

**Review of the
Murray Catchment Management Authority's
trial project –
'Control of African boxthorn within remnant
vegetation'**

A report to the Murray Catchment Management Authority

1st September 2007

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Review of the Murray Catchment Management Authority's trial project –
'Control of African boxthorn within remnant vegetation'

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Disclaimer

The views expressed in this report are solely that of the author, and do not necessarily reflect the views of Charles Sturt University, the Murray Catchment Management Authority or its staff, or any other individual or organisation consulted during this research.

Cover photos

A collection of images of African boxthorn and general rural scenes in the Murray catchment, NSW (Sue Logie & Emmo Willinck).

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**Review of the
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'Control of African boxthorn within remnant vegetation'**

1st September 2007

EXECUTIVE SUMMARY

Overview of the Project and review

The Murray Catchment Management Authority (Murray CMA) has allocated up to \$150,000 of funds and significant human resources (to date, estimated to be 30 days of staff time) to implement a 3-year trial project – '*Control of African boxthorn within remnant vegetation*'). African boxthorn (*Lycium ferocissimum*) is considered by many to be a weed threatening the health of remnant vegetation of farmland in the western area of the Murray catchment.

The Project commenced in July 2005; with the Murray CMA committing funds and staff time until June 2008. The Project has been implemented by the Murray CMA working closely with the Weed Officers of the Councils of Central Murray, Jerilderie, Wakool and Urana. In turn, the Weed Officers negotiated the removal of African boxthorn from the selected areas of remnant vegetation with 14 landholders – with the Project directly supporting the removal of African boxthorn from 1,969 hectares over 16 sites across the Murray catchment.

The Project is considered innovative by the Murray CMA in that:

- Weed Officers employed by Councils are principally responsible for working with landholders and contractors for implementation;
- landholders are selected to be involved, rather than the more common approach of a **public call for 'expressions of interest'**;
- it involves the removal of a specific woody weed in a coordinated manner;

- it focuses on improving the long-term health of native vegetation in priority sites; and
- experienced contractors are directly employed to undertake the weed control treatment.

A review of the Project was conducted during September 2006 – August 2007, with the results presented in this report.

The effective partnership established between the Murray CMA, Councils, contractors and landholders is a highlight of the Project. However, the Project has been constrained by the limited period for thorough planning of **the Project's process for identifying target landholders and sites**, its approach for implementation, and how it should be assessed.

Overall, the Project has been well-supported by a wide range of stakeholders, established effective partnerships with relevant organisations, and has made a significant contribution to the control of African boxthorn on a localised scale. It is too early to judge the medium and long-term outcomes of the Project in terms of increasing agricultural production and enhancing native biodiversity on the selected sites. However, there is an **apparent inconsistency between the Murray CMA's** investment in controlling African boxthorn and the priorities recognised in the Regional Weed Strategy. If this inconsistency can be justified, and the Murray CMA continues with its support of the Project, then follow-up investment should build on the activity already established. Integral to a continuation of the Project should be effort to improve the communication of the approach and initial results with participating and prospective landholders, and other partners.

While there are several aspects of the Project that could be improved, including refining **the Murray CMA's** strategic approach to supporting weed control, the Project has been successful in providing valuable lessons about a new model for delivering support to enhance natural resource management on private land.

Recommendations

The recommendations presented below are offered as ways for the Murray CMA to strengthen the current Project, and why and how it may enhance its capacity to develop a strategic approach to supporting the control of weeds in the Murray catchment.

Recommendation 1: Where projects are considered innovative, challenging or complex – as judged by experienced staff (such as this Project), the Murray CMA should allow a sufficient period for thorough planning and development (eg. 12 months) so that the relevant staff and partner agencies can fully develop the procedures, and organise the anticipated resources and additional support needed for the successful implementation of projects.

Recommendation 2: The Murray CMA should work with Councils to provide initial training for all contractors to ensure a high degree of competency is achieved.

Recommendation 3: The Murray CMA should clarify and document its priority and strategy for investing in the control of weeds (including declared noxious weeds) and, by implication, determine the scale of investment and approach to be used for specific weeds. This should also include an analysis of how to effectively combine voluntary incentives with regulatory requirements to optimise control of targeted weeds.

Recommendation 4: The Murray CMA should work with relevant agencies (eg. Councils, NSW DPI) to spatially reference 'high priority' weeds within the Murray catchment (distribution and level of infestation). GIS data should be at a scale to allow CMA staff and other stakeholders to identify 'high priority' weeds at a sub-catchment level (eg. Council area).

Recommendation 5: The Murray CMA should work with relevant agencies to spatially reference sites of 'high ecological value' within the catchment, using a GIS platform that will allow an overlay of 'high priority' weeds. GIS data should be at a scale to allow CMA staff and

other stakeholders to identify sites of 'high ecological value' at a sub-catchment level (eg. Council area). Furthermore, the Murray CMA should preferentially target and provide greater incentives to control priority weeds in sites of high ecological value.

Recommendation 6: The Murray CMA and Councils should develop with landholders a feasible (ie. practical and efficient) approach to monitoring the impacts of the Project on selected sites, to better assess the Project's effectiveness in the short and long-term against its objectives and CAP targets.

Recommendation 7: The Murray CMA should prepare a 'user-friendly' brochure that summarises the 'expectations and roles of partners' to accompany Agreements with landholders.

Recommendation 8: The Murray CMA should consider designing future Agreements with participating Councils and landholders where 10-15% of the Murray CMA's funds would be paid at the end of the Agreement. A final site inspection could occur to verify the contributions under the Agreement were made to a satisfactory standard, thereby encouraging the active management of the treated site for the duration of the Agreement.

Recommendation 9: If African boxthorn remains a priority weed, then the Murray CMA and Council staff should prepare a brochure that outlines the recommended control practice for African boxthorn in the catchment – for wide distribution amongst the Murray CMA, Councils and other agencies, and interested landholders.

Recommendation 10: The Murray CMA and Council staff should conduct a field day (farm walk) to explain the Project's objectives, approach and lessons (eg. the value of alternate weed control techniques), inviting participating and non-participating landholders to attend and provide input.

