Ranking and apportioning a cost-share to sub-catchment scale environmental work programs

Finlay A Martin – Lachlan Catchment Management Authority, Young, Australia

Abstract

As part of implementing environmental onground works programs in the Lachlan Catchment, a project called Boorowa River Recovery offered incentives for priority onground works in targeted sub catchments for riparian restoration and problem willow removal. Recognition of ongoing drought conditions restricting expenditure on environmental projects due to lower farm profitability saw a need to reward projects that provided greater ecosystem or environmental services to the wider community. A useful methodology was developed by the Lachlan Catchment Management Authority for prioritising projects by ranking them in order of effectiveness to meet designated targets and the level of environmental services produced. This assessment also determined the public and private cost share arrangement offered to the landholder. This contestable allocation process called the Environmental Services Ratio (ESR) used transparent and evidence based indices to compare projects. By using a matrix of available data and rapid collection of on-site data, similar projects in different parts of the sub-catchment could be compared. Better projects gained a higher ranking and a greater proportion of project funding, in line with the greater environmental services they produced, while lower ranked projects were funded at a reduced rate or rejected to enable maximum return on investment. The ESR process was well accepted by project applicants and project officers because it was transparent, resulted in improved project understanding and was able to influence better projects.

Introduction

The complex nature of natural resource management (NRM) issues present in the Murray Darling Basin (MDB) has provided many complications in providing targeted funding programs that achieve effective outcomes. The diverse and interconnected nature of soil, water and land degradation issues, like dryland salinity and habitat enhancement, has lead to a range of programs that seek to improve NRM through government and private investment of onground works.

There has been recognition that ecosystem or environmental services are an important consideration in funding these works. These services are the contribution of particular land management practices to the health and functioning of the wider catchment area (e.g. clean water, river channel stability, regulation of the hydrological cycle and carbon sequestration) (Cork, 2002).

An issue that has increased in prominence due to the extended drought is farm profitability and the reduced priority placed on environmental projects that incur large amounts of cash or in-kind expenditure by the landholder.

Past funding programs such as the National Landcare Program (NLP), relied on willing Landcare groups to apply and receive money for their priority issues. An overly bureaucratic process, this approach resulted in a scattered delivery that although equitable to all catchment landholders was found to be deficient in delivering measurable change and was administratively inefficient that ultimately lead to group burnout (DAFF, 2003).

The largest gains on maximising return on investment for NRM outcomes can be achieved by improved prioritisation of issues, and selecting targeted areas or sub-catchments so that funding isn’t wasted on less critical areas.

The Lachlan Catchment Management Authority (LCMA) through its Catchment Action Plan (CAP) developed catchment and management targets for soil, water, vegetation and community resources. This plan was the product of extensive community consultation and had substantial input from landholders, local government, government agencies, Landcare, industry groups and indigenous communities. As the funding delivery mechanism, it recognised that applications for NRM funding needed to be streamlined with proposals assessed and ranked on cost effectiveness in meeting the catchment and management targets.

One of the main benefits of this funding process was that it allowed NRM staff to meet in a ‘one on one’ situation with landholders to develop project proposals, providing a higher level of customer service than previous funding models.

In the Lachlan catchment these factors lead to the development of Flagship Projects that selected sub-catchments rather than the whole catchment to deliver on-ground works. The CAP process along with reference groups, current mapping and research programs, was able to identify the major issues and prioritise sub-catchments with targeted onground works and community engagement to achieve larger impacts than the ad-hoc scattered approach of the past. This prioritisation process requires continual reassessment to ensure the best available knowledge and data is assessed (fill knowledge gaps) to focus investment.

It was recognised that the projects that were sought, had higher ‘environmental services’ as they provided greater community benefits than those gained by the individual landholder e.g. improved biodiversity, reduced sediment inputs, lower groundwater accessions etc. It was felt that the widely accepted 50:50 cost share between the landholder and funding body needed to be adjusted in line with the environmental services that a project provided. A rapid assessment matrix was developed called Environmental Services Ratio (ESR) to estimate the services that different projects would provide. This allowed a ranking process to take place and a private/public cost-share to be allocated.

