



Environmental Risk Science and Audit

## AUDIT REPORT

# MURRAY CATCHMENT MANAGEMENT AUTHORITY

December 2010









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## List of acronyms

ANU	Australian National University
CAP	Catchment Action Plan
CfoC	Caring for our Country
CIMS	Catchment Information Management System
CMA	Catchment Management Authority
CRM	Customer Relationship Management software
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DECCW	Department of Environment, Climate Change and Water (NSW)
ERSA	Environmental Risk Science and Audit Pty Ltd
IP	Investment Program
LCAG	Local Community Advisory Groups
LHPA	NSW Livestock Health and Pest Authorities
LWMP	Land and Water Management Plans (established under National Action Plan for Salinity and Water Quality Investment)
MAAG	Murray Aboriginal Advisory Group
MBI	Market Based Instruments
MCMA	Murray Catchment Management Authority
MDA	Murray Darling Association
MDB	Murray Darling Basin
MER	Monitoring, Evaluation, Reporting
MERI	Monitoring, Evaluation, Reporting and Improvement
MIL	Murray Irrigation Limited
NAP	National Action Plan
NRC	Natural Resources Commission
NRM	Natural Resource Management
NSW	New South Wales
PVP	Property Vegetation Plans
RAMROC	Riverina and Murray Regional Organisation of Councils
RGA	Ricegrowers' Association Environmental Champions Group
TOR	Terms of Reference
TSR	Travelling Stock Route

## Document Status

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## 1. INTRODUCTION

The Natural Resources Commission (NRC) has a statutory role to audit whether the state's thirteen Catchment Action Plans (CAPs) are being implemented effectively – that is, in a way that complies with the *Standard for Quality Natural Resource Management* (the Standard) and will help achieve the state-wide targets.

In 2008 and 2009 the NRC, and external audit contractors engaged by the NRC, audited how effectively the thirteen Catchment Management Authorities (CMAs) were implementing their regions' CAPs. The NRC's findings and recommendations from the previous Murray CMA audit are contained in the NRC's *2008 Audit Report Murray Catchment Management Authority*.<sup>1</sup>

The Murray CMA (MCMA) requested to be audited again. The NRC contracted ERSA Pty Ltd to undertake the 2010 audit of the implementation of the CAP prepared by the Murray CMA.

This draft Audit Report to the NRC contains the conclusions of the audit of the implementation of the Murray CAP and the actions that the audit team suggests that the Murray CMA Board take to improve this implementation. The full audit conclusions and suggested actions, and a summary of the CMA's response to the suggested actions, are included in Attachment 1 of this report.

The purpose of this report is to promote greater understanding of the Murray CMA's performance, and to guide the CMA Board in continued improvement. The report explains:

- the audit conclusions and their significance, and
- how ERSA used the Standard in reaching the conclusions.

The NRC will use the conclusions, along with those of other audits and additional information, to inform its reports to Government on progress in implementing CAPs and performance of the regional model.

### 1.1 Focus of the audit

Although a range of government agencies have a role in implementing CAPs, the NRC focused its first audits on the actions of the CMAs in NSW. This is because CMAs are the lead agencies responsible for implementing CAPs.

The audits focused on four lines of inquiry:

1. Is the CMA effectively prioritising its investments to promote resilient landscapes that support the values of its communities?
2. Are the CMA's vegetation projects contributing to improved landscape function?
3. Is the CMA actively engaging its communities?
4. Is the CMA effectively using adaptive management?

For each line of inquiry, the NRC required the audit team to assess not only whether the CMA is doing the activity, but whether it is doing it effectively – that is, by applying the most relevant elements of the

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<sup>1</sup> Natural Resources Commission (2008), *Audit Report Murray Catchment Management Authority*, December 2008. Available at: [www.nrc.nsw.gov.au](http://www.nrc.nsw.gov.au)

Standard and achieving the required outcomes of the Standard. The NRC believes a CMA that is doing each of these four activities in a way that reaches the quality benchmarks set by the Standard has the greatest chance of achieving multiple NRM outcomes and making the highest possible contribution towards the state-wide targets.

Finally, in pursuing each of the four lines of inquiry, the audit team was required to focus on CMA projects that use vegetation to improve landscape function. It was not practical to look at all CMA programs and projects, given the timeframe for the audits. The NRC considers that focusing on vegetation-related projects was the best option, as in general these have most potential to contribute to multiple NRM targets across more than one biophysical theme (for example, improvements in river health, soil function and native species habitat).

## 1.2 Summary of audit findings

To conduct the audit, the NRC identified what the audit team would expect to find if the CMA was doing each of the four activities listed above effectively. For each line of inquiry, the NRC identified three or four criteria they would expect the CMA to be meeting. The NRC also identified the elements of the Standard that are most relevant and important to that line of inquiry, and the CMA behaviours and other outcomes we would expect to find if the CMA is properly applying those elements of the Standard.

The audit team then assessed the CMA's performance against these expectations by interviewing a sample of CMA Board and staff members, landholders and other stakeholders; reviewing a range of CMA and public documents; and visiting projects.

Finally, the audit team identified the actions the CMA should take to improve its performance in implementing the CAP in compliance with the Standard.

The sections below summarise the audit findings for the Murray CMA, including the NRC's expectations, the audit team's assessment of Murray CMA's performance against these expectations, and the actions the audit team suggests the CMA take to improve its performance. As noted above, the full audit conclusions and suggested actions for Murray CMA are provided in Attachment 1.

### 1.2.1 Prioritising investments to promote resilient landscapes

If a CMA is effectively prioritising its investments to promote resilient landscapes that support the values of its communities, the NRC would expect to find that it has a commonly understood definition of what constitutes resilient landscapes in its region. For example, its Board members and staff would be able to consistently explain the main natural resource assets in the region, and the interactions that characterise healthy landscape function. They would know the main threats to the assets and landscape function, and the environmental, economic, social and cultural value the community places on those assets. In addition, they would also agree on the options for action and how these actions promote resilient landscapes.

The NRC would also expect to find that the CMA has a system for ranking investment options that uses a wide range of information about the assets and threats, and can identify the projects that will contribute to multiple NRM targets across more than one biophysical theme. This system would be transparent, consistent and repeatable. In addition, the NRC would expect to find that the CMA has a system to ensure its short- and long-term investments are consistent with each other and with the catchment-level targets in the CAP.

Our audit of Murray CMA's implementation of the CAP found that:

- The CMA had a commonly understood definition of what constitutes resilient landscapes in the region. The CMA had updated its understanding of resilience over time and was working on embedding 'resilience thinking' in to its business systems.
- The CMA had a clearly documented and well-defined system that ranked investment options and incorporated the best available information and multiple CAP target achievement. The Board and staff demonstrated a shared understanding of a system to rank investment options that was transparent and delivered consistency and repeatability.
- The CMA had systems that ensured short and long-term investments were consistent with each other and that these investments aligned with other planned targets.

There are no suggested actions for these criteria.

### 1.2.2 Delivering projects that contributed to improved landscape function

If a CMA is effectively delivering vegetation projects that contribute to improved landscape function, the NRC would expect its Board and staff to have a common understanding of how the short-term outcomes of its projects are expected to lead to long-term improvements in natural resource condition, and that the expected long-term outcomes are documented. The NRC would also expect to find that its projects are achieving the expected short-term outcomes, and that the CMA has a system for identifying opportunities to further leverage the experience of its project partners to add value to the initial projects.

In addition, the NRC would expect to find that the CMA is attracting additional funding and in-kind contributions to match government investments in projects, and that it has systems in place to monitor and evaluate project outcomes over time.

Our audit of Murray CMA's implementation of the CAP found that:

- The CMA had documented its long-term intended outcomes in its public documentation such as the CAP, annual reports and in its business systems. However the CMA had not documented the links from management actions through management targets to catchment targets and themes, in its project contracts.
- The CMA demonstrated a common understanding of the relationships between expected outcomes, project outputs and management actions. However interviews of CMA officers and landholders indicated that better documentation would assist staff and landholders to maintain a shared understanding of long-term objectives over time.
- The CMA had successfully achieved project outcomes, and had maximised opportunities to add further value. The CMA's projects were attracting additional resources to match CMA funding. However, the CMA had not established systems for accounting for this added value.
- The CMA had established and was implementing a comprehensive MERI framework. The CMA had a system to monitor the ongoing achievement of projects and had identified deficiencies in its monitoring at the property scale and taken action to remedy these. The CMA was monitoring project inputs and outputs through internal auditing and compliance checking and evaluating the costs of its activities.

The audit team suggests that the Murray CMA Board take a range of actions to address the issues identified by the audit and so improve the extent to which its implementation of the CAP complies with the Standard. These actions include:

- Ensuring the long-term objectives of both the CMA and the landholders are clearly documented in project contracts to facilitate long-term attention to the desired outcomes of the joint investment.
- Developing and implementing effective mechanisms to quantify, analyse and report on additional resources attracted to match CMA funds.

Improvements relating to MERI are dealt with under Line of Inquiry 4 (see Section 1.2.4).

### 1.2.3 Effectively engaging its communities

If a CMA is effectively engaging its communities, the NRC would expect it to have identified the key community groups and stakeholders it should consider in planning and undertaking its work. The NRC would expect its Board and staff to have a shared understanding of these groups, including their knowledge, capacity and values, and the socio-economic and cultural opportunities and threats they pose to the successful implementation of the CAP.

In addition, the NRC would expect the CMA to be implementing an appropriate engagement strategy for each key group in its community, which is designed to build trust in the CMA, promote two-way knowledge sharing, and ultimately achieve outcomes. The CMA would also be implementing a communication strategy that promotes collaboration, sustainable behavioural change and feedback. These strategies would be based on its knowledge of the interests, capacities and values of each group, and their communication preferences.

Our audit of Murray CMA's implementation of the CAP found that:

- The CMA Board and staff had a shared understanding of regional knowledge and community capacity and their values. The CMA had identified but had not documented the key community groups and stakeholders it must consider in planning and undertaking its work.
- The CMA Board and staff had some common understanding of cultural and socio-economic opportunities and threats to CAP implementation and improving landscape resilience, ranging from: reductions to irrigation diversions, cuts to the timber industry, and aboriginal community tensions and opportunities. The CMA had some systematic approaches in place to develop and maintain these understandings, but these were not well-linked with other information management systems within the CMA.
- The CMA had an understanding of meaningful engagement - that is, one that had built trust in the CMA and promoted two-way sharing of knowledge and the effective achievement of outcomes. Since the last NRC audit, the CMA had implemented a different set of strategies to appropriately engage different sectors of its community. However, the CMA did not have a documented overarching engagement strategy to ensure that these individual approaches continued to develop in a consistent and coordinated way.
- The CMA had continued to convene its Murray Aboriginal Advisory Group (MAAG), but some doubts were raised by CMA staff and external stakeholders about its effectiveness.
- The CMA had a sophisticated approach to communicate their messages and for hearing and responding to messages sent by their communities – that is, using a mix of direct and indirect (through the networks of their key partners) approaches to raise their profile and increase both organisational and individual understanding, capacity and willingness to participate in long-term outcomes. The CMA had implemented appropriate strategies for communication reflecting the varied values of their communities. However, the CMA did not record contact with the community, nor maintain 'customer relationship management (CRM)' software that would facilitate analysis of contact and responses.