Recommendation 11: When regions are declared to be in 'exceptional circumstances' (based on Australian government criteria), then the CMA should consider allowing a smaller financial contribution and place greater emphasis on in-kind (ie. non-financial) options for landholders to contribute to the cost-sharing of projects.

Overview of Project

The Murray Catchment Management Authority (Murray CMA) has allocated up to \$150,000 of funds and significant human resources (to date, estimated to be 30 days of staff time) to implement a 3-year trial project – '*Control of African boxthorn within remnant vegetation*' (the Project). African boxthorn (*Lycium ferocissimum*) is considered by many stakeholders to be a weed threatening the health of remnant native vegetation on farmland in the western area of the Murray catchment [Figure 1]. The Project commenced in July 2005 and the Murray CMA has committed funds until June 2008.

The objectives for the Project are for it to:

1. protect and restore the target native vegetation communities;
2. use an approach that is consistent with best management practice for native vegetation management;
3. improve the productivity and economic returns for landholders;
4. establish a partnership between the Murray CMA, Councils and landholders that leads to the removal, and continued suppression, of African boxthorn from the Murray **CMA's East Billabong management unit**; and
5. contribute towards achieving the Murray **CMA's** Catchment Action Plan (CAP) targets.

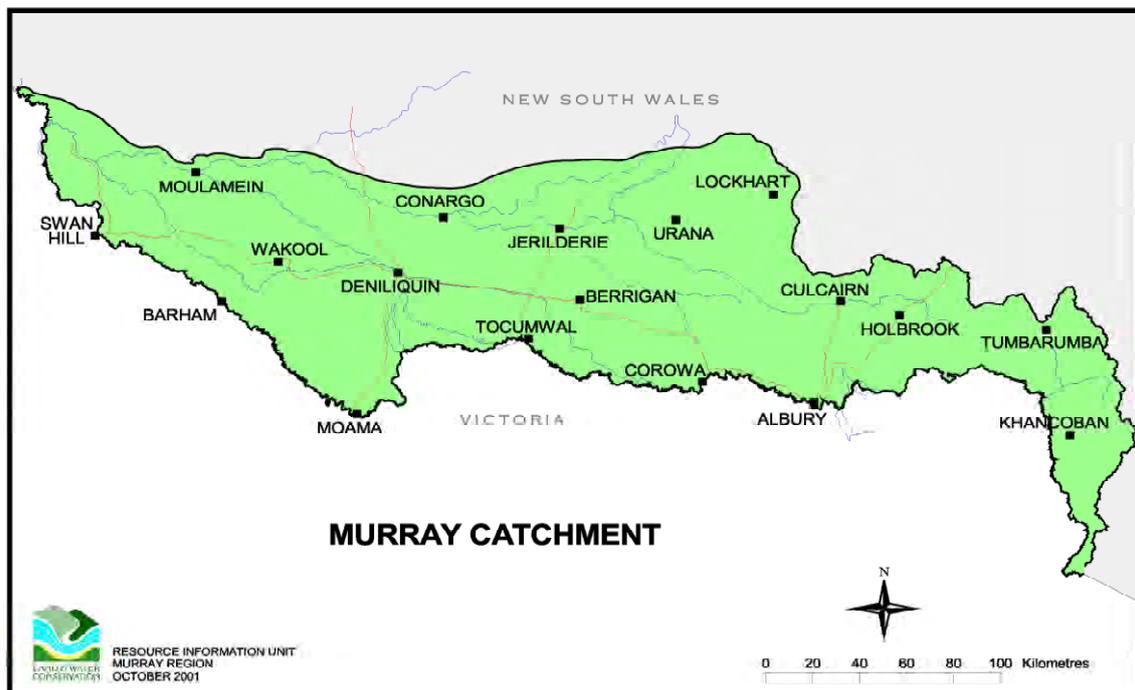
The implementation of the Project was undertaken by the Murray CMA working closely with the Weed Officers of the Councils of Central Murray, Jerilderie, Wakool and Urana. In turn, the Weed Officers negotiated with 14 landholders the area and approach for removing the African boxthorn from remnant vegetation across 16 sites (sites initially located by aerial surveillance and local knowledge of Council Weed Officers). Three contractors were employed to undertake the initial control measures (combination of mechanical and chemical weed removal). The Project has directly led to the removal of African boxthorn from 1,969 hectares across the 16 sites in the Murray catchment.

The Project is considered innovative by the Murray CMA in that:

- Weed Officers employed by Councils are principally responsible for working with landholders and contractors for implementation;
- landholders are selected to be involved, rather than the more common approach of a public call for 'expressions of interest';
- it involves the removal of a specific woody weed in a coordinated manner;
- it focuses on improving the long-term health of native vegetation in priority sites; and
- experienced contractors are directly employed to undertake the weed control treatment.

This report presents the findings and recommendations by an Evaluation team that reviewed the Project during September 2006 – August 2007.

Figure 1: Murray catchment, New South Wales



Project evaluation

Evaluation framework

A small team of staff from Charles Sturt University and the Murray CMA formed an Evaluation team (Digby Race, Emmo Willinck, Josh Ellis and Sue Logie), which undertook a review of the Project during September 2006 – August 2007. The Evaluation team framed its assessment in terms of how appropriate, effective and efficient the Project was.

Assessing the **appropriateness** of the project was done by exploring the rationale or logic of the Project – such as exploring the mix and sequence of activities, how consistent the Project is with current understanding of issues, and whether the Project complements the interests and activities of relevant stakeholders (eg. Councils, landholders). For this Project, the Evaluation team explored whether the Project was consistent with the:

- **Murray CMA's Blueprint and Catchment Action Plan (CAP);**
- Draft Regional Weed Strategy (prepared by Eastern Riverina Noxious Weeds Advisory Group, NSW Department of Primary Industries and Murray CMA);
- best management practices for weed control;
- landholder objectives; and the
- accepted logic of forming agency-landholder partnerships to improve natural resource management (NRM).

Assessing the **effectiveness** of the Project was undertaken by exploring the extent the objectives were achieved, with the objectives detailed above (p. 1).

The Evaluation team assessed the **efficiency** of the Project in terms of the extent the expenditure:

- **reflects a level and balance that is likely to achieve the Project's objectives; and**

- is consistent with the costs of meeting accepted best management practices and parallel projects undertaken by the Murray CMA, Councils and landholders.