Boorowa River Recovery (BRR) was one of five original Flagship Projects that’s aim was to enhance riparian condition of the Boorowa River and Pudman Creek via incentives to landholders for fencing, revegetation, erosion control, supplying alternate stock water, improve fish passage and removal of invasive willow species. The ESR was used on this project with the aim of maximising return on investment, improving landholder understanding of NRM issues and reward landholders that undertook larger projects. Apart from onground works the project had a strong focus on community awareness and education. It involved a range of stakeholders including the Lachlan Catchment Management Authority (LCMA), Greening Australia (GA), Boorowa Regional Catchment Committee (BRCC), Transgrid and the catchments’ community.

This paper describes the project assessment and cost-share process that was delivered as part of the BRR project and discusses the factors that could influence better projects for prioritised funding in the Lachlan catchment.

Project overview

The aims of the BRR project were to engage the community and encourage co-investment in targeted works and education, to improve water quality and biodiversity in the Boorowa River and Pudman Creek catchments.

Onground works included

- fencing riparian, corridor (linking) or remnant vegetation,
- revegetating riparian or corridor areas,
- provide alternate water supply when excluding riparian areas,
- gully erosion control measures (concrete flumes, gully control structures)
- willow control measures (cut and paint method)

As major partners, GA and Lachlan CMA signed a Memorandum of Understanding that saw GA staff implement the project using Lachlan CMA incentives process. GA was also responsible for community awareness and education aspects of the project supported by the Lachlan CMA.

Project Location

The project area is 840km^2 and includes the Boorowa River (upstream of Boorowa) and Pudman Creek catchments.

The Boorowa River catchment has been extensively cleared for agriculture during the past 150 years. It is now estimated that less than 10% of the catchment remains under woodland or forest cover (Hayman, 1996 & Freudenberger et al. 2004). The impacts of this clearing are apparent across the landscape, resulting in increasing dryland salinity, gully erosion and soil acidity. Biodiversity has been hugely impacted upon, with a number of temperate grassland and grassy box woodland communities listed as endangered ecological communities under state and federal legislation. Furthermore, about 20 species of regionally declining birds are now only found infrequently in the area (Reid 1999).

The remaining vegetation continues to decline in condition due to factors such as fragmentation, isolation and natural senescence. Water quality has been severely impacted on, with the Boorowa River and Hovell's Creek ranking second in a study on the intensity of gully erosion across the Lachlan Catchment. It also ranks highly on studies into the intensity of bed & bar and streambank instability (Massey 1998).