The audit team suggests that the Murray CMA Board take a range of actions to address the issues identified by the audit and so improve the extent to which its implementation of the CAP complies with the Standard. These actions include:

- Documenting the key community groups and stakeholders to further target the CMA's activities and ensure consistency with community values.
- Continuing to develop and document an overarching strategic plan to guide engagement approaches that meaningfully engage with appropriate community groups and stakeholders to encourage effective two-way sharing of knowledge and the promotion of resilient landscapes.
- Reviewing the effectiveness of the MAAG and considering alternatives that may include appropriate use of other CMA partnerships and networks.

#### **1.2.4 Effectively using adaptive management**

If a CMA is effectively using adaptive management, the NRC would expect it to have documented how it will apply the principles of adaptive management in its planning and business systems. The NRC would expect its Board and staff to be able to explain how the CMA uses adaptive management to promote continuous learning at both an individual and institutional level. They would also be able to explain the key knowledge gaps and uncertainties related to the assets and threats in the region, and how the CMA manages these.

In addition, the NRC would expect the CMA to use monitoring and evaluation systems that test the assumptions underlying its investments in improving landscape function and resilience, and use appropriate experts to assess the planned and actual outcomes of these investments. There would also be an organisational focus on applying new knowledge (gained from monitoring and evaluation or other sources) to increase the effectiveness of investments. Finally, the NRC would expect the CMA to have and maintain information management systems that support its adaptive management processes.

Our audit of Murray CMA's implementation of the CAP found that:

- The CMA had documented adaptive management principles in key processes at the strategic level and there was a common understanding of how adaptive management principles were applied to their planning and operations. The Board and senior management had fostered a 'learning culture' and there was extensive use of both internal and external reviews and the application of feedback loops in the form of 'lessons learned' assessments. The CMA had also established an internal audit system as a key component of their adaptive management framework.
- The CMA had an understanding of and managed knowledge gaps and uncertainties. The Board had established a comprehensive risk management framework with responsibilities delegated to appropriate levels of authority.
- The CMA's programs were designed and delivered in ways that facilitated structured learning, generated new knowledge and increased the effectiveness of investment. CMA documents identified individual responsibilities for monitoring and evaluation, but the CMA had not fully developed a shared understanding with landholders of their roles in ongoing monitoring and evaluation.
- The CMA's monitoring and evaluation systems tested the assumptions about how each management action would lead to changes in landscape function. However the audit found inconsistencies across CMA projects, gaps in the collection and use of project data, and in the integration of analysis and reporting of financial and performance data.

- The CMA had established a number of relatively sophisticated information management systems to support investment decisions, reporting requirements and continual improvement, including strong spatial analysis and investment modelling capabilities that could be demonstrated in real time. CMA Board and staff agreed systems provided adequate access to accurate data. However, there was also a shared view that linkages between systems could be improved.
- The CMA planned to introduce a new integrating system, Catchment Information Management System (CIMS), and had begun training and software installation at the time of the audit.

The audit team suggests that the Murray CMA Board take a range of actions to address the issues identified by the audit and so improve the extent to which its implementation of the CAP complies with the Standard. These actions include:

- Continuing to develop the internal audit function to monitor and encourage ongoing contract compliance and property-scale monitoring.
- Ensuring plans to integrate the information management systems (through CIMS) are developed and implemented in sufficient time to support the upcoming CAP review.

### **1.3 Structure of the report**

The rest of this report explains the audit conclusions and how the audit team used the Standard in reaching those conclusions in more detail. It is structured around each of the four lines of inquiry as follows:

- Chapter 2 describes the audit team's assessment of whether the CMA is effectively prioritising its investments to promote resilient landscapes that support the values of its communities
- Chapter 3 focuses on whether the CMA's vegetation projects are contributing to improved landscape function
- Chapter 4 discusses the audit team's assessment of whether the CMA is effectively engaging its communities
- Chapter 5 looks at whether the CMA is effectively using adaptive management.

The attachments provide the full audit conclusions, suggested actions, more detailed information about the audit, and an overview of the context for the audit conclusions including a summary of the key features of the Murray region and CMA. As noted above, a summary of the CMA's response to suggested actions is provided in Attachment 1.

## 2. PRIORITISING INVESTMENTS TO PROMOTE RESILIENT LANDSCAPES

The audit's first line of inquiry was to assess whether the CMA is effectively prioritising its investments to promote resilient landscapes that support the values of its communities. This line of inquiry focused on planning – the first step in the adaptive management cycle. Its aim was to assess whether the CMA had established the knowledge, understanding, systems and procedures required to undertake this step effectively, in line with the Standard.

Although the CAP itself documents the priorities in the region, the NRC recommended approval of each CAP on the basis that the CMA would continue to improve the plan's quality and potential to contribute to the state-wide targets. Therefore, the CMA cannot simply spend its funds in line with the CAP. Rather, it needs to continue to apply the Standard in implementing the CAP. This will enable it to continually refine its investment priorities as its knowledge of the landscapes and communities in its region improves, and its understanding of best-practice NRM evolves.

The NRC identified three criteria that they would expect a CMA to meet in order to effectively prioritise its investments in compliance with the Standard. These criteria include that the CMA had:

- a commonly understood definition of what constituted resilient landscapes in its region
- a system for ranking investment options that took account of factors such as scientific and local knowledge; socio-economic information; community and investor preferences; potential for partners to contribute matching funds or in-kind support, and potential to achieve maximum outcomes, for example, by contributing to multiple NRM targets across more than one biophysical theme, and
- a system that ensured that its short- and long-term investment priorities were consistent with each other, and with the catchment-level targets in the CAP.

The NRC identified the elements of the Standard that are most relevant and important for meeting these criteria. The NRC also identified the behaviours and other outcomes they would expect the CMA to demonstrate if it is properly using these elements of the Standard, and thus meeting the criteria to a level of quality consistent with the Standard.

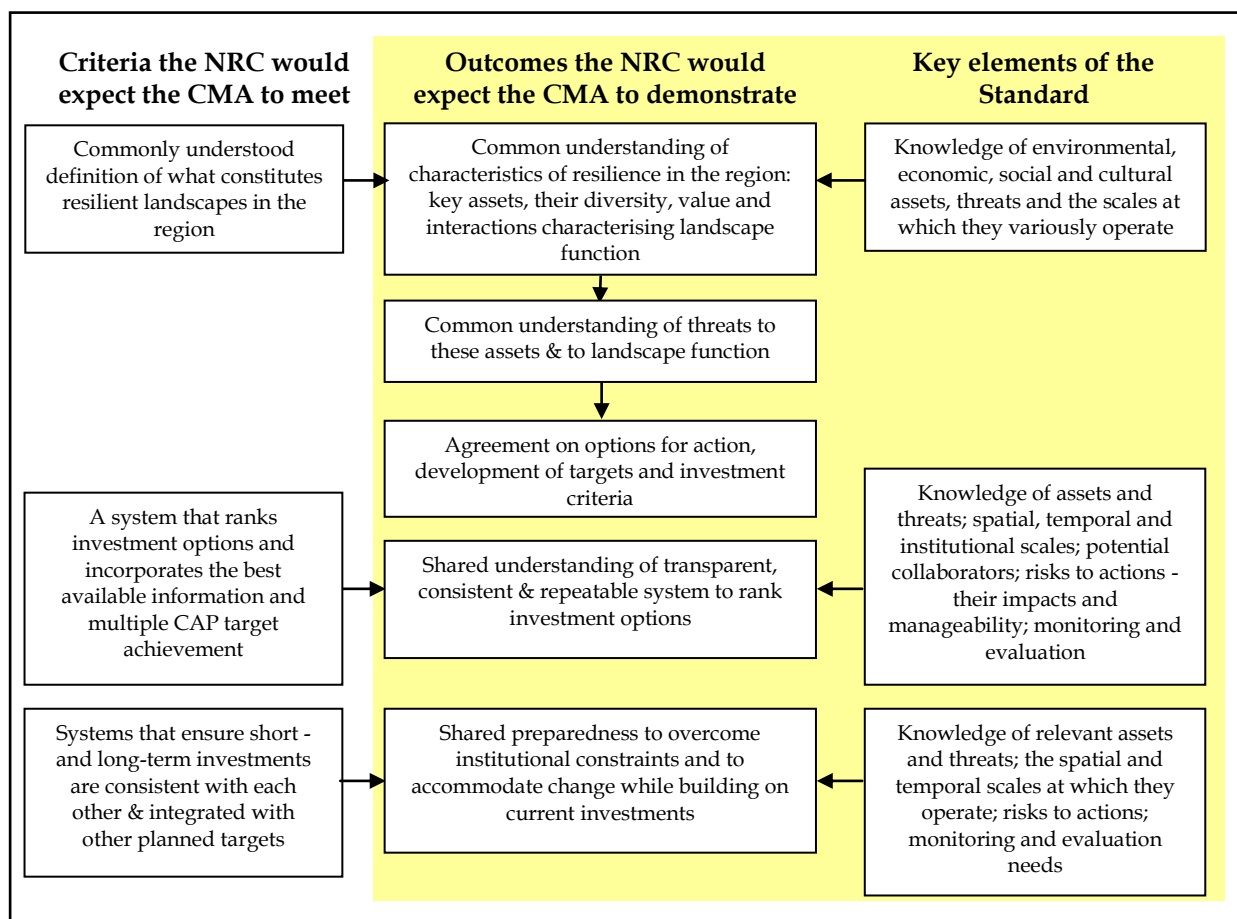
For example, if the CMA is meeting the first criterion (having a commonly understood definition of what constitutes resilient landscapes in its region) in a way that complies with the Standard, the NRC would expect it to be collecting and using the best available knowledge on the natural resource assets and threats in its region, and on the economic, social and cultural values its community places on those assets. The NRC would also expect it to be considering the scales at which the assets and threats operate, and determining the optimal scale at which to manage them to achieve multiple NRM benefits and integrated outcomes.

As a result, the NRC would expect to find that its Board members and staff can consistently explain the main natural resource assets in the region, and the interactions that characterise healthy landscape function. The NRC would also expect them to understand the main threats to the assets and landscape function, and the environmental, economic, social and cultural value the community places on the assets. In addition, they would agree on the options for action to address the threats and maintain or improve the quality of the assets, and the criteria for deciding the actions in which the CMA should invest.