Evaluation approach

A combination of methods was used so a meaningful, yet cost-efficient, evaluation of the Project could be undertaken. Information derived by one method was cross-referenced with information derived from other methods, ensuring the key findings are based on a robust foundation of data. The methods used by the Evaluation team included:

- semi-structured interviews with a wide range of selected stakeholders [20 people];
- workshop with selected stakeholders (eg. staff from Murray CMA and Councils) [12 people];
- review of key Murray CMA documents (eg. Murray **CMA's Blueprint** and CAP, Regional Weed Strategy) and Project files (eg. information brochures, landholder agreements, project budgets); and
- peer review of the draft evaluation report.

The stakeholders directly involved in the evaluation of the Project included:

- participating landholders (12 landholders),
- non-participating landholders (eg. neighbouring landholders with African boxthorn but not involved in the Project) (4 landholders),
- Weed Officers from participating Councils (4 officers),
- Murray CMA (5 staff),
- Eastern Riverina Noxious Weeds Advisory Group (ERNWAG) (3 members),
- Rural Land Protection Board (RLPB) (1 staff),
- contractors involved in boxthorn removal (2 contractors),
- a Murray CMA Board member (1 member), and
- the Project originator (1 staff).

Interviews were arranged and undertaken by one person from the Evaluation team, with interviews usually for a period of 30-45 minutes. A

letter was given to interviewee's to explain the purpose and scope of the interview [Appendix 1]. Most interviews were conducted in person (the preferred option), however a small number of interviews needed to be conducted via telephone or responses received via email. Handwritten notes were taken to record the key points discussed in the interviews, without **recording the interviewee's identity** – anonymity of interviewees was viewed as important for encouraging in-depth discussion. The questions used to guide the semi-structured interviews are presented in Appendices 2 and 3.

A half-day workshop was conducted amongst key staff from the Murray CMA, four Weed Officers from participating Councils, members of the ERWAG, a landholder and member of the Murray CMA Board, and a staff member from the RLPB. The workshop was facilitated by the Evaluation team, and discussion was structured around four key questions that explored **the Project's context and effectiveness, and suggestions for improvement**. The letter of invitation sent to workshop participants is presented in Appendix 4, with the workshop program presented in Appendix 5.

The Evaluation team undertook a review of key documents and Project files to enable an assessment of the:

- consistency of Project's **approach** with accepted best management practices for weed control in native vegetation, Weed Council guidelines, and the Murray **CMA's Blueprint and CAP**;
- relevance and quality of the information sent to landholders who expressed interest (eg. extent it was informative, relevant to farm plans);
- clarity and flexibility of landholder agreements (eg. what was negotiable) and the basis for determining how landholders were selected;
- components of Project expenses (eg. how was the 50:50 contribution calculated); and
- Project compared to parallel projects operated by the Murray CMA and Councils (eg. aims, activities, outcomes, budgets).

The information generated by all the assessment methods described above are integrated and presented below, and where appropriate, recommendations have been identified.

A draft of the evaluation report was circulated to all people directly involved in the review (eg. interviewees, workshop participants) for their comments in mid-June, with the evaluation report finalised in late-August 2007. While the views of a wide range of people were considered in the preparation of this report, ultimately the assessment of the Project and recommendations contained within are principally those of the Evaluation team.

The primary audiences for this report are the Murray CMA staff and Board, although it is expected that other key stakeholders of the project may also be interested (eg. participating landholders, Council Weed Officers).

Evaluation results and recommendations

Strong partnership with stakeholders

There is clear evidence that the Project developed a strong and effective partnership between the staff of the Murray CMA, the Weed Officers of the Councils of Central Murray, Jerilderie, Wakool and Urana, the contractors, and the 14 landholders directly involved. The decision to form a close working partnership with the relevant Council staff allowed the Project to benefit from the expertise and local networks of the Weed Officers, and is consistent with the Murray **CMA's** CAP. The effective partnership established between the key stakeholders is a highlight of the Project.

The short period of time for the design and initial implementation of the Project constrained the opportunity for the Murray CMA and Council staff involved to discuss the criteria for selecting landholders, to plan their works program, to estimate the time commitment required of staff for successful implementation, and for the design of an effective communication strategy and products. The limitation of this period contributed to a perception by many stakeholders that the Project was rushed, and implemented without adequate planning and preparation.

Recommendation 1: Where projects are considered innovative, challenging or complex – as judged by experienced staff (such as this Project), the Murray CMA should allow a sufficient period for thorough planning and development (eg. 12 months) so that the relevant staff and partner agencies can fully develop the procedures, and organise the anticipated resources and additional support needed for the successful implementation of projects.

Use of contractors

The Project's approach to directly engage contractors to undertake the mechanical removal and chemical treatment of African boxthorn appeared successful for most stakeholders in that it drew on the contractors'

expertise and capacity (eg. equipment, available time), and was an approach widely supported by those involved. An essential aspect of engaging contractors was their participation in some brief initial training and guidance of the Murray **CMA's and Council's expectations**.

It was reported that the contractors used weed control techniques consistent with recommended practices (Agfact P7.6.31 '*African boxthorn*', NSW DPI 2004; '*Weed information note on African boxthorn*', Victorian DPI 2004), and involved a combination of mechanical removal and chemical treatment of African boxthorn. Stakeholders reported that the Project followed the recommended practice where specific treatment was tailored to individual sites, so to minimise disturbance of native vegetation and prevent soil erosion.

Several stakeholders mentioned that there is limited understanding amongst landholders of the recommended practice for controlling African boxthorn, and that it was valuable for many of the participating landholders to see the contractors following the recommended practices. However, one landholder was not satisfied with the work of the contractor and suggested the Project could be improved, such as by "*...the sub-contractor did a bad job and we paid 50% of the cost. There should be a credit or reimbursement to us as it was a waste of time and money*". Another landholder explained the contractor "*... has left a bit of debris in the paddocks. It would have been good to be able to pick up the bush*".

Another landholder reported they were not satisfied with the weed contractor's practice, saying "*... we had a problem with a ... sub-contactor who was using the water from the creek which was dirty. I tried to convince him to use the bore water but was ignored. The result was a very poor kill. After his spraying we would have expected only 20-30% to remain but there is still 50% which is what we had after the first spray*".