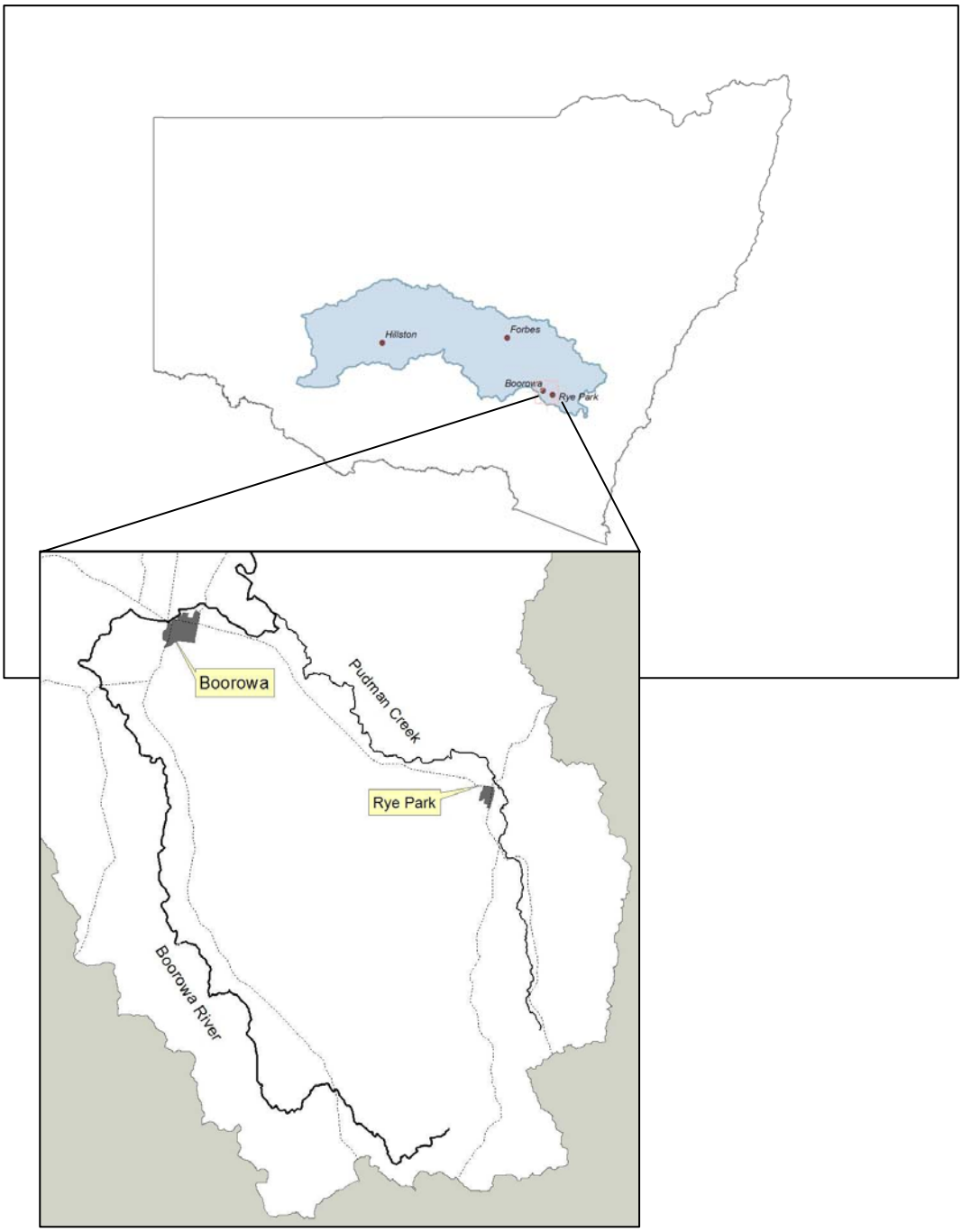


Figure 1: Boorowa River and Pudman Creek catchments – NSW

Environmental Services Ratio

The Environmental Services Ratio (ESR) allowed for on-ground projects to be prioritised against each other. The assessment process values the contribution of the project according to the environmental service it provides. i.e. the more environmental outcomes achieved the higher the ESR and funding contribution to the project.

In developing an assessment matrix to determine environmental services a few guiding principles were established.

- Clear understanding of project outcomes is required i.e. what do you want to achieve and what works do you want to fund?
- All assessment indicators must be applicable and measurable for all projects. They should be based on recognised mapping/assessments and objective where possible.
- Assessment indicators should be based on the physical attributes of the project and be weighted according to the proposed works and management that will achieve outcomes.

- Determine the minimum and maximum range of cost sharing that the funding body is prepared to fund. This range will determine the weighting of the assessment indicators.
- Weighting of indicators should be based on its importance in affecting or achieving outcomes.
- Extensive monitoring of project implementation is required to ensure cost sharing arrangements are effective.
- The more assessment indicators that can be formulated the better it assists in separating the ESR score between projects. A minimum of 12 assessment indicators should be used.

Table 1: Example of some indicators in the ESR used to determine environmental services.

