12 months	95	0 days
Member of a local Landcare group	103	36%
Prepared a property management or whole farm plan that addressed the existing situation and included future management and development plans	73	56%
Completed or updated the whole farm plan in the last five years	77	34%
Completed a short course relevant to property management past 5 years	103	34%
Respondent or their partner received a net off-property income (after expenses and before tax) last financial year (2008/2009)	96	68%
Total off-property income (before tax) for respondent or partner last financial year (2008/2009)	59	\$35,000
A net on-property profit (income exceeded all paid expenses before tax) last financial year (2008/2009)	99	36%
Total on-property profit (before tax) last financial year (2008/2009)	33	\$15,000
Family members interested in taking on the property in the future	96	42%
Agreed succession plan for the transfer of the property to the next generation	43	69%

Task 1: Assess the effectiveness of the river health projects

River health projects engage a substantial cross section of riparian landholders

By engaging 36% of the respondent landholders, the river health projects have engaged a much larger proportion of the target population than is typical of most natural resource management projects/ programs (<10%). River health project participants and non-participants are relatively similar suggesting that project staff have engaged a representative cross-section of the target population. For example, there was no difference between river health project participants and non-participants on property size, absentee ownership, enterprise mix or the proportion identifying as farmers.

River health project participants are more focussed on environmental values and less concerned about loss of autonomy

There are some significant differences between river health project participants and non-participants. Project participants managed longer stretches of river frontage and were less likely to have been involved in Landcare, have completed a short course or updated a property management plan. Participants and non-participants also differed on five of the 18 items exploring the values landholders attach to their river frontage and the single item exploring landholder stewardship values.

Interestingly, each of the values items where there was a significant difference relates to the value of river frontages for their ecological functions as opposed to more utilitarian values of frontages. In each case, participants gave a higher rating to the value statement. Consistent with these trends, participants gave a higher rating to a number of environmental issues. Participants and non-participants were also different in terms of their attitudes about the roles and responsibilities of NRM practitioners (different on four of six items). In summary, participants were less concerned about losing some of their autonomy as a result of government taking a stronger role in NRM.

River health project participation linked to desired outcomes

Analysis of survey data suggests that the river health projects had a significant impact on the achievement of key project objectives which can reasonably be expected to lead to improved resource condition outcomes.

- participants gave a significantly higher rating to three of the five items exploring landholder awareness of river health issues.
- participants reported significantly higher knowledge for 10 of the 11 topics.
- participants provided a more positive rating than non-participants for all survey items exploring confidence in recommended practices, with significantly more positive ratings for five of the eight items.
- participants are implementing recommended practices at significantly higher levels than non-participants, that the scale of implementation is beyond what might be described as symbolic, and that at least half of the work implemented has occurred since the river health projects commenced.

Overall, participants were significantly more likely to be engaged in recommended practices for 10 of 14 items (excluding willow-related items because willows are not a problem for most landholders along the Loddon) including in the median amount of work implemented that is related to:

- installation of off-stream watering points, fencing to manage stock access to the waterway, fencing land to encourage natural regeneration of native vegetation, and establishing plants along the frontage during their period of management;

- installation of off-stream watering points, fencing to manage stock access to the waterway, establishing plants along the frontage and time spent poisoning or physically removing woody weeds during the past five years; and
- time spent poisoning or physically removing woody weeds in 2009.

Table 2: Comparison of participants and non-participants: implementation of recommended practices. Loddon river health projects 2009 landholder survey, N=108