Generally there was strong support amongst the participating landholders and other stakeholders for the use of contractors in the Project. Councils need to ensure that only competent contractors are employed to undertake weed control, and that some initial training should be compulsory, such as native plant identification.

Recommendation 2: The Murray CMA should work with Councils to provide initial training for all contractors to ensure a high degree of competency is achieved.

Weed priority

African boxthorn was identified by stakeholders as a common weed in areas of farmland with permanent grazing (broadacre cropping practices tend to remove most weeds), in the north and western areas of the Murray catchment (eg. north-west of Urana). However, several stakeholders expressed doubts this should be **a weed of 'high priority' for the Murray CMA**. For instance, African boxthorn was not identified during the extensive consultation with a range of stakeholders during July 2006 in the preparation of the Regional Weed Strategy for the Murray catchment (Draft Regional Weed Strategy, p.32). Also, the NSW Department of Primary Industries (DPI) does not rate it as amongst the most critical weeds for the Catchment, with a rating of Class 4 (Class 1 and 2 weeds are viewed by NSW DPI as most critical for control and eradication). As such, the selection of African boxthorn for a specific weed control project funded by the Murray **CMA does not appear consistent with the advice of the region's Weed Advisory Group or NSW DPI**.

Also, several stakeholders reported that African boxthorn is not a high priority for many landholders. Landholders reported the high cost of control and more pressing issues confronting farmers as reasons for not undertaking widespread control of African boxthorn, although its control is technically feasible. Like many investments in natural resource management, landholders vary in the priority they afford specific weeds, in part depending on their desire to enhance the production of farmland or enhance native biodiversity.

It is important to note that the Project is not exclusively focused on the control of African boxthorn throughout the Murray catchment as such, but is focused on its control in so far that it enhances native biodiversity of

selected areas. Arguably, weed priorities and strategies for enhancing biodiversity may not be identical to priorities and strategies for increasing agricultural production. The divergence between weed control for biodiversity and agriculture may explain the apparent inconsistency between this Project and the Regional Weed Strategy, **and NSW DPI's** rating.

The investment in weed control by the Murray CMA needs careful consideration, as most effective weed control strategies are likely to be expensive, and will need to be comprehensive (covering large areas) and sustained (initial and follow-up control). Some stakeholders reported that while the Project has been effective, it would need to be of a much larger scale (eg. 10-20 times the budget and number of participating landholders) and sustained for at least 10 years to have a major impact on the distribution and infestation level of African boxthorn in the Murray catchment. Several stakeholders mentioned that long-term control would also need to minimise the spread of African boxthorn from neighbouring catchments.

There is not uniform agreement of the most appropriate strategy for weed control amongst specialists. The Project targeted sites of remnant native vegetation with high infestation of African boxthorn with the aim of enhancing the native biodiversity of sites with high ecological value. However, this is counter to the advice of some Murray CMA weed specialists, who argue that control of weeds with a wide distribution has a higher cost-benefit ratio when working from sites with low infestation towards sites with high infestation.

Several stakeholders suggested the Murray CMA needs to focus its effort on weed control on sites with a high ecological value, and use an approach that is integrated and aligned with other Murray CMA investments (eg. enrichment planting with local species). It was suggested the Murray CMA could allocate funding to landholders for weed control based on a correlation with the native vegetation asset value (ie. high native vegetation asset value would correlate to a high level of support). Also, the Murray CMA could consider supporting weed control in buffer areas surrounding vegetation with a high value. Achieving greater alignment with the weed

control strategies of neighbouring CMA's (NSW and Victoria) was suggested by several stakeholders.

Also, some stakeholders reported they doubted whether the Murray CMA should be directly supporting the control of noxious weeds on private land, given the regulatory responsibility of landholders to undertake such works. However, others expressed the view that by the Murray CMA making funds available for the control of weeds – noxious or otherwise – it assists to raise awareness and encourage landholders to be actively involved in the control of selected weeds.

Recommendation 3: The Murray CMA should clarify and document its priority and strategy for investing in the control of weeds (including declared noxious weeds) and, by implication, determine the scale of investment and approach to be used for specific weeds. This should also include an analysis of how to effectively combine voluntary incentives with regulatory requirements to optimise control of targeted weeds.

Recommendation 4: The Murray CMA should work with relevant agencies (eg. Councils, NSW DPI) to spatially reference 'high priority' weeds within the Murray catchment (distribution and level of infestation). GIS data should be at a scale to allow CMA staff and other stakeholders to identify 'high priority' weeds at a sub-catchment level (eg. Council area).

The Project is consistent with the Murray CMA's CAP in that it focused on controlling a weed affecting the health of several 'under-represented' vegetation types, such as the Boree, Grassy Box and Sandhill Woodlands. Also, given the Project's focus on these vegetation types, it is logical that the Project actively works with the Councils of Central Murray, Jerilderie, Wakool and Urana.

It is understood that the Project has focused on involving landholders with high infestations of African boxthorn in, and surrounding, remnant native vegetation – the primary criterion for selecting landholders. However, the quality of information available for Murray CMA and Council staff was reported to be inadequate for readily identifying sites of high ecological value at the property scale. While it is recognised that existing property vegetation planning tools assist landholders prioritise vegetation management activities, more needs to be done so that Murray CMA and Council staff can easily identify areas for weed control.

Recommendation 5: The Murray CMA should work with relevant agencies to spatially reference sites of 'high ecological value' within the catchment, using a GIS platform that will allow an overlay of 'high priority' weeds. GIS data should be at a scale to allow CMA staff and other stakeholders to identify sites of 'high ecological value' at a sub-catchment level (eg. Council area). Furthermore, the Murray CMA should preferentially target and provide greater incentives to control priority weeds in sites of high ecological value.

Control of African boxthorn

Landholders reported African boxthorn has reduced the land available for grazing, caused stock husbandry problems, led to punctures in vehicle tyres, limited access to livestock and water points, and increased harbour for pest animals (eg. rabbits, foxes). Some landholders reported African boxthorn has been progressively spreading across their properties in recent years. **The Project improved several landholders' understanding** of effective control of African boxthorn.