Indicators		SCORE					
		Nil	**Low**	**Medium**	**High**	**Very High**	**Notes**
0.0	**GENERAL**						
0.1	**Is this a group application?**	No		Yes, 2 – 3 properties	Yes, 4-5 properties	Yes, 6+ properties	
1.0	**REGIONAL VALUE**						
1.1	**Conservation status of veg type**	Vegetation of least significance or exotic vegetation	Medium regional significance		High regional significance	Very high regional significance	*See Appendix 1.1: NPWS Database*
2.0	**LANDSCAPE VALUE**						
2.3	**Total adjacent remnant area (ha)**	<100 <20 <10 <1	100-199 20-49 10-19 1-9		200-499 50-99 20-49 10-19	500+ 100+ 50+ 20+	<30% already cleared 30-70% already cleared 71-90% already cleared >90% already cleared
3.0	**SITE VALUE**						
3.4	**Project size (ha)**	2 - 4 2 - 4 2 - 9		5 - 9 5 - 9 10 - 49	10 – 19 10 – 19 50 - 99	20+ 20+ 100+	**Revegetation** ❑ **Tablelands** ❑ **Slopes** ❑ **Plains** *See Appendix 3.4*
			2 - 4 2 – 4 2 - 9	5 – 9 5 – 9 10 - 39	10 – 19 10 – 19 40 – 59	20+ 20+ 60+	**Conservation** ❑ **Tablelands** ❑ **Slopes** ❑ **Plains** *See Appendix 3.4*
4.0	**MULTIPLE BENEFITS**						
4.4	**Proximity to known salinity site**		10km +	9 – 5km	4 – 1km	< 1km	See known Saline Sites feature class in ArcGIS9 (salt outbreaks)

Table 2: Example of the ESR calculator with selected indicators

Indicators		Weight	Score						Max Possible Score
#	Detail		Nil = 0	Low = 2	Medium = 4	High = 6	V.High = 8	Total	
0.1	Is this a group application?	**6**	1					0	48
1.1	Conservation Status of Veg Type	**5**		1				10	40
2.3	Total adjacent remnant area (ha)	**5**				1		30	40
3.1	Size	**20**				1		120	160
4.5	Proximity to known salinity site	**3**					1	24	32
							TOTAL	284	320

Incentives process

The relative small size of the sub-catchment areas allowed a more targeted approach to engage adjoining landholders.

The process for landholders to apply for funding included:

- Expression of interest;
- Site visit by a Project Officer to help develop a project plan;
- Site assessment (ESR) and baseline data acquisition for monitoring
- Submission of project plan;
- Project plan assessment based on environmental services with cost-share allocated;
- Acceptance or refusal of a management agreement with payment; and
- Monitoring and evaluation.

Expression of interest

Details of the project were explained at community meetings, in print media and through letter drops. Meetings were held with Landcare groups and Rural Fire Brigades to detail the project aims, conditions and expected outcomes. Landholders were provided with the project aims, types of works to be funded and an indicative cost share (40-90% of total budget) and a list of minimum standards. To be eligible the landholder returned the EOI form agreeing to the minimum standards e.g. revegetation greater than 2ha, riparian corridor greater than 20m width from each top bank, establish endemic trees and shrubs etc.

Project plan development

To achieve high levels of project ownership the landholders developed their own project proposals based on information provided. Assistance from the Project Officer allowed the project detail to be spatially recorded on ArcMap™ (Geographical Information System) that allowed accurate measurement of area and distances together with providing a powerful visual-planning tool. The landholders were expected to organise and coordinate the completion of works so that they were heavily involved in the project.

Site assessment

A rapid assessment (ESR) was used to compare and rank similar landholder proposals in the catchment area. This involved using indicators (criteria) to determine the environmental services that a proposal would achieve e.g. improved biodiversity, reduced sediment inputs, lower groundwater accessions etc. An example of selected indicators can be seen in Table 1. These environmental services also allowed the Lachlan CMA to determine the effectiveness of a project to meet catchment and management targets.

Upon inspecting the proposal the Project Officer determined if minimum standards had been reached and then stepped through the ESR assessment with the landholder. The ESR was able to value projects with predominantly objective measurements based on Regional scale criteria (e.g.. conservation status of vegetation community), Landscape scale criteria (e.g. width of revegetation), Site condition criteria (e.g.. species and age of existing vegetation) and multiple benefit criteria (e.g.. salinity or riparian benefits). Table 2 shows a sample of how an indicator was weighted based on parameters such as accuracy of data, ability to reach targets, value in achieving environmental services etc.