Practices undertaken during your management					
Survey items	n***	overall mean	participant mean	non-participant mean	p value
Number of off-river/ wetland stock watering points established where stock previously accessed water from the river or wetlands during your management of the property ***	67	3 points	6 points	2 points	0.0018
Distance along the river where the frontage is fenced and this allows you to manage stock access to the water way (metres)	96	1,562 m	2,481 m	1,058 m	0.0039
Number of trees/shrubs planted, including by direct seeding, along the river frontage (within 40m of each bank) during your management of the property (number of trees)	96	1,433 plants	3,601 plants	244 plants	0.0057
Area of land along the river fenced for natural regeneration of native vegetation during your management of the property (hectares)	96	197 ha	292 ha	144 ha	0.0444
Removed willows and replaced them with native vegetation during your management of the property	38	5% yes	14% yes	0% yes	0.1294
Removed willows during your management of the property	40	30% yes	43% yes	23% yes	0.2808
Placed large woody debris or snags in the water way as fish habitat	70	10% yes	15% yes	7% yes	0.1855
Practices undertaken in the last 5 years (since early 2005)					
Survey items	n	overall mean	participant mean	non-participant mean	p value
Number of trees/shrubs planted, including by direct seeding, along the river frontage (within 40m of each bank) (number of trees)	96	414 plants	1,163 plants	4 plants	0.0001
Length of fencing erected near the river to manage stock access to the water way (metres) ***	67	1,469 m	3,090 m	728 m	0.0002
Did poison or physically remove woody weeds such as gorse, blackberries or willow regrowth	64	66% yes	81% yes	55% yes	0.0595
Time spent poisoning or physically removing woody weeds such as gorse, blackberries or willow regrowth (days per year)	40	7 days	10 days	5 days	0.0041
Number of off-river/ wetland stock watering points established where stock previously accessed water from the river or wetlands during your management of the property ***	67	2 points	4 points	1 point	0.0084
Willows removed and replaced with native vegetation	39	5% yes	14% yes	0% yes	0.1228
Willows removed	36	22% yes	33% yes	17% yes	0.3974

Practices undertaken this year (2009)					
Survey items	n	overall mean	participant mean	non-participant mean	p value
Did poison or physically remove woody weeds such as gorse, blackberries or willow regrowth	66	53% yes	78% yes	36% yes	0.0011
Time spent poisoning or physically removing woody weeds such as gorse, blackberries or willow regrowth (days per year)	35	7 days	9 days	4 days	0.0514
During 2009, did stock graze any part of your river frontage for more than a week at a time? ***	66	53% yes	50% yes	54% yes	0.7931
During 2009, did stock access drinking water from any part of your river frontage for more than a week at a time? ***	66	58% yes	60% yes	57% yes	1.0000

The grey shaded survey item is so close as to be considered significant, All survey items used the Kruskal Wallis test for significant differences to 0.05 level (pink shading indicates a significant difference)

**** Statements where only responses from those landholders that were identified as having a livestock enterprise were used.*

Statistical modelling confirms that river health projects have a significant positive impact on outcomes

Statistical modelling that considered the impact of other potential influences on the achievement of river health project outcomes, confirmed the positive impact of project participation. For example, modelling established a significant positive relationship between participation in river health projects and five knowledge items:

1. How to access information about government support for landholders to better manage Crown Land river frontages
2. The role of river frontages as corridors supporting the movement of animals from one area to another
3. The contribution of floodplain wetlands towards the health of the Loddon River
4. The ability of perennial vegetation and standing stubble to improve the quality of runoff water (*All programs on river frontages*)
5. Predicted impact of climate change on river flows in the Loddon catchment (*All programs on river frontages*).

The statistical modelling also established a significant positive relationship between participation and five implementation items:

1. the number of off-stream watering points established (their management period);
2. the number of off-stream watering points established (past five years);
3. the number of trees/shrubs planted (past five years);
4. the length of fencing erected to manage stock access (past five years) (*All river frontage programs*); and
5. the time spent poisoning or physically removing woody weeds (past 12 months).

Assessment of the quality of engagement through river health projects

Project participants were very satisfied with the support provided by North Central CMA and Department of Primary Industry (DPI) staff. Almost all survey respondents provided very positive feedback for all 11 items exploring the key aspects of staff engagement, including that they were approachable and responsive, treated landholders with respect, were flexible when negotiating work, treated landholders as equal partners, provided sufficient technical advice and clearly explained future management responsibilities [Table 3].

River health project participants who were interviewed also identified areas for improvement, including the need for more follow-up from staff to reinforce the value of work undertaken and to provide advice about future management approaches, particularly as sites responded to project interventions. Some informants also thought the river health projects needed to identify and engage less willing landholders, particularly through one-on-one extension to explain the program and address landholder concerns.

**Table 3: Assessments of support provided by river health project staff
Loddon river health projects 2009 Landholder survey, N=108**

Support provided by CMA/DPI staff	n	% disagree	% not sure	% agree	% NA	mean
Staff provided sufficient technical advice for me to understand what the project involved	35	3%	3%	91%	3%	4.15
Staff showed me respect	35	3%	0%	94%	3%	4.41
Staff were approachable and responsive	35	3%	6%	89%	3%	4.21
Staff were flexible when negotiating work to be undertaken	35	6%	3%	86%	6%	4.18
I was treated as an equal partner	35	6%	6%	86%	3%	4.18
I had sufficient input into decisions about the work undertaken	35	3%	11%	83%	3%	4.15
Staff carefully negotiated the management agreement with me	35	0%	14%	77%	9%	4.16
Staff carefully explained my responsibilities for ongoing management	35	3%	9%	86%	3%	4.12
I have received sufficient technical information to carry out the work that I'm responsible for	35	11%	6%	77%	6%	4.00
Staff ensured that my ongoing management responsibilities are not going to be too onerous in terms of time or expense	35	6%	11%	77%	6%	3.97
The agreement clearly spells out my responsibilities for future work	36	3%	17%	69%	11%	3.91