Prior to the Project, most landholders reported they controlled African boxthorn using a similar approach to that used by the contractors (ie. chemical control and some mechanical removal), but it was usually on a much smaller scale, as illustrated by their comment "... ***finding the time and labour is always an issue for us, drought conditions (have meant) funds for this work have not been available***". Also, the approach used by landholders

may not have been as effective as that used by the contractors, as illustrated by the following comments: *"...it is the big ones on the levee bank and under the trees that we have not been able to get anywhere near. The excavator was great", "...it would seem that we have been doing the follow up spray at the wrong time of year. We have used all sorts of spray that have been rather expensive and not work" and "... in the past we have sprayed (not always at the right time of year) and dozed them out. The biggest problem is that after we dozed we did not do enough follow up"*.

The Project improved several landholders' understanding of effective control of African boxthorn, as illustrated by the following comments: *"... although we have a crack at them (African boxthorn) when we can we have quite often been doing it at the wrong time of year, as there always seems to be something else more important to do. We now understand that if we are not spraying at the right time of year we are wasting our time and money", and "... it did not really fit into our regular program. We are normally busy with rice at that time of year or sowing or watering when we should be spraying. The project has actually made us do it, which is good. It is not something that we do every year but we should definitely start to"*.

Another participating landholder said the Project has made their land management more enjoyable, as supported by the following comment *"... perfect ... we are only weekend farmers so it has been good to get the mechanical removal done by a contractor. Now we can just go around on our days off and do the mop up at our own leisure"*.

A large majority of participating landholders reported a high level of satisfaction with the Project in that it has removed African boxthorn from heavily infested areas, with little regrowth apparent six months after its removal (it is expected that the dry conditions during 2006-'07 has contributed in part to the lack of weed regeneration). The greatest benefit reported by participating landholders of the Project was that it controlled a major weed, and generated a range of direct and indirect benefits, such as returning land for grazing livestock, reducing harbour for rabbits, and improving the property's value. Some landholders reported the Project has given them renewed motivation to tackle a problem that was getting 'out of hand', and that it provided a major boost to their effort to remove a

problem weed ("*... we didn't have the finance or equipment to control boxthorn on this scale, so we were never really tackling main source of boxthorn*").

In most cases, it is expected that the control of African boxthorn will provide localised benefits for native biodiversity in the medium term (ie. 5 years). However, in highly degraded landscapes, CSIRO and Murray CMA ecologists reported that African boxthorn can provide important protective habitat for small native birds and other native fauna at risk of predation by foxes and cats. In such cases, the removal of African boxthorn may lower the habitat quality for native birds, and thereby lowering the biodiversity value of a site, unless weed removal is accompanied by establishing native plants with similar physical characteristics.

Recommendation 6: The Murray CMA and Councils should develop with landholders a feasible (ie. practical and efficient) approach to monitoring the impacts of the Project on selected sites, to better **assess the Project's effectiveness in the short and long-term** against its objectives and CAP targets.

The Evaluation team expects the impacts (outcomes) from the Project to vary in terms of the nature of the benefits and over time. At this stage of the Project (end of Year 2), the Evaluation team has not assessed the **likelihood of the Project's impacts in the medium or long-term**, particularly in terms of achieving the Murray CMA CAP targets. For instance, the different impacts of the Project are likely to be apparent at varying stages, such as:

- control of the selected weed may be observable within 1-2 years,
- improved grazing potential may be observable within 2-3 years,
- improved native biodiversity may be observable within 3-5 years.

Strong support for follow-up control

There was a unanimous view amongst the wide range of stakeholders interviewed that follow-up control of the areas treated by the Project is vital to ensure the control of African boxthorn in the longer term. Several landholders reported they expected to be able to control African boxthorn in 3-5 years time, as the Project has removed the most heavily infested areas **(ie. wouldn't be as demanding on labour as previously)** and they have increased their technical knowledge of effective control strategies (eg. most effective time for spraying African boxthorn).

However, a major concern expressed by many stakeholders was that landholders would not necessarily have the capacity or willingness to provide the follow-up control of African boxthorn in the areas treated by the Project – thereby jeopardising the initial impact achieved by the Project. This appears a reasonable concern given the relatively high cost of controlling African boxthorn compared to the current income generated from farming (control costs estimated to be up to \$140/ha), and that many landholders **don't view it as a high priority weed** (not those participating in the Project). Several landholders reported that weed control in general tends to be a low priority in the farm business plan (*"... if you have any money left you do it"*).

Landholders participating in the Project reported several factors that would constrain their capacity to undertake effective follow-up control of the treated sites, including an increase in summer rainfall which would stimulate excessive regrowth of African boxthorn, and that they may have insufficient time, finance and equipment – particularly if difficult climatic and financial conditions continue for landholders in the Murray catchment.

Also, some landholders mentioned that re-infestation of African boxthorn from neighbouring properties could present an ongoing challenge, as illustrated by the comments: *"... birds and foxes bringing in new seed from neighbouring properties"* and *"... our biggest problem is that the neighbouring properties have still got huge infestations, especially on the Victorian side, so we are just going to have to make sure that it is a regular thing that we do every year"*. Some suggested that the Project needed to be

applied across the whole district if to be fully effective ("*... really the whole area needs to get involved*", "*... all the neighbouring properties really need to do the same thing*").

Non-participating landholders interviewed also expressed mixed views about the likelihood that the landholders involved in the Project would be able to maintain the control of the weed. One landholder suggested it should be possible as much of the weed has (presumably) largely been removed from the treatment area, however another suggested that given 'outside' assistance (beyond the farm business) was required it was an indication that follow-up 'outside' assistance will be required again. This is an important point given farm incomes have generally been severely reduced due to the recent drought, and may take several years before farm businesses return to profitability – with relatively expensive weed control likely to be seen as an optional expense in many farm businesses in the short-term.

All stakeholders interviewed by the Evaluation team stressed it was critical for there to be coordinated on-going work to ensure re-infestation of African boxthorn does not occur in the treatment areas. While recognising the short-term benefits of controlling African boxthorn on the selected sites, the Evaluation team has concerns the medium and long-term benefits may be far more limited due to the high cost of treatment and the low priority for controlling this weed amongst many landholders.