Figure 2.1 provides an overview of this assessment framework. The criteria the NRC would expect the CMA to meet are shown in the left hand column, the most relevant and important elements of the Standard

for meeting these criteria are in the right hand column, and the behaviours and other outcomes the NRC would expect the CMA to demonstrate if it is using these elements of the Standard are shown in the centre column.

**Figure 2.1: The framework the audit team used to assess whether the CMA was effectively prioritising investments to promote resilient landscapes**



The sections below discuss each criterion, including why it is important and what the audit found in relation to it.

## 2.1 Commonly understood definition of resilient landscapes

NSW's aspirational goal for natural resource management is resilient landscapes – that is, “landscapes that are ecologically sustainable, function effectively and support the environmental, economic, social and cultural values of our communities”. At its simplest, a CMA's role is to coordinate investment to improve NRM across its region and deliver outcomes that make the greatest possible contribution to the achievement of this goal. To do this, the CMA must have a commonly understood definition of what constitutes resilient landscapes in its catchment – its Board and staff members need a consistent understanding of what the goal means for the particular landscapes and communities in its region.

The Audit found that the Murray CMA had a commonly understood definition of what constitutes resilient landscapes in the region. This was expressed in the Board's Strategic Plan as “Our goal is to achieve resilient landscapes and communities within the Murray catchment – that is units of land that are

ecologically sustainable, and when challenged by change or disturbance, continue to function effectively and support the environmental, social, cultural and economic values of the community.”

The CMA Board and staff had a common understanding of the characteristics of resilience in the region. This understanding included the ability of the landscape to respond to change, the importance of the adaptive capacity of the community and the close relationship of ‘resilience’ with ‘sustainability’.

Board portfolios and multidisciplinary project teams were being used to ensure that the understanding of assets and threats was shared across the CMA. A wide range of data capture projects were being undertaken to strengthen the CMA’s understanding of assets and threats.

The CMA had updated its understanding of resilience over time and had embraced the concept of ‘resilience thinking’. This approach was being developed and progressively applied across its business systems. This strengthened understanding was particularly evident in recently developed strategies and project plans such as the Biodiversity Management Plan.

In respect to the Standard, the CMA:

- demonstrated it was progressively collecting knowledge of environmental, economic, social and cultural assets and threats, and the scales at which they variously operate, to inform its understanding of landscape function (*Collection and use of knowledge, Community engagement, Determination of scale*), and
- demonstrated a shared understanding of characteristics of resilience in the region, the key assets, their diversity, value and interactions characterising landscape function (*Collection and use of knowledge, Determination of scale, Information management*).

## 2.2 A system for ranking investment options

Our knowledge of biophysical and natural systems is incomplete and evolving. People’s interactions with natural systems are also dynamic, and community values evolve over time. Because of this, CMAs need to continually seek out improvements in knowledge and adjust their focus accordingly. Their systems for ranking their investment options need to use a wide range of information – such as scientific and local information on the assets and threats in the catchment, as well as information on the values the community places on the assets, and on potential collaborators and their capacity.

In addition, CMAs have received limited government investment and have an enormous amount to achieve if we are to realise the goal of resilient landscapes. This means they need to invest these funds in ways that will make the greatest possible contribution towards as many catchment-level and state-wide targets as possible. To do this, they need a system for ranking investment options that takes account of the options’ potential to contribute to multiple targets.

The Audit found that the Murray CMA had a clearly documented and well-defined system that ranked investment options and incorporated the best available information and multiple CAP target achievement.

Following the 2008 NRC Audit the CMA restructured its prioritisation system. In the period since 2008 the prioritisation system had clearly directed investment towards achieving CAP targets. The CMA allocated funding within the Investment Program (IP) according to percentages established in the asset policy

documents. These funds were then allocated proportionally to private and public land based on an assessment of threats to key assets.

Incentives for private landholders were then delivered through 'market based instruments' (MBIs) or tenders. Public land investments were delivered predominantly through projects targeted at the preservation of selected key assets. Both delivery methods demonstrated clear linkages between targets, funding allocations and individual projects.

In 2010 the CMA assessed progress against the CAP targets. It also undertook an evaluation of its achievements under the current prioritisation system in comparison to achievements prior to 2008. This comparison demonstrated that a marked improvement in 'value for money' was being achieved.

A range of targeted projects had been undertaken and others were being developed to capture data and improve understanding of assets and threats in areas that included biodiversity, soil health and riverine health. The data flowing from these projects was being incorporated into the information management system for use in spatial analysis that would further strengthen the prioritisation system. This issue is fully discussed in Section 5.3.

The incentive delivery system took account of any option's potential to contribute to multiple targets. The CMA used a multidisciplinary team approach to design projects that contributed towards multiple targets. Incentive applications were evaluated and ranked according to evaluation criteria that addressed multiple targets. As target milestones were met remaining projects were then re-ranked to enhance the CMA's ability to meet all of its targets.

The Board and staff demonstrated a consistent understanding and strong appreciation of the system. The system elements were clearly documented and system processes could be readily followed and understood.

In respect to the Standard, the CMA:

- demonstrated it had consistently applied available knowledge of assets and threats and risks to actions to prioritise investment, design programs and assess individual projects (*Collection and use of knowledge, Determination of scale, Risk management*), and
- demonstrated it had consistently applied spatial analysis to refine its understanding of the scale of assets and threats and improve its prioritisation of investment. (*Determination of scale, Information management*).

## 2.3 Systems that ensure consistent short and long-term investments

The time lapse between changes to the management of natural resources and the improvement in the function of natural systems can be significant. In the interim much can change, and CMAs need to accommodate this change without losing focus on the long-term objectives of their region's CAP. To do this, CMAs need systems to help them adaptively manage towards long-term targets as they learn what works and what doesn't, and as the environmental, economic, social and cultural landscapes around them change.

The Audit found that the Murray CMA had systems that ensured short and long-term investments were consistent with each other and that these investments aligned with other planned targets.

In 2008 the NRC audit found that the CMA's ability to manage its long and short-term priorities had been constrained by the limited capacity of its financial management and reporting system. These difficulties were no longer evident in 2010.

The investment funding Murray CMA had available in 2009 fell to 60% of the funding it had invested in 2008 and in 2010 fell further to 30%. However a review of 'cost per ha' demonstrated a significant improvement of hectares managed per dollar invested.

Additionally the CMA was using extensive collaboration and additional grant funding to enhance its knowledge base and strengthen its prioritisation.

In 09/10 the CMA demonstrated its ability to achieve its targets while meeting its 'Net Cost of Service' requirements. The prioritisation system had clear linkages to short-term and long-term targets at multiple scales. Further the allocation of funding proportionally between private and public lands had been adjusted to target areas of highest conservation value.

The CMA had undertaken reviews of both the appropriateness of targets and progress toward targets to inform its future prioritisation. The flexibility of the prioritisation system ensured the CMA could readily reprioritise investment toward unmet targets by re-ranking project applications within each investment round. Recent improvements in spatial information systems enabled the CMA to model the impact of investment decisions in real time. This capability is discussed further in Section 5.3.

In respect to the Standard, the CMA:

- demonstrated that it had evaluated and adapted its short-term investments to promote integrated long-term outcomes (*Collection and use of knowledge, Determination of scale, Monitoring and evaluation, Information management*).

### Box 2.1: Using best available knowledge and tendering to target investment toward areas of highest priority

#### ***The MCMA used best available knowledge and a tender process to target investment toward priority areas in the Spring Creek sub catchment***

In 2005 the MCMA commissioned external expertise to undertake a study into the cause of high sediment levels in streams flowing into the Hume Dam. This study used the River Styles system and updated earlier work by the Department of Land and Water Conservation survey in 1997. The study investigated high sedimentary loads in the sub catchment and recommended priority areas for remedial treatment in the Upper Spring Creek area.

In 2008 targeted brochure mail outs were used to invite expressions of interest from private landholders in the area that were interested in undertaking action to enhance native vegetation and decrease erosion. MCMA staff then met with interested landholders and made an initial assessment of each potential project.

Where there was agreement from both the landholder and CMA that there was value in a project, a project proposal was developed that met the objectives of both parties and delivered the best outcomes at the property, landscape and catchment scale. Project proposals were then submitted by the landholders under a tender process.



All proposals received by the CMA were evaluated by assessment panels made up of CMA staff that were independent of the project, according to clearly defined evaluation criteria. These criteria had been carefully designed to assess projects on factors including their proximity to high priority areas, the extent of vegetation being preserved and their value for money. All applications were then ranked by score and available funding was allocated to the projects with the highest ranking.

The Audit inspected a project in the Spring Creek area that had been selected using the evaluation process. Through the project almost 20ha of floodplain woodland had been fenced and an off stream water point established. The landholder had entered into a 10 year Property Vegetation Plan (PVP) agreement, implementing a management regime designed to restore and regenerate native vegetation and consequently enhance biodiversity and reduce rapid runoff.

**Above: The treated area showing the fence constructed with project funds and the resultant improved coverage of native vegetation.**

The project contributed to the stabilisation of the Spring Creek catchment and consequent reduction of sediment flowing into the Hume Weir. The project outcomes will be monitored as part of a longer term catchment-wide monitoring project being undertaken by ANU in collaboration with the CMA and DECCW. The data is expected to contribute to upgraded knowledge of the river system and enable further prioritisation of areas for treatment in the future.

This approach of building knowledge to identify priority areas for treatment, and targeting investment to priority areas through the use of a two stage tender process maximised progress towards CAP targets and promoted the benefits of bio diversity stewardship to landholders within the Spring Creek region.