This process allowed the landholder to see what aspects of the project influenced a higher score, which lead to a better appreciation of the projects value and how a project could be improved to gain a better cost-share. By valuing the attributes and showing how each affected the final score, it provided a powerful tool in negotiation with the landholder to ‘up-size’ or to improve projects.

Submission of project plan

The project plan developed by the landholder becomes the basis of the agreement. By submitting a project plan the landholder agrees to a set of minimum standards and management conditions that the Lachlan CMA details to minimise risk of project failure.

Bid assessment based on environmental services with cost-share allocated

The ESR value became the basis of offering a sliding scale of funds to the landholder. If a project was excellent in producing environmental services and contributed considerably to catchment and management targets it would score highly, thus providing an attractive cost-share to the landholder 70-90%. On the other hand if the project were limited in providing environmental services it would score lower resulting in the landholder being offered a less attractive cost-share or being rejected if the funding round was over subscribed.

This process also provided the ability to approve good projects as they were assessed by setting a threshold ESR value. Those above the value were approved and signed up with those below pooled with an allocation taking place at the end of the funding Round. This allows workloads to be spread more evenly over the funding period improving service to the client.

Acceptance or refusal of a project plan

The landholder was offered a cost-share that they could accept or decline. Once accepted they entered into a 10-year agreement to maintain and manage the site based on Best Management Principles (BMP’s) outlined in the agreement. Fifty percent of the funded amount was given up front to the landholder with the remaining 50% paid upon completion and sign off of all works.

Monitoring and evaluation

A monitoring program was established at 20 selected sites that were paired with 20 control (untreated) sites to determine change to riparian health over time. This monitoring provides both baseline and comparative data. Indicators that were chosen include:

- Macroinvertebrates (SIGNAL2)
- Vegetation (vegetation community, vegetation structure and abundance, regeneration, habitat value, willow invasion, & land use)
- Erosion Activity (Ephemeral Drainage Line Assessment – CSIRO, 2008)
- In-stream habitat (woody debris, riffles, pools, shade and connectivity)
- Bird Populations (Canberra Ornithologists Group)
- Fish populations (Electrofishing monitoring by DPI Fisheries)
- Community attitude (changes in attitude towards the environment, ongoing site management and project operations and management)

A significant amount of data is also collected through the ESR process, which (where compatible) underpins analysis of results of the monitoring and evaluation.