Note: the means are ranked on the level of agreement with each statement by the respondents

Discussions with the NRMC and river health project staff identified the following strengths of the engagement tools and processes employed:

- engaging landholders through informal approaches to individuals;
- helping landholders gain a better understanding of the connectivity between their riparian areas and those of other landholders through the use of visual materials during site visits, including aerial photos;
- demonstrating the benefits of river health projects by way of examples of success;
- providing information and enabling debate about the nature of the projects through community meetings; and
- including credible, knowledgeable individuals with diverse farming backgrounds on the NRMC and listening to the advice and feedback they provide.

NRMC and river health project staff identified the following issues with landholder engagement:

- landholders being unclear and/or concerned about their responsibilities – particularly in relation to maintenance should floods damage fences erected;
- insufficient follow up with participating landholders;
- insufficient emphasis on building long-term commitment by undertaking community capacity building;
- some staff lacking understanding of the social drivers of practice change;
- instances of over-zealous staff who seemed insensitive to the values and needs of landholders;
- the use of coercion to obtain landholder participation (e.g. the implied threat that if landholders didn't participate in the projects that at some point in the future governments would require them to do so and at their expense);
- inconsistent use of management plans and apparent differences in the nature or content of those plans for different landholders; and
- high project staff turnover which made consistent engagement with farmers more difficult.

Reasons for non-participation in river health projects

Survey respondents identified three key explanations for non-participation:

1. not being approached;
2. not aware of the program; and
3. my frontage is in good condition and no work is needed.

Interview data confirmed that project staff had focussed on landholders who were likely to be sympathetic to project aims and had worked through existing landholder networks to identify potential project participants. So, it is likely that many landholders simply were not contacted and invited to participate. Some of the interviewees also said they didn't engage with the river health projects because they had completed the work they wanted to do on their property.

Survey and interview data suggest there is only a small proportion (<20%) of landholders who would be difficult to engage in conservation projects such as the river health projects. For example, only 10% of all respondents disagreed with the survey item exploring the extent of a stewardship ethic. This small group has a very weak commitment to environmental stewardship, is suspicious of governments and concerned about the potential loss of decision making autonomy in terms of property decision making. Many of these landholders also have strong reservations about the efficacy of some recommended practices promoted by the river health projects, including fencing river frontages to manage stock access to waterways and stream sides.

These findings suggest there is a real opportunity to engage a substantial proportion of the non-participants should the lead agencies want to extend the river health projects or implement similar projects/programs. Findings in this section provide some useful guidance about the concerns that would need to be addressed if the aim was to engage all/almost all landholders and the way to structure engagement.

Task 2: Identify constraints to implementation by landholders not in river health projects

Constraints to implementation by non-participants

The cost of materials and equipment to carry out work; drought conditions affecting the availability of water for wetlands; the impact of flood events on fences and other infrastructure; and the perception of increased risk that fires because of fuel build up behind fences were the items most frequently rated as important constraints by non-participants. Indeed, these were the only items rated as important constraints by more than half of the non-participants.

Non-participants were also more concerned about the potentially negative impacts or costs imposed by fencing out river frontages and appeared to want greater clarity about who is responsible for managing river frontages. It seems that a lack of confidence in fencing is an important influence on river health project participation.



Protective fencing near Boort. Photo: R.Sample

Factors influencing implementation by non-participants

Regression modelling demonstrated positive relationships between involvement by non-participants and widely established NRM approaches that rely on engaging and building social and human capital, including Landcare participation; property management planning; and government support of onground work on properties. Values (those attached to river frontages) and attitudes (about the roles of stakeholders, including government) also appear to be powerful influences on landholder behaviour.

The modelling findings are consistent with findings from the survey and interviews about the constraints to implementation discussed above. It is unrealistic to expect to change these more deeply ingrained personal characteristics, at least not in the short-term. However, NRM practitioners need to consider the values and attitudes of landholders when they develop engagement tools and processes.