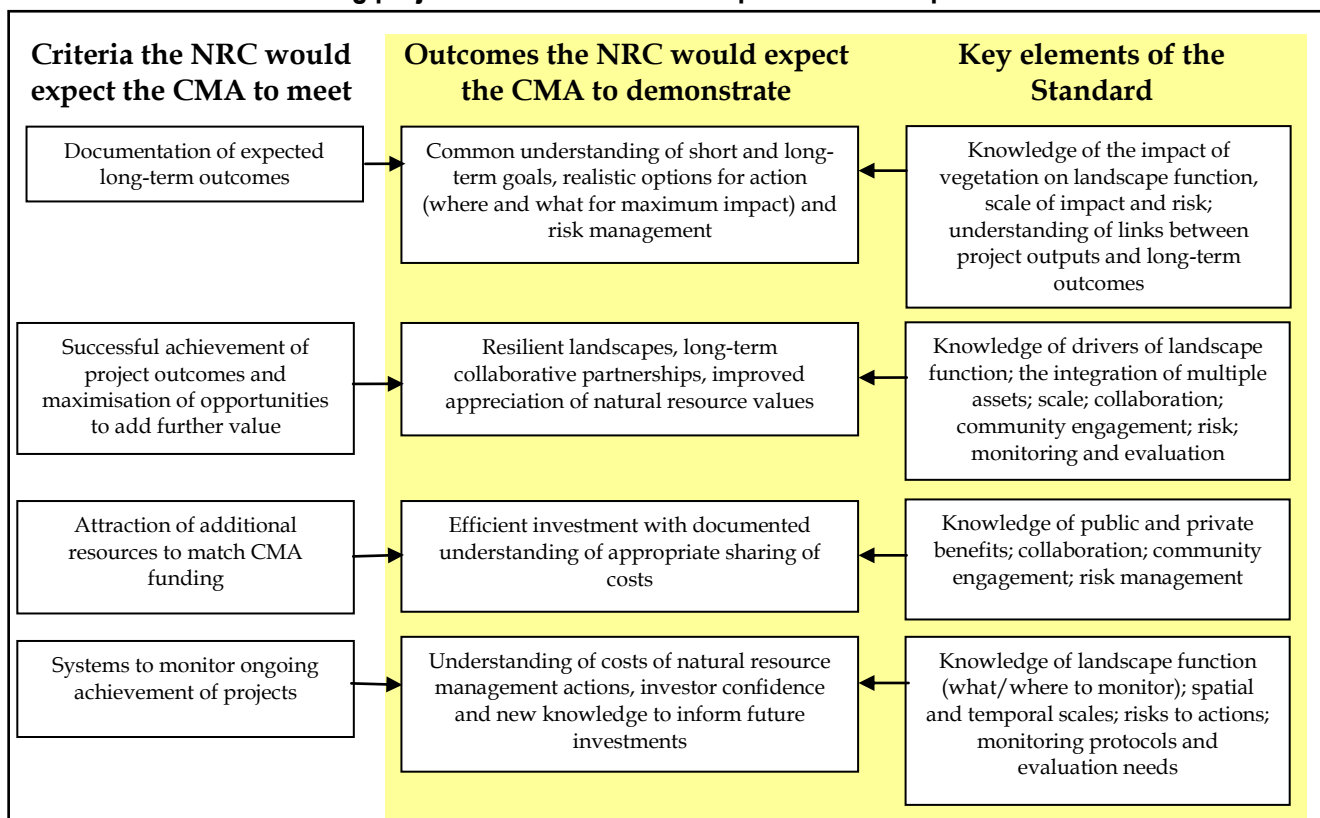
### 3. DELIVERING PROJECTS THAT CONTRIBUTE TO IMPROVED LANDSCAPE FUNCTION

The audit's second line of inquiry assessed whether the CMA's vegetation projects are contributing to improved landscape function. CMAs should promote short-term improvements in the management of natural resources in their catchments that will contribute to long-term improvements in natural resource condition. To understand whether they are pursuing this aim in a way that meets the quality benchmarks set by the Standard, we assessed whether they were meeting four criteria. These were that the CMA:

- documents the expected long-term outcomes of projects it invests in
- is successfully achieving short-term project outcomes, and maximising further opportunities to add value
- is attracting additional resources to match its funding in projects, and
- has a system to monitor achievement of ongoing project outcomes.

As for all lines of inquiry, the NRC also identified the elements of the Standard that are most relevant to meeting these criteria effectively, and the behaviours and other outcomes the NRC would expect to see if the CMA is using those elements of the Standard. These are shown in Figure 3.1.

**Figure 3.1: The framework the audit team used to assess whether the CMA was effectively delivering projects that contribute to improved landscape function**



The sections below discuss each criterion, including why it is important and what the audit found in relation to it.

### 3.1 Documentation of expected long-term outcomes

Natural resource management is a long-term process, and it can take many years to achieve intended improvements in landscape function. In addition, our knowledge of natural systems and best practice in managing them continues to evolve, so natural resource managers need to continually adapt their actions to take account of new knowledge. The documentation of projects' expected long-term outcomes is important to help ensure projects stay on track over time. For example, it can help landholders and CMA field staff in continually managing towards those outcomes in the longer term as circumstances change.

The Audit found that the Murray CMA had documented its long-term intended outcomes, in its public document such as the CAP, in annual reports and in its business systems. The logic links between short-term investments and these goals were clearly expressed in ways that suit its investors i.e. state and federal government.

The CMA had reported in its 2010 Strategic Progress Update to the NRC that "Objectives have been specified in all management agreements since 1 July 2008." However, the CMA's internal audit of projects had revealed this was not always the case and the long-term objectives of both the CMA and landholders were seldom expressed in any detail in individual project contracts inspected during the audit.

This meant that the linkages between the short-term activities and management actions in contracts and the expected long-term outcomes of both parties were not always clear to landholders. As a result, there is a risk that the importance of changed management actions could be lost during the 10 years of the project contracts. This would reduce the likelihood that the intended long-term outcomes would be achieved.

In respect to the Standard, the CMA:

- demonstrated it had clearly documented expected outcomes in its CAP and these were consistently expressed in all supporting documentation (*Determination of scale, Risk management*)
- demonstrated a common understanding of the logical relationships between project outputs, management actions and the long-term expected outcomes (*Determination of scale, Community engagement and Risk management*), and
- could not demonstrate that long-term objectives of both parties were clearly documented in project contracts (*Risk management and Information management*).

### 3.2 Successful achievement of project outcomes

CMAs' projects need to successfully achieve short-term changes in the way natural resources are managed in their region to maintain credibility with their communities, and create confidence in their investors. However, as CMAs often engage with their communities on the community's terms (at least initially), they also need to seek opportunities to add greater value to the projects proposed by landholders or other stakeholders.

The Audit found that the six projects that were inspected had successfully achieved short-term changes, both in natural resource outcomes and the way they were managed. In most cases the CMA had been implementing projects successfully and short-term condition change was observable on some projects. This short-term change suggests that the projects will achieve their long-term objectives.

Where exceptions to successful implementation were observed they were not significant and were generally explainable in terms of adverse weather conditions. Project achievements were meeting the agreed objectives of the CMA and landholder, i.e. addressing agreed landscape functions that impact on long-term landscape 'health', a term related to resilience.

The CMA had sought opportunities to add greater value to the projects proposed by landholders or other stakeholders through its project development and selection process. In one audited project the CMA was building on a twenty year period of investment by the landholder and a wide range of agencies and groups (see Box 3.1).

The CMA had developed long-term collaborative project partnerships with both public and private landholders and was improving appreciation of natural resource values in the region. The CMA and landholders shared long-term objectives and these were underpinned by a common understanding of key landscape assets and threats. Projects inspected were promoting an understanding of 'resilience' and increasing the appreciation of natural resource values within the community.

In respect to the Standard the CMA:

- demonstrated its ability to successfully plan and implement projects that are likely to achieve outcomes that build resilience and address real landscape processes (*Determination of scale, Community engagement*).

### 3.3 Attraction of additional resources

To make the most of the small amount of funding CMAs have to invest in their regions, they need to look for opportunities to attract matching funding. They also need to encourage private landholders to make ongoing in-kind contributions, as this promotes resource stewardship and can increase the likelihood of landholders remaining committed to the success of the project over time.

The Audit found that the Murray CMA had attracted additional resources from landholders and project collaborators, including both monetary and in-kind investments. Significant in-kind investment had been attracted through a range of projects being undertaken in collaboration with ANU, DECCW, CSIRO, local Councils and landholders. The CMA had also encouraged ongoing in-kind contributions through ten year stewardship contracts on all incentive projects delivered to private landholders.

However, the CMA had not followed through on audit 2008 recommendations and established systems to account or estimate the additional resources attracted. The CMA had engaged external expertise to develop an appropriate accounting system but had been advised by the consultant against such a system, on the basis of poor cost efficiency and inherent inaccuracy.

The CMA had sought to maximise efficient use of its investments and documented its understanding of appropriate sharing of costs. The tender process used for selecting incentive projects on privately owned land incorporated 'value for money' principles and evaluation criteria used to rank projects incorporated a 'value for money' assessment.

The CMA had undertaken an evaluation of dollars invested per hectare over the period from 2003 to 2010 and this demonstrated a significant improvement in the amount of land conserved for each dollar invested.

In respect to the Standard, the CMA:

- could demonstrate it had attracted additional resources to its investments (*Opportunities for collaboration, Community engagement*)
- could not demonstrate it had established systems to account or estimate the additional resources attracted (*Monitoring and evaluation, Information Management*).

### 3.4 A system to track ongoing achievement of projects

Long-term projects to encourage resource stewardship need monitoring – particularly given the significant time lapses between investments and resulting improvements in resource condition, the gaps in our understanding of how to manage dynamic natural systems, and the unavoidable flux in social, economic and climatic conditions. Investors require reliable information that short-term targets have been met, and progress towards longer term objectives is being made.

The Audit found that the Murray CMA had a system to monitor the ongoing achievement of projects. The CMA had responded positively to the findings of the NRC Audit Report 2008 and had established a comprehensive internal audit system. The monitoring of ongoing achievement of projects relied on internal audits and external reviews to provide assurance.

The CMA had undertaken reviews of its progress against targets as well as the cost effectiveness of its programs. The evaluation of cost effectiveness over the period 2004 to 2010 indicated a significant improvement in dollar per hectare value.

The CMA had established a comprehensive MERI framework and this was being implemented progressively. A wide range of monitoring programs was being implemented, both independently and with collaborative partners, to improve monitoring of resource condition change at a landscape and catchment scale. The MERI framework and these monitoring programs are further discussed in Section 5.2.

In respect to the Standard, the CMA:

- demonstrated it was implementing a comprehensive MERI system to monitor and report on project outcomes and evaluate the effectiveness of its investments (*Collection and use of knowledge, Monitoring and evaluation, Risk management*).

#### Box 3.1: Building on previous investment to add value and improve appreciation of natural resource values

***The Murray CMA built on previous investments by several agencies to add value and improve appreciation of natural resource values in its region.***

CMA's need to seek out opportunities where they can add greater value to projects proposed by landholders or other stakeholders by building on previous investment. They also need to develop long-term collaborative project partnerships and improve appreciation of natural resource values in its region.

The owners of one property inspected are descendants of the family that first established the property in the 1860s. The family has been committed to protection of the native vegetation since first settlement when

they had the foresight to leave large areas of native vegetation intact. The current owners are committed to building the biodiversity, enhancing the native vegetation and preserving the cultural and historic heritage of the area. They are working to develop an eco tourism venture to complement the original grazing enterprise.

In 1991 the landowners secured a grant to enhance the biodiversity of their property. Since that time they have secured a series of investments that have improved the property. Significant investments have been made by the landholders, groups and agencies including Greening Australia, DECCW and previous catchment committees, as well as the MCMA.

Activities began with the recovery and protection of remnant bush in the sandy soils surrounding the wetlands on the property. A native seed production area was established from seed collected off the property with plans to use the seed produced in future biodiversity works. The CMA supported the regeneration and protection of native vegetation within wetlands and the grassy box woodlands across the property. As a result of these investments on the property, the flight path for the vulnerable superb parrot has been enhanced, which should encourage population increase. The area of regenerated vegetation links the parrot's feeding grounds on the creek to roosting sites in yellow box country. It also strengthens the overall connectivity of remnant native vegetation in the region.