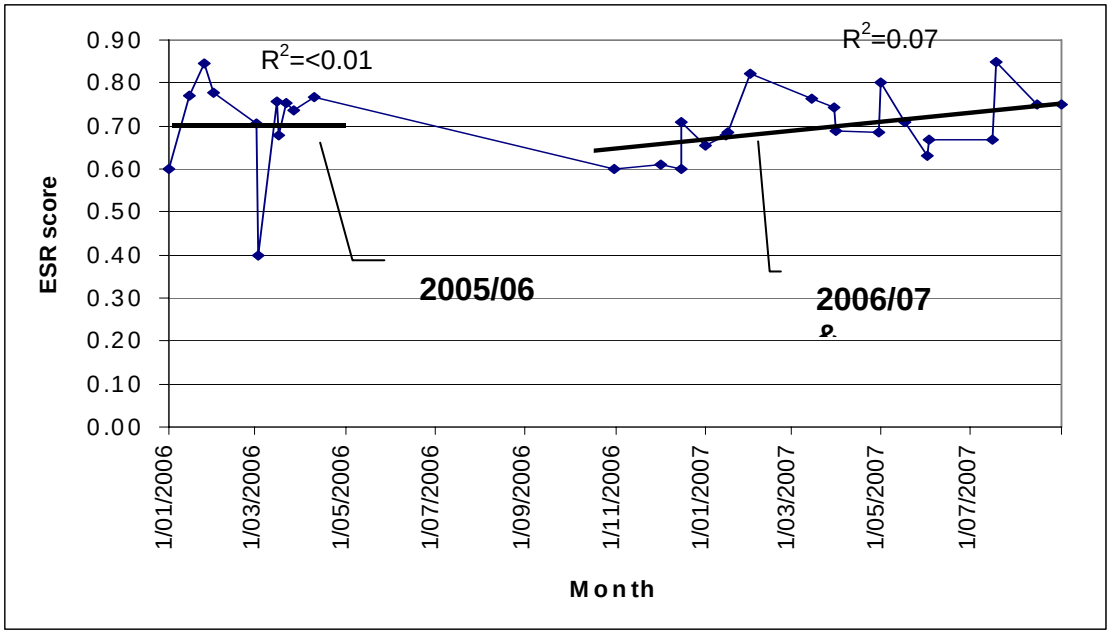
Discussion

The BRR project was a three-year project with most expenditure occurring in the 2006/07 financial year (Table 1).

The first funding period (2005/06 financial year) saw an initial ESR process trialled. Following a review of the ESR process, which found projects were not reaching targets (small size), an updated version was used to assess 2006/07 and 2007/08 applicants. This later version included less subjective and different weighting for indicators and different minimum standards set for applicants.

Table 1: Financial year breakdown of project cost and ESR scores

Financial year	Landholders	Total project cost	ESR average
2005/06	11	$160,341	0.71*
2006/07	15	$427,401	0.67
2007/08	4	$127,576	0.76



Note: An initial version of the ESR process was used in the 2005/06 financial year.

Figure 1. ESR score during the 2006/07 & 2007/08 financial years

Figure 1 shows results from the BRR project indicating an increase in ESR scores in the 2006/07 and 2007/08 financial years representing increased project value in terms of environmental services. This increase in ESR scores was mainly associated with projects becoming larger.

Figure 2 and 3 shows a definite trend of increasing project cost and size respectively as funding progressed This was attributed to many factors including landholder recognition of cost-share potential gained by achieving higher ESR scores, familiarity with project staff and confidence in the funding process.