Most participating landholders reported they regularly review the field sites where control works were undertaken, and have noted little re-growth of African boxthorn at time of interviewing (February 2007), with some spraying and grazing by livestock to control any re-growth. Also, some landholders reported they were undertaking rabbit and fox control works now the site was clear of the weed. Some areas where African boxthorn removal has occurred have been fenced from livestock to encourage regeneration of native vegetation, with other landholders reporting they have sprayed for African boxthorn re-growth. The Evaluation team suggests this approach could be problematic for the regeneration of native vegetation

if landholders are widely applying a 'knockdown' herbicide throughout the treatment area to control for African boxthorn re-growth.

Management agreement

Most participating landholders reported the management agreement (Agreement) was clear, and were happy to fit in with the advice of the weed contractors (eg. the best time for mechanical and chemical removal). Some reported the Project also linked well with other farm activities, such as revegetation. However, some landholders and other stakeholders found the Agreement inflexible and daunting, as illustrated by the following comments: "*... I found the timing of removal bureaucratic and inflexible as it forced us to do mechanical removal in the summer when we would have preferred winter. Bees are active in summer and some areas were not cleared because of hives*", "*...management agreement was pretty onerous*" and "*... management agreement was a bit daunting at first*".

Some other stakeholders indicated that a formal Agreement that was binding for five years or longer was a disincentive to engaging some landholders. It was also suggested a 'user-friendly' summary accompany future Agreements.

Recommendation 7: The Murray CMA should prepare a 'user-friendly' brochure that summarises the 'expectations and roles of partners' to accompany Agreements with landholders.

Most landholders were happy with the current approach involving a partnership between different agencies and the landholder, although some would have preferred a longer period in the Agreement for them to make their financial contribution (say 10 years, instead of 5 years).

The five-year Agreement between the Murray CMA and landholders receiving financial payments is consistent with some other Murray CMA programs (eg. management of native pastures), yet shorter than

Agreements for the management of native bushland (10 year Agreement). While some stakeholders suggested making a proportion of the Murray CMA's funds contingent upon satisfactory maintenance of the site by landholders through until the end of Year 5, this would be difficult to achieve under the Project's current Agreement – which is essentially designed to cover the contractor's and Council's expenses (largely incurred in Year 1). As such, the Murray CMA's financial contribution in the project ceases at the end of Year 3, with the landholder's contribution extended over 5 years.

Recommendation 8: The Murray CMA should consider designing future Agreements with participating Councils and landholders where 10-15% of the Murray CMA's funds would be paid at the end of the Agreement. A final site inspection could occur to verify the contributions under the Agreement were made to a satisfactory standard, thereby encouraging the active management of the treated site for the duration of the Agreement.

Other stakeholders expressed the need for the Project to be explicit in the Agreement about the need for participating landholders to undertake the follow-up control of any regrowth, including highlighting the regulatory requirement of landholders to control noxious weeds. Some stakeholders also suggested that the agencies with regulatory authority for enforcing weed control need to be closely informed of the intent and number of Agreements, so they can plan ahead for the necessary site inspections.

Project publicity

Murray CMA and Council staff produced publicity material and conducted two field days (70 attendees) to raise awareness amongst landholders in the early stages of the Project. Some stakeholders raised concerns that the initial information provided to them about the Project was not particularly clear or consistent.

Recommendation 9: If African boxthorn remains a priority weed, then the Murray CMA and Council staff should prepare a brochure that outlines the recommended control practice for African boxthorn in the catchment – for wide distribution amongst the Murray CMA, Councils and other agencies, and interested landholders.

Although some non-participating landholders reported hearing about the positive results, none had seen sites where the weed control treatment had occurred.

Recommendation 10: The Murray CMA and Council staff should conduct a field day (farm walk) to explain the Project's objectives, approach and lessons (eg. the value of alternate weed control techniques), inviting participating and non-participating landholders to attend and provide input.

Awareness of other Murray CMA projects

Most landholders mentioned they were aware of the Murray CMA's fencing incentives (for remnant vegetation, creeks and wetlands). Several also mentioned they were aware of support for constructing stock containment areas and alternative watering points. One landholder suggested the Murray CMA could become an investor in improved water efficiency on farms, such as piping for 'stock and domestic' supplies.

Another landholder reported the wide range of agencies and respective programs relating to land management remains confusing ("*...government bodies assume landholders know who they are and what they do! I find it all confusing and more effort should go into clarifying who does what*").

Project management

As discussed above, the Project appears to have been highly effective in establishing a collaborative partnership between the Murray CMA, Councils, contractors and the 14 landholders directly involved. Several stakeholders reported that the Project provided Councils with tangible support to work **with landholders to control weeds (ie. provided a 'carrot' for landholders to be involved)**, with the combination of financial support and technical advice widely considered an effective method for building a constructive partnership between agencies and landholders.

Some stakeholders reported that the Murray CMA and Councils underestimated the staff time required to identify and build a strong relationship with the landholders, negotiate and consult with the contractors, complete the reporting and other administrative tasks associated with the Project. Again, this sentiment in part reflects inadequate planning in the initial phase of the project.

Most landholders found the Project's communication and administration process straightforward, clear and efficient ("*...crystal clear, the management agreement was easy to understand*", "*...everything seems to have been well coordinated and organised*", "*...the process went very smoothly*", "*... process was very easy*", "*...it was much better than the fencing incentive*").

One participating landholder suggested there "*...should be a paddock inspection 6 months after the job to ensure the works have been successful*". In terms of enhancing the learning from this trial Project, undertaking field inspections of all sites 12-18 months after treatment, and a diverse sample of sites 3 years after treatment, is advisable (refer to Recommendation 6).

Enhancing native vegetation

It is worth noting that the participating landholders and non-participating landholders interviewed by the Evaluation team expressed similar views on criteria for enhancing native vegetation on farmland, with the key elements including:

- keeping weeds and pests under control (may include reducing the grazing by kangaroos);
- controlling livestock, usually by fencing or careful/selective grazing to control grasses;
- fencing off the creek to stop soil load and reduce pollution;
- encouraging the regeneration and supplementary planting of a diverse range of native species; and
- creating habitat for native animals (including birds).