**Right: A lignum wetland recovering after construction of fencing to exclude stock. Aboriginal camping areas are hidden in the grass along the shores of this former source of freshwater mussels.**

The project inspected by the audit included construction of fencing and the establishment of water points to protect nearly 80 ha of lignum wetland and adjacent grassy box woodland. A survey of aboriginal heritage had also been undertaken in collaboration with local aboriginal groups. This survey had identified aboriginal middens, scar trees and artefacts that would now be protected for future generations. A cultural heritage field day held on the property earlier this year demonstrated the positive relationship between the CMA, landholders and the wider community.

These project activities over two decades have built community knowledge and capability while delivering against a range of biophysical targets. Important sections of the area are now protected by Property Vegetation Plans (PVPs) and the bird life and other flora and fauna is evidencing increasing population densities and diversity. The ecotourism business also contributes to the local economy.

The CMA's targeted investment into a long-term project has added value, strengthened collaboration, enhanced biodiversity and preserved cultural heritage.

## 4. COMMUNITY ENGAGEMENT

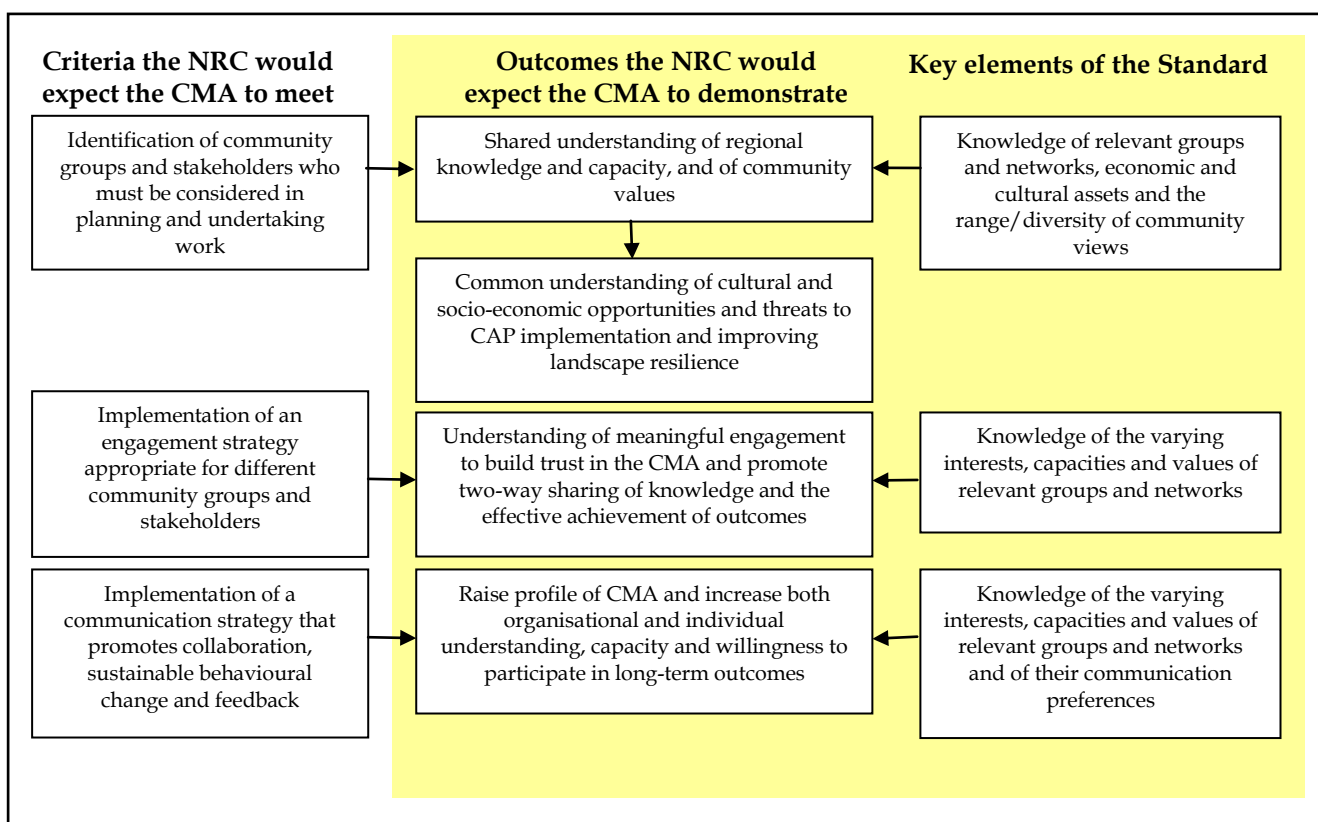
The audit's third line of inquiry was whether the CMA is effectively engaging its communities. Given that 89 per cent of land in NSW is in private management, it is critical for CMAs to engage private landholders and other stakeholders who manage the natural resources on this land. This allows CMAs to access the local knowledge of their communities, and understand the values placed on the natural resource assets in their region. It also enables them to influence how natural resources on private land are managed, and to maximise the effectiveness of government investment in NRM by establishing collaborative partnerships with landholders and other stakeholders, and strengthening the capacity of their communities.

The NRC identified three criteria that a CMA would be expected to meet in order to effectively engage its communities in compliance with the Standard. These criteria include that the CMA:

- has identified the community groups and stakeholders it must consider in planning and undertaking its work
- is implementing engagement strategies appropriate for different community groups and stakeholders, and
- is implementing a communications strategy that promotes collaboration, sustainable behaviour change and feedback.

Each of these criteria is shown on Figure 4.1, along with the key elements of the Standard for meeting it effectively, and the CMA behaviour and other outcomes the NRC would expect to see if the CMA was using those elements of the Standard.

**Figure 4.1: The framework the audit team used to assess whether the CMA was effectively engaging its communities**



The sections below discuss each criterion, including why it is important and what the audit found in relation to it.

#### **4.1 Identification and analysis of community groups and stakeholders**

A CMA's logical first step in engaging the community is to identify the key community groups and other stakeholders it must consider in planning and undertaking its work. To be effective, it also needs to understand these groups – for example, what they know about the natural resource assets and threats in the region, what is important to them, and to what extent they have the capacity to participate in NRM designed to improve landscape function. In addition, it needs to understand how these groups might present opportunities or pose threats to its ability to effectively implement the CAP and meet the catchment-level targets in the CAP. Developing and maintaining this kind of understanding requires systematic research and analysis.

The Audit found that the CMA Board and staff had a shared understanding of regional knowledge, community capacity and the community's values. Both CMA staff and external stakeholders described the community's NRM knowledge as good, but recognised a reduced capacity due to the years of drought. The CMA identified that further socio-economic analysis would be valuable, but not necessarily essential to the next CAP development process. For example, the CMA's strong networks of partners such as the Rice Growers' Association (RGA) Environmental Champions Group could be used to undertake informal analysis, as they had the capacity to engage on behalf of the CMA.

The CMA had identified, but had not documented the key community groups and stakeholders it must consider in planning and undertaking its work. The CMA had not treated this task with as high a priority as other developmental activities, as it considered it could develop its next CAP by engaging through its current and planned partnerships. Plans had been made to develop and document a better understanding of key community groups and stakeholders (through social surveys), but these had been hampered by recruitment issues and limited funding. The CMA Board had recently approved proposals to address this gap by finalising key parts of the draft Community Capacity Building Framework. Resource constraints had limited the CMA's capacity to implement change and the CMA will need to monitor the sustainability of its engagement programs carefully in the lead up to development of the next Murray Catchment Action Plan.

The CMA Board and staff expressed some common understanding of cultural and socio-economic opportunities and threats to CAP implementation and improving landscape resilience, ranging from: reductions to irrigation diversions, cuts to the timber industry, and aboriginal community tensions and opportunities. External stakeholders confirmed these threats to CAP implementation. An example of opportunity for CAP implementation may come from recent changes to forest ownership in the Western part of the region to allow for Indigenous Protected Areas, as this may present opportunities for the CMA to work with aboriginal communities to build NRM capacity and improve landscape resilience.

The CMA had some systematic approaches in place to develop and maintain these understandings of community and stakeholders. For example, CMA staff regularly attended community events, where presentations were made and informal feedback collected. To illustrate the scale and breadth of this engagement, in 2009/10, 256 community events were attended by staff for awareness-raising purposes (as reported by the CMA under their Capacity Building Targets).

In addition, the CMA monitored community NRM knowledge and current issues through evaluation of all communication activities (see Section 4.3 below).

These processes for collecting information were not well-linked with other information management systems within the CMA, weakening the access to the data for decision-making purposes.

In respect to the Standard, the CMA:

- demonstrated a good understanding of community groups and stakeholders across the catchment including their capacity, attitudes and values (*Collection and use of knowledge, Determination of scale*), and
- demonstrated it had some processes in place to develop and maintain knowledge over time, but recognised that further processes were needed and planned (*Collection and use of knowledge*).

## 4.2 Appropriate engagement strategies for different community groups and stakeholders

Most regions of NSW include a variety of communities, community groups and other stakeholders, which the CMA should consider in planning and undertaking its work. These groups have different knowledge and capacity for NRM, and value the region's natural resources in different ways. For example, they might include rural communities, farmers and graziers, urban communities, Landcare groups, mining companies, tourism operators, local councils, relevant government agencies and other government institutions. To effectively engage these diverse groups, a CMA needs to use its understanding of each group to develop an appropriate strategy for meaningful engagement. This requires strategic thinking, risk management and processes to identify and fill knowledge gaps.

The Audit found that the CMA had an understanding of meaningful engagement - that is, one that had built trust in the CMA and promoted two-way sharing of knowledge and the effective achievement of outcomes.

In the two years since the last NRC audit, the CMA had implemented a different set of strategies to appropriately engage different sectors of its community. External stakeholders confirmed that engagement through Local Community Advisory Groups (LCAGs) had not functioned well, and that new, more appropriate strategies were needed to engage with the CMA's stakeholders. The CMA had reviewed the advisory group model and in consultation with key stakeholders, had rebuilt its approach to engagement. Of the advisory groups described in the Murray CAP, only the Murray Aboriginal Advisory Group (MAAG) continued to operate.

The CMA had instead focussed on creating a few strong partnerships to achieve its engagement, piggy-backing on the capacity of selected groups, including:

- supporting the development of the Eastern Murray Landcare Network (overarching the Holbrook and Corowa Landcare Networks) and developing mutual working arrangements with local government groups (through RAMROC) to deliver the Community Grants Program
- developing relationships with producer groups in Western Murray (RGA and the Western Murray Land Improvement Group)
- contracting with DECCW, ANU and others to deliver the Biodiversity Monitoring Project, and
- working with the Murray Darling Association and Wirraminna Environmental Education Centre on the Creative Catchments Program.