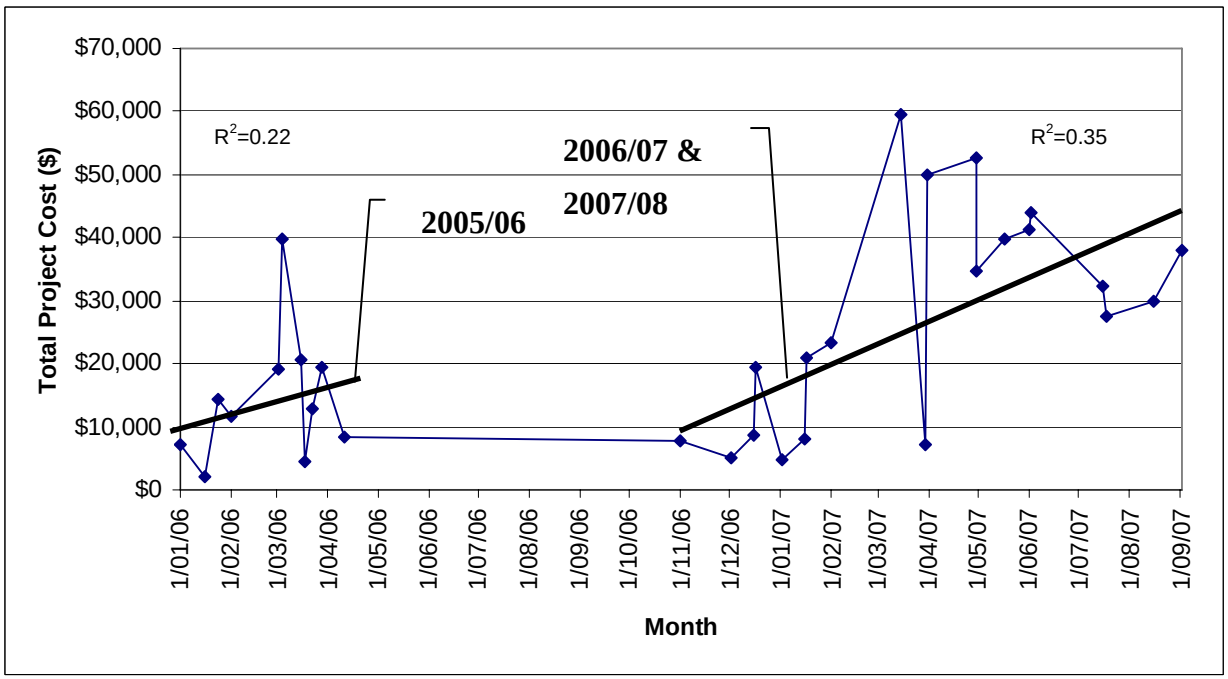


Figure 2: Total cost of projects over 2006/07 & 2007/08 financial years

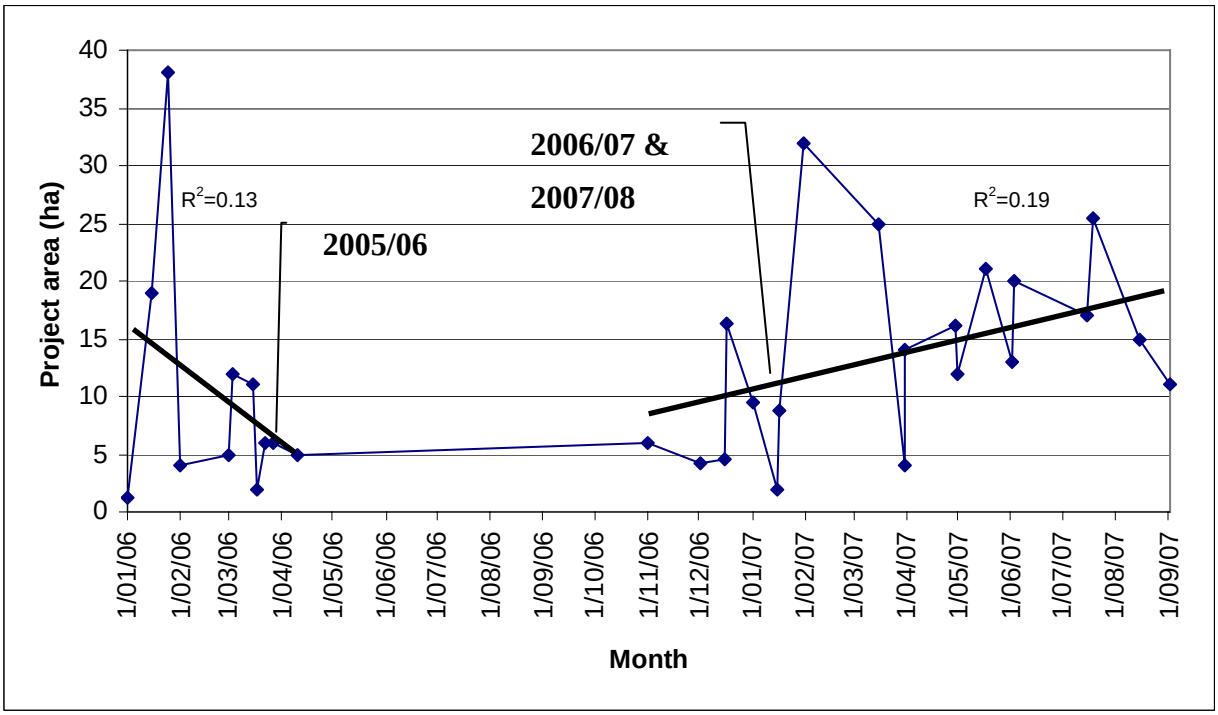


Figure 3: Size of projects over 2006/07 & 2007/08 financial years

The valuing of environmental services of a project provides a valuable tool in assessing and ranking several proposals in terms of ecosystem benefits that are produced and the value that society place on these.