These actions are consistent with **practices outlined in the Murray CMA's *Riverina Vegetation Guide***, and suggests that effective approaches to enhancing native vegetation is generally well understood by landholders in the Murray catchment – a positive sign for the Murray CMA.

Treatment costs

To date, the Project has spent and committed \$136,141 through until end-June 2008, which is within the \$150,000 budget initially allocated by the Murray CMA. The Councils administered the payments to the contractors, with the majority of Murray CMA funds utilised to cover the most of the costs of the contractors. Approximately 10-15% of the Murray CMA funds have been allocated to the Councils to cover the costs of their staff involvement in the Project.

The Project has involved 14 landholders in the control of African boxthorn over 1,969 hectares across 16 sites. The Murray **CMA's direct investment** in the Project equates to an average area of 120 hectares per site, at a cost of \$70 per hectare (approximate average of Murray CMA funds allocated per site = \$8,400). Given landholders are required to match the funds allocated

by the Murray CMA for the treatment of African boxthorn on their properties, the full cost of treatment undertaken through the Project is estimated to average \$130-140 per hectare over the 5-year life of the Project.

The scale of investment per site in the Project is comparable with other Murray CMA programs (eg. native vegetation management, native pasture management). Also, the Murray CMA allocated \$77,554 for the control of **other weeds (eg. St John’s Wort, Chilean Needle Grass) over 1,744 hectares** managed by the Rural Lands Protection Board and Councils in the Murray catchment during 2005-’06.

The involvement of Murray CMA staff in the Project has been estimated for each site at about 2 days of staff time (all activities required for the Project: initial consultation, planning, implementation and project review) and 750 kilometres traveled . To date, the total time of Murray CMA staff involved in the Project is estimated to be 30 days FTE, and they traveled approximately 12,000 kilometres. Most of this time allocated during the summer months for one Murray CMA staff, and during the winter-spring months for another Murray CMA staff.

Different amounts of funding were allocated to the four Councils involved in the Project, with a variation in the size of area treated for African boxthorn control. The cost of treatment varies between Councils, with this variation best explained by the cost of treatment being proportionally higher for high-infestation sites [refer to Table 1].

Table 1: Summary of treatment area and costs for four Councils
(Estimated 2005-’06 to 2007-’08)

Council	Treatment area	Treatment cost	Treatment cost/ha
Central Murray	327 ha	\$43,015	\$131/ha
Jerilderie	415 ha	\$53,966	\$130/ha
Wakool	477 ha	\$19,921	\$41/ha
Urana	750 ha	\$19,239	\$25/ha
Total	1,969 ha	\$136,141	\$70/ha

The Project files maintained by the Murray CMA provides a record of all Agreements with individual landholders, including the allocation of funds, site locations and supporting photographs – documentation viewed by the Evaluation team that provides satisfactory accountability of an investment of this nature and scale.

Most stakeholders reported the 50:50 ratio of Murray CMA funds to the **landholder's contribution is fair and necessary. However, some suggested greater flexibility should be applied in terms of when the landholder makes their contribution, particularly given the recent 'exceptional circumstances' created by the extended drought conditions and subsequent decline in farm incomes** ("*...the funding was necessary as the paddock was verging on being out of control and we are flat broke*", "*...the funding was pretty much necessary, I think the job would have been too big for us otherwise*"). Some landholders suggested being eligible to contribute their labour or machinery (ie. in-kind) towards the 50:50 cost-share of projects would be helpful, or have the ratio reduced for landholders to 25:75 cost-sharing – particularly during periods of difficult climatic and financial conditions.

Recommendation 11: When regions are declared to be in 'exceptional circumstances' (based on Australian government criteria), then the CMA should consider allowing a smaller financial contribution and place greater emphasis on in-kind (ie. non-financial) options for landholders to contribute to the cost-sharing of projects.

Conclusion

In summary, the Project has been well-supported by a wide range of stakeholders, established effective partnerships with relevant organisations, and has made a significant contribution to the control of African boxthorn on a localised scale. It is too early to judge the medium and long-term outcomes of the Project in terms of increasing agricultural production and enhancing native biodiversity on the selected sites.

The effective partnership established between the Murray CMA, Councils, contractors and landholders is a highlight of the Project. However, the Project has been constrained by the limited initial period for thorough planning of the process for identifying target landholders and sites, approach for implementation, and how it should be assessed.

Also, there is an apparent inconsistency between the Murray CMA's investment in controlling African boxthorn and the priorities recognised in the Regional Weed Strategy. The priority and strategy for controlling weeds to enhance native biodiversity may differ to priorities and strategies for weeds affecting agriculture. If this divergence can be justified, and the Murray CMA continues with its support of the Project, then follow-up investment should be made available to continue the activity and motivation already established. Integral to a continuation of the Project should be effort to improve the communication with participating and prospective landholders, and other partners.

While there are several aspects of the Project that could be improved, **including the Murray CMA's strategic approach to supporting weed control,** the Project has been successful in providing valuable lessons about a new model for delivering support to enhance natural resource management on private land.

APPENDIX 1: Letter sent to interviewees



DATE	Contact:	Sue Logie or Josh Ellis
	Phone:	
	Email:	@cma.nsw.gov.au
NAME	Our Ref:	
TITLE	Your Ref:	
ORGANISATION		
ADDRESS		
TOWN STATE POSTCODE		

Dear

Subject: Boxthorn Review - Survey

In 2006 the Murray CMA initiated an African Boxthorn (*Lycium ferocissimum*) removal trial. The trial involved the provision of incentives to assist some landholders with the removal of boxthorn in areas of high conservation value native vegetation.

We are now undertaking a review to assess the appropriateness, effectiveness and efficiency of the trial. What we learn from the trial we wish to use to inform our future business, in particular weed control programs.

Part of the review involves surveying a variety of stakeholders, including participating landholders.

We are hoping you could make yourself available to be surveyed by Sue Logie or Josh Ellis in the next few weeks. Sue or Josh will make telephone contact with you soon to discuss your availability to participate.

If you agree to being surveyed we will ensure the information you provide will remain confidential. The survey is anticipated to take 30-45 minutes. In the main you will be asked questions about what you think:

- the trial achieved
- was good about trial
- could be improved with the trial
- are good native vegetation management practices.

We would greatly value your input on this trial and hope that you can participate in this survey.