Approaches considered meaningful by external stakeholders included the direct and open GM/Chair engagement, the CMA's use of forums and awards events, and the use of existing networks. The Murray Landcare Awards in 2009 were described by a range of stakeholders as providing a valuable opportunity to share learning, bringing the Landcare Network closer to the CMA.

The CMA did not have a documented overarching engagement strategy to ensure that these individual approaches continue to develop in a consistent and coordinated way. While the CMA had developed plans and identified milestones for developing such a strategy, the Community Capacity Building Framework had not been completed in the two years since the last NRC audit.

The last NRC audit raised concerns about engagement with some key community groups, including urban groups, Murray Irrigation Ltd (MIL) and aboriginal communities. The CMA identified, and its external stakeholders confirmed, that the selected partnerships would engage with urban (non-landholding) communities of the region, in particular through the Landcare and Producer Group Networks, the education program and the work with local government.

The need for the CMA to engage with MIL had diminished since the last NRC audit, with the Land and Water Management Plan (LWMP) funding no longer flowing to MIL through the CMA. The CMA's recent partnerships with producer groups in Western Murray such as RGA, covering the MIL area of operations, now filled what was identified as an engagement gap for the CMA.

Finally, as mentioned above, the CMA had continued to convene its MAAG, but some doubts were raised by CMA staff and external stakeholders about its effectiveness. Factors supporting this included the limited availability of staff to support the MAAG during parts of the last year, the inability of the MAAG to achieve momentum with consistent and adequate attendance at meetings, and the sense of isolation from the CMA felt by some members of the MAAG.

In respect to the Standard, the CMA:

- demonstrated it had appropriate strategies to engage key stakeholders that recognised the varying interests and capacities to engage, but that the overarching framework for these strategies had not been documented (*Collection and use of knowledge, Community engagement, Determination of scale*), and
- could not demonstrate it had effectively engaged with Aboriginal groups at the strategic level (*Determination of scale, Risk management*).

#### **4.3 Communication promoting collaboration, behavioural change and feedback**

CMAs are also required to lead their diverse communities in understanding natural resource management. To do this, they need sophisticated approaches to communicating their messages, and for hearing and responding to the messages sent by communities. To capture the attention of diverse stakeholders such as Aboriginal communities, landholders, industry sectors, and urban and environmental organisations, their communication strategies need to reflect the varied values of their communities. This broad focus also helps to attract the widest possible funding and support across the region.

The Audit found that the Murray CMA had a sophisticated approach to communicate their messages and for hearing and responding to messages sent by their communities – that is, using a mix of direct and indirect (through the networks of their key partners) approaches to raise their profile and increase both organisational and individual understanding, capacity and willingness to participate in long-term outcomes.

The CMA planned operational aspects of communication through its Communications Calendar, but key strategies for communication remained incomplete at the time of the audit, due to limitations on staff availability for what was perceived by the CMA as a lower priority issue (also discussed at 4.1 above).

The CMA received most messages from the community through individual staff members, but networks and direct senior management contact were also seen by external stakeholders as well-used.

External stakeholders could not present a clearly effective picture of the CMA systematically responding to messages from the community. For example, some stakeholders were not satisfied with CMA explanations for changes to funding priorities and support, while others had received an explanation they could understand and accept. The transition from LCAGs to the present partnerships that will form the Landcare and Producer Group Network was described by external stakeholders as a good example of a response to the message from local communities that the LCAGs were not working.

The CMA monitored the success of communication through mechanisms such as surveys regularly undertaken at field days. For example, a CMA Evaluation Summary for a recent (June 2010) Seedbank Field Day recorded feedback from 26 respondents who rated the field day well (85% very good or excellent), and elicited numerous ideas for future field days and follow-up.

The CMA did not record informal or ad hoc contact with the community, nor maintain 'customer relationship management (CRM)' software that would facilitate analysis of contact and responses.

The CMA had implemented appropriate strategies for communication reflecting the varied values of their communities. For example, the CMA had used mail-outs, e-newsletters, information stalls at a wide range of community events, and issues-focussed field and demonstration days that have had demonstrated success.

The CMA's use of its website had developed since 2008, and contained some elements of Web 2.0, such as [www.youtube.com](http://www.youtube.com) video links to support its 'Place Stories'. However, the CMA did not use the website to receive feedback from its communities through social media, unlike other regional organisations (such as local councils and DECCW).

In respect to the Standard, the CMA:

- demonstrated it had effectively implemented a strategy that raised the CMA's profile and promoted feedback from the community (*Collection and use of knowledge, Community engagement*).

#### Box 4.1: Establishing partnerships to engage with communities in the Murray region

***Creative Catchment Kids was an innovative partnership between Murray CMA, primary schools, NSW Department of Education and the Murray Darling Association, teaching natural resource management. It helped the CMA to encourage students to build NRM understanding and also to engage with the school communities across the Murray region.***

The Creative Catchment Kids program built on some successful work in other catchments, and was focussed on students interested in natural resources and the environment. Rather than catering for entire class groups, two or three Year 5 and 6 students from each participating school attended a series of

workshops that involved presentations, discussion and activities around natural resource management and resulted in students conducting a project to be presented at the end of the program.



CMA Board members and staff were involved in planning, presentations and project support. These activities put the CMA alongside landholders, local government, community groups, teachers, students and parents from participating schools, raising awareness of the CMA and building its reputation.

**Left: A Creative Catchment Kids workshop on the Murray River near the Barmah Choke (Photo: Sandy Dellwo)**

The CMA Annual Report 2009/10 reported some examples of projects the students had worked on, including:

- revegetating a waterway,
- building and installing habitat boxes,
- investigating soil structure and farming methods,
- studying threatened species and threat abatement, and
- monitoring water quality.

The CMA's partners confirmed that these projects were an effective way for the CMA to engage with key community groups and stakeholders.

Murray CMA had confirmed funding and staff support for an expanded Creative Catchment Kids program in 2011 (the CMA's 2009-10 investment was \$22,500). The CMA will need to monitor this expansion carefully, and ensure it has the capacity to support the program in the lead up to development of the next Murray Catchment Action Plan.

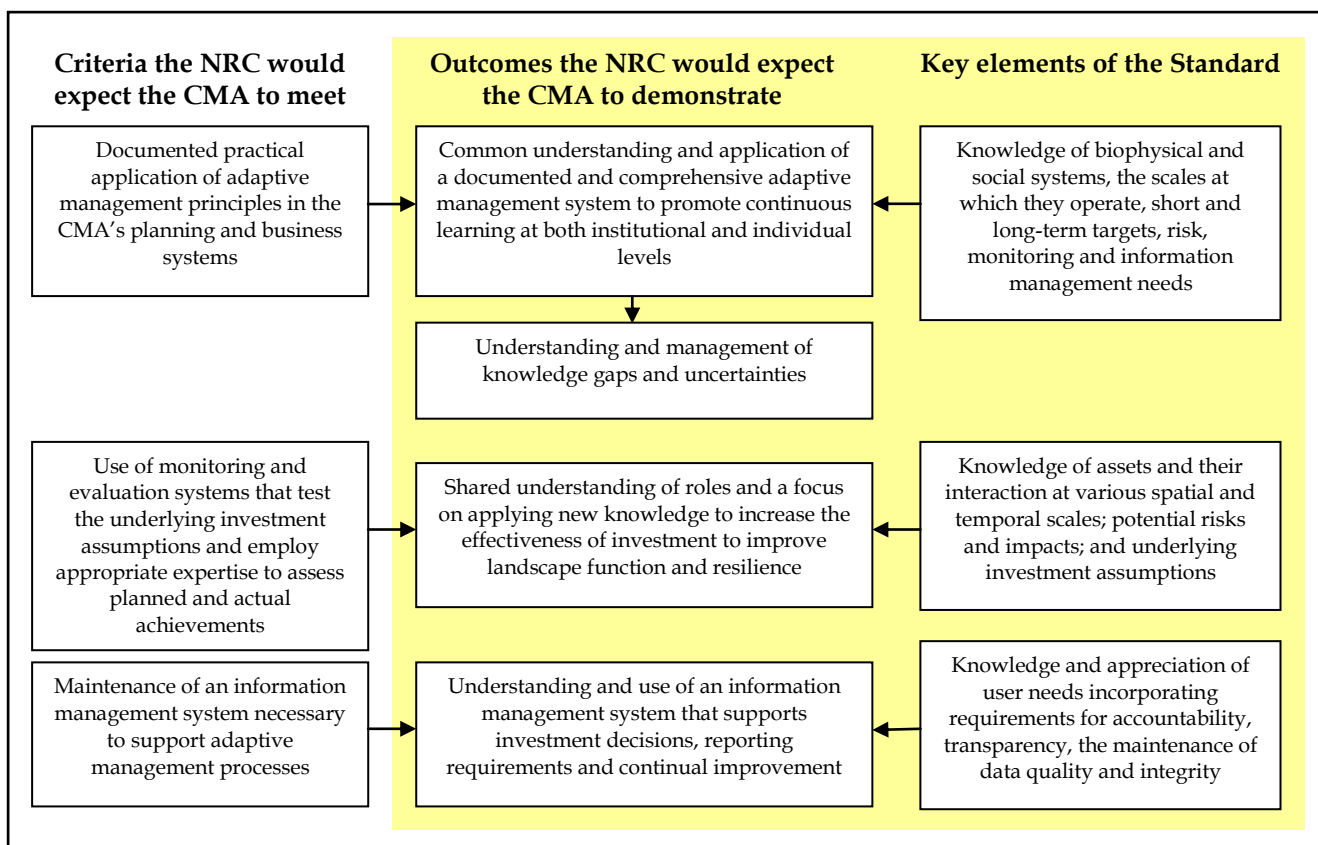
## 5. EFFECTIVELY USING ADAPTIVE MANAGEMENT

The audit's fourth line of inquiry assessed whether the CMA was effectively using adaptive management. It looked at whether the CMA:

- had documented the practical application of adaptive management principles to its planning and business systems
- had monitoring and evaluation systems that test its underlying investment assumptions and use appropriate experts to assess planned and actual achievements, and
- maintained information management systems necessary to support the adaptive management process.

Each criterion is shown on Figure 5.1, together with the elements of the Standard that are most relevant to meeting it effectively, and the CMA behaviour and other outcomes the NRC would expect to see if the CMA is using these elements of the Standard.

**Figure 5.1: The framework the audit team used to assess whether the CMA was effectively using adaptive management**



The sections below discuss each criterion in more detail, including why it is important and what the audit found in relation to it.

## 5.1 Adaptive management principles in planning and business systems

Adaptive management is 'learning by doing'. It is a structured, iterative process of decision-making that is intended to gradually reduce uncertainty and improve performance through monitoring, evaluation and response. It adds transparency and accountability to decision-making and the allocation of resources, while providing a framework for learning and ongoing improvement.