Common barriers to adopt riparian best management practices include landholders financial situation, perceived production loss of fenced out land, lack of understanding of the NRM issue, unaware of its significance to underpin long-term sustainability and lack of confidence in onground works being effective.

The Boorowa River Recovery project found the ESR process useful in being able to compare like projects and the environmental services that they achieve. Other benefits were that projects generally improved over the funding period (increasing ESR score) and that projects became larger. This could be attributed to landholder and project staff understanding the benefits of key criteria and the influence that these had on the final cost-share between the Lachlan CMA and themselves. Another contributing factor may be the result of time and familiarity of the general public with the project, particularly in a small catchment. Word of mouth (a powerful communication tool) in conjunction with a strong awareness raising campaign means that there is a level of trust gained prior to site visits (particularly if a neighbour or acquaintance has had a good experience) making negotiation easier (Patmore & Davey 2004)

As drought conditions continue, financial constraints on many landholders restrict cash contributions to environmental projects. Increased cost share based on environmental services reward landholders who have maintained riparian areas in better condition and those who were willing to forgo perceived grazing potential in rehabilitating riparian lands. The transparency of the process was also an important factor. Landholders appreciated that they were involved in the assessment and that they got to participate in the paddock rather than a process behind closed doors.

By including the landholder in the planning and implementation phases of the project there was opportunity to encourage a better understanding of the complex nature of NRM issues. This input will also be a factor in how the landholder maintains ownership and responsibility of the project in future. Too many examples can be seen where projects have ultimately failed due to inappropriate management practices after the establishment phase.

It is likely that through use of the ESR process and thereby building landholder capacity and knowledge during the project planning and implementation (in addition to ongoing monitoring), projects may have a greater chance of long-term success.

Conclusion

The Environmental Services Ratio and funding process used in the Boorowa River Project allowed more detailed interaction between project officers and landholders. It clearly explained the features of a project that were important in maximising environmental services. It resulted in rewarding landholders that proposed larger projects and those that had maintained their riparian area in relatively good condition. This was one factor that achieved better projects as funding progressed.

Present knowledge gaps in NRM issues can limit the strategic prioritisation of investment. As data and knowledge gaps are filled, CMA's (and other regional NRM organisations) will be better able to prioritise particular on-ground works within and across selected sub-catchments to achieve the most cost efficient rehabilitation/enhancement projects. The ESR process provides a useful delivery mechanism to achieve this.

References

Cork, S (2002) What are ecosystem services? In *River and Riparian Lands Management Newsletter*, Land & Water Australia, Edition 21, 2002.

CSIRO (2008) *Ephemeral Stream Assessment* http://www.cse.csiro.au/research/efa/resources/EphemeralDrainageLineAssessment.pdf

Department of Agriculture, Fisheries & Forestry (2003) *Review of the National Landcare Program*, DAFF, Canberra.

Freudenberger, D., (2001). *Bush for Birds: Biodiversity Enhancement Guidelines for the Saltshaker Project*, Boorowa, NSW. Unpublished report commissioned by Greening Australia (ACT and Southeast NSW) Inc., CSIRO Sustainable Ecosystems, Canberra.

Hayman, G. (1996). Dryland salinity control in the Boorowa River catchment. *Australian Journal of Soil and Water Conservation* 9(4), 23–26.

Massey, C (1998) *An assessment of riverine corridor health in the Lachlan Catchment*, Project No. LA032194 NSW Department of Land and Water Conservation for the Lachlan Catchment Management Committee, Forbes

Patmore & Davey (2004) *Bidgee Banks, Monitoring and Evaluation in the Upper Catchment*, University of Canberra. Report to Greening Australia ACT & SE NSW and the Bidgee Banks Steering Committee, Canberra

Reid, J. W. 1999. *Threatened and declining birds in the New South Wales sheep-wheat belt: diagnosis, characteristics and management*. Report to NSW NPWS, Sydney.