Yours sincerely,

Helen Wilson
Team Leader – Community and Implementation

APPENDIX 2: Questions for interviews with participating landholders

Questions to guide semi-structured interviews (expected 30-45 minutes duration, in-depth conversational approach) with landholders who participated in the project include:

1. What did you want to achieve by being involved in this project – and did you achieve this?
2. What were the benefits (eg. biodiversity, economic, productivity) of being involved – were any of these unexpected?
3. Was the cost share (ie. 50:50) fair and necessary (if so, why)?
4. Considering the benefits and costs, should another approach be considered?
5. To what extent was the communication and administration process for being involved in the project: clear (eg. management plan easy to understand), relevant, efficient (not too onerous)?
6. Can you suggest ways to improve the project's:
 - communication?,
 - administration process?
7. How relevant is the management agreement between yourself and the Council/CMA to your situation (eg. integrated into your farm work schedule, timely for the control of boxthorn)?
8. If you would you prefer to contribute in another way, how?
9. Before this project, how did you attempt to control boxthorn?
10. After about 12 months since the boxthorn removal, how are you managing the site (eg. fenced out remnant vegetation, crash grazing)?
11. If re-infestation of boxthorn occurs in 3-5 years time:
 - how capable will you feel in being able to control it – in terms of having the equipment, funds, time, technical knowledge?
 - what are the greatest risks or limitations you are likely to face for controlling it?
12. For you, what are the key aspects of well-managed native vegetation?
13. What other Murray CMA projects are you aware of?

APPENDIX 3: Questions for interviews with other stakeholders

Questions to guide semi-structured interviews (expected 30-45 minutes duration, in-depth conversational approach) and a group discussion with other stakeholders include:

1. Why were the participating landholders/properties selected? [directed to Council Weed Officers & CMA]
2. How effective has the project been in controlling boxthorn in the target area (what evidence do you have, have you undertaken field inspections >12 mths, heard from landholders)? [directed to all stakeholders, non-participating landholders, contractors]
3. How confident are you that the approach used by the project will be an effective long-term strategy for controlling boxthorn:
 - on the targeted properties?
 - across the wider district? [directed to all stakeholders]
4. How likely is it that landholders who participated in the project will be able to control boxthorn on their properties in the long-term (if not, what support will be needed)? [directed to all stakeholders]
5. How would you describe the effectiveness of the partnership between the CMA, Councils and landholders adopted for this project? [directed to CMA, WCP, ERWAG]
6. How could the partnership be improved? [directed to CMA, WCP, ERWAG]
7. How would you describe the approach used by the contractors (did they have the expertise, necessary equipment, were they communicative, operating on time)? [directed to CMA, WCP, ERWAG]
8. How effective was your relationship with key Council staff (eg. clear communication, adequate training, timely information, fair payments)? [directed only to contractors]
9. Overall, what evidence do you have that the project achieved gains in biodiversity and/or in productivity? [directed to all stakeholders]
10. In what ways could the project be improved? [directed to all stakeholders]
11. For you, what are the key aspects of well-managed native vegetation? [directed to all stakeholders]

Note: The above questions were adapted and made relevant to each interviewee's experience and role in the project.

APPENDIX 4: Letter of invitation sent to workshop participants



DATE 20 April, 2007	Contact:	Emmo Willinck
	Phone:	02 6051 2220
	Email:	Emmo.Willinck@cma.nsw.gov.au
NAME	Our Ref:	
TITLE	Your Ref:	
ORGANISATION		
ADDRESS		
TOWN STATE POSTCODE		

Dear

Subject: Boxthorn Review – Workshop 15 May, 2007

In 2006 the Murray CMA initiated an African Boxthorn (*Lycium ferocissimum*) removal trial. The trial involved the provision of incentives to assist some landholders with the removal of boxthorn in areas of high conservation value native vegetation.

We are now undertaking a review to assess the appropriateness, effectiveness and efficiency of the trial. What we learn from the trial we wish to use to inform our future business, in particular weed control programs.

As part of the review we are hoping you could make 15 May, 2007 available for a workshop to be conducted in the Berrigan Council Chamber Room, Berrigan. Emmo Willinck will make telephone contact with in early May to discuss his availability to participate.

The attached agenda provides more detail on the questions that will be worked through as part of the workshop.

We would greatly value your input on this trial and hope that you can participate in this workshop.

Yours sincerely,

Helen Wilson
Team Leader – Community and Implementation

All Correspondence: PO Box 835 DENILIQUIN NSW 2710
Tel: 03 5880 1400 Fax: 03 5880 1444 - Email: murray@cma.nsw.gov.au

APPENDIX 5: Workshop program

African Boxthorn Project Review Workshop

Tuesday 15th May 2007

Venue: Berrigan CMA Office (across the road from Council office)

9.45 am – 1.00 pm

Agenda

- | | |
|---------|---|
| 9:45am | Coffee/Tea |
| 10am | Welcome and Introductions
Overview of the Review of African Boxthorn Project (Emmo Willinck) |
| 10:20am | Background to the Project: Purpose, location, administration & operation (Helen Wilson) |
| 10:30am | Facilitated discussion on workshop questions (Digby Race)

Question 1: <i>How much of a problem is African boxthorn compared to other weeds in the Western Murray area (if so, in what locations & land type is it most serious)?</i> |
| 11am | Question 2: <i>How <u>appropriate</u> was the project's approach (eg. selection of landholders, use of contractors, role of Council's Weed Officer, 50:50 cost share, method of weed removal)?</i>
[Appropriateness = was the project logical, fit the local context] |
| 11:30am | Tea/coffee break [15 minutes] |
| 11:45am | Question 3: <i>How <u>effective</u> was the project's approach (eg. in terms of removing African boxthorn in short & long-term, improving biodiversity, increasing the grazing potential)?</i>
[Effectiveness = did the project meet its objectives] |
| 12:15pm | Question 4: <i>How could the project's approach be improved?</i> <ul style="list-style-type: none">• <i>Should this approach be used for controlling other weeds?</i>• <i>Should this approach be used for other Murray CMA activities?</i> |
| 12:45pm | Review process from here. Thank you (Emmo Willinck) |
| 1pm | Finish and lunch |