At a practical level, it is important that CMAs document, within their planning and business systems, how staff can apply adaptive management principles. This will help ensure their staff and collaborators can readily apply those principles in the many, diverse circumstances in which they work.

The Audit found that the CMA had documented adaptive management principles in key processes at the strategic level including the Board Strategic Plan, the MERI and Risk Strategies and the project management framework. These principles of plan, implement, audit and respond were being progressively incorporated into business systems and plans across the CMA.

Extensive use was being made of both internal and external reviews and feedback loops, in the form of 'lessons learned' assessments, were consistently applied. The CMA had established an internal audit function as a key component of their adaptive management framework. The Audit and Risk Management Committee had clear Terms of Reference (TOR) and staff had been appointed to undertake the internal audit function. Regular review and assessment processes were built into the CMA's business systems.

Board and staff demonstrated a common understanding of how adaptive management principles were applied to their planning and operations. The Board and senior management had successfully fostered a 'learning culture' that was recognised and appreciated by staff.

The CMA understood and managed knowledge gaps and uncertainties and had developed a comprehensive risk management framework. The Risk Management Strategy defined roles and delegated responsibilities to levels of authority proportionate to the risk. Strategic and operational risk registers were maintained and updated regularly. External reviews had assessed the risk management process and commented positively. The key systems that support adaptive management had developed to where they could actively drive continual improvement throughout the organisation.

In respect to the Standard, the CMA:

- demonstrated that it had applied the Standard to incorporate the principles of adaptive management into its planning and business systems. (*All Required Outcomes of the Standard*), and
- demonstrated that it had implemented its numerous strategies and tools in a consistent CMA-wide approach to drive continual improvement throughout the organisation. (*Information management, Monitoring and evaluation*).

## 5.2 Monitoring and evaluation system

To effectively apply adaptive management principles, CMAs' programs need to be designed and delivered in ways that facilitate structured learning. For example, investment programs need to record what changes to defined indicators are expected to result from the management actions within the program. Only then can CMAs undertake quantitative monitoring of these actions, and evaluate how successful they were in producing the expected changes.

It is not enough for a CMA to monitor and evaluate whether its projects have delivered the expected outputs (e.g., that the expected quantity of native grasses were planted, or that the expected kilometres of fencing was installed). It also needs to test whether or not the assumptions about how each management action would lead to changes in landscape function were correct and so resulted in these changes (for example whether fencing and revegetation of a riparian zone resulted in improved water quality and riverine ecosystem health). In addition, the CMA needs to use experts with appropriate skills and knowledge in assessing its planned and actual results. This will allow it to apply new knowledge – gained from the monitoring and evaluation process and other sources – to increase the effectiveness of ongoing and future projects in improving landscape function and resilience.

The Audit found that the CMA's programs were designed and delivered in ways that facilitated structured learning, generated new knowledge and increased the effectiveness of investment. The CMA's strategic documents, such as the Board Policies relating to each key theme (land, water and biodiversity) and project management, supported its MERI framework. Supporting this, the CMA had built evaluation into its project management system.

For example, the CMA had prepared a Lessons Learnt and Recommendations for Future Projects (Roadside Reserves Project 2006-2008) report, which was used to develop its new Linear Reserves investments with local government and other public land holders. The CMA had used experts with appropriate skills and knowledge in assessing its planned and actual results.

CMA documents identified individual responsibilities for monitoring and evaluation, but the CMA had not fully developed a shared understanding with landholders of their roles in ongoing monitoring and evaluation. The CMA had identified that landholder monitoring requirements were not always being fulfilled and were implementing a range of measures to address the problem, for example all current management agreements contain a site management plan that lists and describes agreed actions and monitoring requirements.

The CMA's monitoring and evaluation systems tested whether or not the assumptions about how each management action would lead to changes in landscape function. In particular, the CMA's Biodiversity Baseline Monitoring Project had tested a significant number of the assumptions about management actions designed to lead to improved biodiversity outcomes. The results of this MERI project had been built into the eligibility criteria and weightings applied to the assessment of incentive applications and into project designs.

However weaknesses in the CMA's monitoring and evaluation systems remained, including inconsistencies across CMA projects, and gaps in the collection and use of project data, and in the integration of analysis and reporting of financial and performance data.

The CMA had focused on applying new knowledge to increase the effectiveness of investment to improve landscape function and resilience. For example, a planned evaluation of the trial African Boxthorn Project showed that the project may not be an appropriate kind of project for the CMA, as it provided a voluntary incentive to fund a core statutory function for other agencies (i.e. councils and the Livestock Health and Pest Association (LHPA)) and the weed was so wide spread that small scale projects could not make a significant impact to achieve catchment targets. The CMA responded to this information by amending their funding strategy and making no further investment toward these pest weeds.

In respect to the Standard, the CMA:

- demonstrated that it had designed a comprehensive MER system and had begun implementing a consistent approach to monitoring and evaluating the effectiveness of its investments (*Monitoring and evaluation, Collection and use of knowledge, Risk management*), and
- demonstrated that the MER system was testing the underlying investment assumptions and employing appropriate expertise to assess planned and actual achievements. (*Monitoring and evaluation, Collection and use of knowledge, Risk management*).

### 5.3 Information management systems that support adaptive management

CMAs need relatively sophisticated information management systems to support adaptive management. For example, these systems need to keep track of the changes in landscape function expected as a result of the management actions within a project, and provide ready access to this and other necessary information when the project is being evaluated and decisions on improving its effectiveness are being made. These systems also need to keep track of new knowledge that is derived from the monitoring and evaluation process and other sources, so this can be used in making decisions.

The Audit found that the Murray CMA was continuing to develop an information management system necessary to support adaptive management processes. The CMA demonstrated it had made significant progress since the NRC Audit in 2008 and had established a number of relatively sophisticated information management systems to support investment decisions, reporting requirements and continual improvement. However some significant gaps remained, particularly in the area of linkages to project management, MER and stakeholders' databases. Information needs analyses had been undertaken at both state and CMA scales and plans were being developed to remedy these system deficiencies. The CMA planned to introduce a new integrating system, Catchment Information Management System (CIMS), which is used by other CMAs, and had begun training and software installation at the time of the audit.

A particular strength of the information systems was the ability to undertake detailed spatial analysis and model investment outcomes in real time. This capacity could be used to assess the impact of a range of investment scenarios on both short and long-term targets. Maximising progress against targets could then be achieved by choosing the model with the best outcomes. This had the potential to significantly enhance the flexibility of the CMA's prioritisation system.

The CMA did not have information management systems which kept track of new knowledge derived from the monitoring and evaluation system. The CMA had established an MER program in collaboration with DECCW and ANU to collect catchment wide MERI data to evaluate the effectiveness of biodiversity investments (see Box 5.1). However, linkages between systems that store MERI data and other CMA systems had not been established. The CMA needs analysis had identified requirements for MERI systems and implementation plans were being implemented.

The CMA had a shared understanding of the information management system and the Board and staff generally agreed systems provided adequate access to accurate data. However, there was a shared view that linkages between systems needed to be further improved.

In respect to the Standard, the CMA:

- demonstrated it had developed an information management system that met the needs of the CMA (*Collection and use of knowledge, Determination of scale, Monitoring and evaluation, Information management*) and
- could not demonstrate some elements of integrated information management, but it had a clear strategy for continued improvement of its information system, including implementation of a suite of new systems and upgrades (*Risk management, Information management*).

### Box 5.1: Monitoring the effectiveness of biodiversity investments in Murray region

#### ***ANU Biodiversity Baseline Monitoring partnership***

*Since 2007, Murray CMA had been working with a team of researchers from the Fenner School of ANU to build an effective method of monitoring the effectiveness of biodiversity investments in the region. This work had developed significant flow-on opportunities for other CMAs and other programs.*

The project was set up to establish a baseline assessment of the region's flora and fauna presence and abundance, and to monitor and determine biodiversity changes and trends and factors contributing to changes in biodiversity over time. All of these objectives contributed directly to help improve, justify and/or prioritise incentive delivery schemes and management actions within the CMA.

The partnership approach with ANU had allowed CMA staff and Board members to work together with wildlife ecologists and statisticians, land managers and other key stakeholders to design the project, and thus ensure high scientific integrity and maximum usefulness to the CMA. The work was able to build on long-term ANU research that had been running since 2002 on farm properties in the South West Slopes Bioregion.

The project monitored 226 permanent sites: 116 sites in the Riverina Bioregion across five vegetation types, and 110 sites in the South West Slopes Bioregion.

In addition to establishing long-term monitoring on permanent sites, a number of shorter term studies had been published or were developing from this partnership, including:

- a reptile life history study – looking at the effect of vegetation type/condition states on life-history attributes of Boulenger's Skinks
- a travelling stock route (TSR) study – comparing the value of these areas for biodiversity relative to sites on private properties
- a planting attribute study – looking at the effects of various planting attributes for biodiversity (e.g. size, shape, age, perimeter, landscape location etc)
- a study of the scale effects for biodiversity, and
- a study of landscape thresholds – testing the assumption that land managers should aim to have 30% of a region/landscape covered by native vegetation.



This is an ongoing project, and the CMA investment for 2009-2010 was \$124,000 and the ANU approximately \$296,000. For Murray CMA, this study had filled a number of high-priority gaps in its monitoring needs and had provided science to support some of the assumptions made that particular actions would lead to an expected natural resource outcome.



**Left: An example of the fauna identified at a biodiversity monitoring site, near Urana**

The CMA and ANU recently expanded this partnership to include DECCW, as part of an ongoing Biodiversity Monitoring Plan for the Murray Region, which will provide long-term certainty of monitoring funding and expertise. As many other CMAs and land managers also invest

in the activities Murray CMA uses to improve biodiversity resilience, such as riparian fencing, the results of this project are of importance well beyond the Murray region.

## Attachment 1 Conclusions, suggested actions and CMA response

This Section provides a table summarising conclusions of the audit of the implementation of the Murray CAP, the actions the audit team suggested the CMA take to improve this implementation and a summary of the Murray CMA's response to the suggested actions. The CMA Board is expected to monitor the completion of these actions and the NRC may review these activities in future audit work.

Conclusion	Suggested actions	CMA response
Line of inquiry #1 – Had Murray CMA effectively prioritised its investments to promote resilient landscapes that support the values of its communities?		
<p>Criteria 1.1: <i>whether the CMA had a commonly understood definition of what constitutes resilient landscapes in their region</i></p> <ul style="list-style-type: none"> <li>▪ The CMA Board and staff members had a commonly understood definition of what constitutes resilient landscapes in the region.</li> <li>▪ There was a common understanding of the characteristics of resilience in the region among the Board and staff. Board portfolios and multidisciplinary project teams were being used to ensure that the understanding of assets and threats was shared across the CMA.</li> <li>▪ The CMA had updated its understanding of resilience over time and was working on embedding 'resilience thinking' in to its business systems.</li> </ul>	There are no suggested actions for this criterion.	
<p>Criteria 1.2: <i>whether the CMA had a system that ranked investment options, which incorporated the best available information and multiple CAP target achievement</i></p> <ul style="list-style-type: none"> <li>▪ The CMA had a clearly documented and well-defined system that ranked investment options and incorporated the best</li> </ul>	There are no suggested actions for this criterion.	