Plans to sell or subdivide don't appear to be inhibiting the willingness of non-participants to engage in best-practice management of river frontages. This is an encouraging finding given the increased subdivision occurring and predicted in much of Victoria.



Regeneration near Newbridge. Photo: R.Sample

Task 3: Identify factors influencing long-term commitment by landholders to river health project outcomes

Most of the survey respondents with a management plan seem to have made a serious attempt to implement the work as agreed. For example,

- two-thirds said they had implemented most/all of the work agreed related to weeds, stock access and fence maintenance; and
- over half had implemented about half/most/all work as agreed for the remaining topics of manage pests animals and revegetation.

What is understood by long-term commitment?

Our key informants indicated that long-term commitment was a difficult concept for them to define. Nevertheless, it was possible to identify a set of attitudes and behaviours they recognise as demonstrating commitment by landholders, either in their conversations with landholders or when visiting a property, including:

- landholders acknowledging they are responsible for maintaining the infrastructure provided by projects;
- landholders undertaking the ongoing maintenance of infrastructure provided through the projects;
- landholders engaging in sound/appropriate land management before and after the installation of infrastructure provided by projects;
- ongoing landholder participation in NRM programs (e.g. Bush Tender); and
- landholders demonstrating that they accept the public-good value of caring for riparian areas.

Our discussions with landholders and key informants provided some additional insights into their construction of the concept of long-term commitment, including:

1. long-term for some interviewees extended beyond 10 years and both landholders and project staff mentioned 20 year time-frames.
2. some landholders emphasised the need for long-term commitment by agencies and governments, including to the cost of maintaining infrastructure, such as fences damaged by floods. Some landholders also wanted a commitment through support for one-on-one extension that would reinforce the value of volunteer contributions (e.g. through on-site visits to see work accomplished) and enable landholders to learn to better manage riparian areas.
3. an implicit understanding that scientific knowledge/understanding and community values/standards change over time and that this temporal dimension to NRM needs to be part of any concept of long-term commitment.

Building long-term commitment

Some of the key informants interviewed also talked about what was needed to help build long-term commitment amongst landholders. Three key findings were identified:

1. long-term commitment was easier to achieve by working with landholders who were already willing to engage in improved natural resource management;
2. long-term commitment was the end result of long-term engagement informed by understanding of the context in which landholders operate and individual's goals/aspirations and capacity; and
3. long-term commitment was built on the demonstration of successful program outcomes on the ground.

Building long-term commitment provides substantial challenges for NRM programs and practitioners.

In the first instance, NRM agencies will need to give considerable thought to the level and rates of implementation that is needed to achieve desired outcomes, including the level of implementation over time at property and sub-catchment scales; and the extent that objective(s) can be accomplished with willing participants, with and without extension or cost-sharing support.

Secondly, it is difficult to demonstrate success given that in many instances in NRM we don't have a clear understanding of causality and the final goal is uncertain and most likely to change over the long-term. Under these circumstances, effective/ practical NRM will almost certainly involve some "shifting of the goal posts". If that is the case, then learning becomes critical to success and extension approaches are likely to be needed to engage "willing" and "less-willing" landholders.

Thirdly, to the extent that learning is critical, agencies will need to employ highly competent extension staff, preferably with a commitment to working with landholders over a number of years. This continues to be a major challenge given the short-term nature of programs and the common practice of employing extension staff on entry-level conditions.

Most of the river health project non-participants were more production-focused when considering how they would manage their riparian areas in the future. Their responses were typically framed by stating that they had no plans to change what they were doing. Where they talked about a future vision for their sites, they tended to speak primarily about seeking increased soil and bank stability and a reduced weed burden. However, some non-participants were committed to improving both the productivity and the ecological functioning of their riparian areas.

As demonstrated above, at least 90% of the survey respondents have values that suggest it would be possible to engage them in river health projects. There is also evidence that some non-participants have not been engaged simply because they have not been approached. In other research we have identified the goal of "leaving the land in better condition" as a personal norm that almost all landholders ascribe to. While there are differences in individual interpretation of what "better condition" means, there are common threads that should guide communication and extension efforts. "Better condition" can involve improving the profitability of business enterprises, upgrading or enhancing property infrastructure or improving environmental health. It is also possible for NRM programs to establish new social norms, particularly those approaches that attempt to engage landholders in dialogue and learning, and that these norms about "what good farming" involves can be powerful influences on landholder behaviour and lead to long-term commitment to program goals.

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