Conclusion	Suggested actions	CMA response
<p>available information and multiple CAP target achievement.</p> <ul style="list-style-type: none"> <li>The Board and staff demonstrated a shared understanding of a system to rank investment options that was transparent and delivered consistency and repeatability.</li> </ul>		
<p>Criteria 1.3: <i>whether the CMA had a system that ensures short and long-term investment priorities are consistent with each other and integrated with other planned NRM targets</i></p> <ul style="list-style-type: none"> <li>The CMA had systems that ensured short and long-term investments were consistent with each other and that these investments aligned with other planned targets.</li> </ul>	<p>There are no suggested actions for this criterion.</p>	
<p>Line of inquiry #2 – Had the Murray CMA’s vegetation projects contributed to improved landscape function?</p>		
<p>Criteria 2.1: <i>whether the CMA had documented expected long-term project outcomes</i></p> <ul style="list-style-type: none"> <li>The CMA had documented its long-term intended outcomes, in its public document such as the CAP, in annual reports and in its business systems. However the CMA had not documented the links from management actions through management targets to catchment targets and themes, in its project contracts.</li> <li>The CMA demonstrated a common understanding of the relationships between expected outcomes, project outputs and management actions. However interviews of CMA officers and landholders indicated that better documentation would assist staff and landholders to maintain a shared understanding of long-term objectives over time.</li> </ul>	<p>The audit team suggests that the CMA take the following actions:</p> <ol style="list-style-type: none"> <li>Ensure the long-term objectives of both the CMA and the landholders are clearly documented in project contracts to facilitate long-term attention to the desired outcomes of the joint investment.</li> </ol>	<p>The Murray CMA agrees with the suggested action.</p> <p>Agreed long-term objectives will be consistently defined and entered into contracts using CIMS.</p> <p>The CMA notes that development of ‘standard objectives’ across all CMAs may be a valuable component of state or national environmental accounting.</p> <p>The Murray CMA will complete the action by <b>30 June 2011</b>.</p>

Conclusion	Suggested actions	CMA response
<p>Criteria 2.2: <i>whether the CMA successfully achieved project outcomes, and maximised opportunities to add further value</i></p> <ul style="list-style-type: none"> <li>▪ The CMA had successfully achieved project outcomes, and maximised opportunities to add further value.</li> </ul>	<p>There are no suggested actions for this criterion.</p>	
<p>Criteria 2.3: <i>whether the CMA's projects were attracting additional resources to match CMA funding</i></p> <ul style="list-style-type: none"> <li>▪ The CMA's projects were attracting additional resources to match CMA funding. However, the CMA had not established systems for accounting for added value.</li> </ul>	<p>The audit team suggests that the CMA take the following actions:</p> <ol style="list-style-type: none"> <li>2. Develop and implement effective mechanisms to quantify, analyse and report on additional resources attracted to match CMA funds.</li> </ol>	<p>The Murray CMA agrees with the suggested action. Matching funds will be recorded in CIMS and a transparent, repeatable and consistent method to estimate this amount will be developed.</p> <p>The Murray CMA will complete the action by <b>30 June 2011</b>.</p> <p>The CMA notes that there is no agreed methodology across all CMAs to quantify, analyse and report on additional resources attracted to match CMA funds.</p>
<p>Criteria 2.4: <i>whether the CMA had a system to monitor ongoing achievement of project:</i></p> <ul style="list-style-type: none"> <li>▪ The CMA had a system to monitor the ongoing achievement of projects.</li> <li>▪ The CMA was monitoring project inputs and outputs through internal auditing and compliance checking and evaluating the costs of its activities.</li> <li>▪ The CMA had established a comprehensive MERI framework and this was being implemented.</li> </ul>	<p>There are no suggested actions for this criterion. Suggested actions relating to MERI are discussed in Criterion 4.3.</p>	

Conclusion	Suggested actions	CMA response
<ul style="list-style-type: none"> <li>The CMA had identified deficiencies in its monitoring at the property scale and had actioned steps to remedy these.</li> </ul>		
<p>Line of inquiry #3 - Had the Murray CMA effectively engaged its communities?</p>		
<p>Criteria 3.1: <i>whether the CMA had identified community groups and stakeholders it must consider in planning and undertaking work</i></p> <ul style="list-style-type: none"> <li>The CMA had identified but had not documented the key community groups and stakeholders it must consider in planning and undertaking its work.</li> <li>The CMA Board and staff had a shared understanding of regional knowledge and community capacity and their values.</li> <li>The CMA Board and staff expressed some common understanding of cultural and socio-economic opportunities and threats to CAP implementation and improving landscape resilience, ranging from: reductions to irrigation diversions, cuts to the timber industry, and aboriginal community tensions and opportunities.</li> <li>The CMA had some systematic approaches in place to develop and maintain these understandings, but these were not well-linked with other information management systems within the CMA.</li> </ul>	<p>The audit team suggests that the CMA take the following actions:</p> <ol style="list-style-type: none"> <li>Document the key community groups and stakeholders to further target the CMA's activities and ensure consistency with community values.</li> </ol>	<p>The Murray CMA agrees with the suggested action.</p> <p>A Stakeholder Engagement Plan, informed by a comprehensive stakeholder register and analysis, and a communication plan, will be completed.</p> <p>The Murray CMA will complete the action by <b>30 June 2011</b>.</p>
<p>Criteria 3.2: <i>whether the CMA was implementing an engagement strategy appropriate for different community groups and stakeholders</i></p> <ul style="list-style-type: none"> <li>The CMA had an understanding of meaningful engagement - that is, one that had built trust in the CMA and promoted two-</li> </ul>	<p>The audit team suggests that the CMA take the following actions:</p> <ol style="list-style-type: none"> <li>Continue to develop and document an overarching strategic plan to guide engagement approaches that meaningfully engage with appropriate community</li> </ol>	<p>The Murray CMA agrees with the suggested action.</p> <p>See response to suggested action 3.</p>

Conclusion	Suggested actions	CMA response
<p>way sharing of knowledge and the effective achievement of outcomes.</p> <ul style="list-style-type: none"> <li>▪ Over the two years since the last NRC audit, the CMA had implemented a different set of strategies to appropriately engage different sectors of its community.</li> <li>▪ The CMA did not have a documented overarching engagement strategy to ensure that these individual approaches continue to develop in a consistent and coordinated way.</li> <li>▪ The CMA had continued to convene its MAAG, but some doubts were raised by CMA staff and external stakeholders about its effectiveness.</li> </ul>	<p>groups and stakeholders to encourage effective two-way sharing of knowledge and the promotion of resilient landscapes.</p> <p>5. Review the effectiveness of the Murray Aboriginal Advisory Group, and consider alternatives that may include appropriate use of other CMA partnerships and networks.</p>	<p>The Murray CMA agrees with the suggested action.</p> <p>A review of the Murray Aboriginal Advisory Group and development of improved engagement pathways will be undertaken.</p> <p>The Murray CMA will complete the action by <b>30 June 2011</b>.</p>
<p>Criteria 3.3: <i>whether the CMA was implementing a communications strategy that promotes collaboration, sustainable behavioural change and feedback</i></p> <ul style="list-style-type: none"> <li>▪ The CMA had a sophisticated approach to communicate their messages and for hearing and responding to messages sent by their communities – that is, using a mix of direct and indirect (through the networks of their key partners) approaches to raise their profile and increase both organisational and individual understanding, capacity and willingness to participate in long-term outcomes.</li> <li>▪ The CMA planned operational aspects of communication through its Communications Calendar, but key strategies for communication remained incomplete at the time of the audit, due to limitations on staff availability for what was perceived a lower priority issue.</li> </ul>	<p>The audit team suggests that the CMA take the following actions:</p> <p>6. Develop and implement a plan to communicate in a strategic way to promote collaboration, sustainable behavioural change and feedback. (i.e. carry forward the non actioned suggestion from last report).</p> <p>7. Investigate how the knowledge gained through direct communication and evaluations can be collected and used more effectively to support CMA decision-making.</p>	<p>The Murray CMA agrees with the suggested action.</p> <p>See response to suggested action 3.</p> <p>The Murray CMA agrees with the suggested action.</p> <p>Consideration of community and other stakeholder knowledge will be strengthened in the adaptive management procedure to better inform project planning and delivery by 30 June 2011. Improved linkages between the CMAs audit and risk registers and decision-making will also be established.</p> <p>The Murray CMA will complete the action by <b>30 June 2011</b>.</p>

Conclusion	Suggested actions	CMA response
<ul style="list-style-type: none"> <li>▪ The CMA did not record contact with the community, nor maintain 'customer relationship management (CRM)' software that would facilitate analysis of contact and responses.</li> <li>▪ The CMA had implemented appropriate strategies for communication reflecting the varied values of their communities.</li> </ul>		
Line of inquiry #4 - Has the Murray CMA effectively used adaptive management?		
<p>Criteria 4.1: <i>whether the CMA had documented the practical application of adaptive management principles in its planning and business system</i></p> <ul style="list-style-type: none"> <li>▪ The CMA had documented adaptive management principles in key processes at the strategic level. Extensive use was made of both internal and external reviews and feedback loops in the form of 'lessons learned' assessments were frequently applied. The CMA had established an internal audit system as a key component of their adaptive management framework.</li> <li>▪ The CMA demonstrated a common understanding of how adaptive management principles were applied to their planning and operations. The Board and senior management had fostered a 'learning culture' and had built regular review and assessment processes into its business systems.</li> <li>▪ The CMA had an understanding of and managed knowledge gaps and uncertainties. The Board had established a comprehensive risk management framework with responsibilities delegated to appropriate levels of authority.</li> </ul>	There are no suggested actions for this criterion.	

Conclusion	Suggested actions	CMA response
<p>Criteria 4.2: <i>whether the CMA had monitoring and evaluation systems that test underlying investment assumptions and employ appropriate expertise to assess planned and actual achievement</i></p> <ul style="list-style-type: none"> <li>▪ The CMA's programs were designed and delivered in ways that facilitated structured learning, generated new knowledge and increased the effectiveness of investment.</li> <li>▪ CMA documents identified individual responsibilities for monitoring and evaluation, but the CMA had not fully developed a shared understanding with landholders of their roles in ongoing monitoring and evaluation.</li> <li>▪ The CMA's monitoring and evaluation systems tested whether or not the assumptions about how each management action would lead to changes in landscape function. However weaknesses in the CMA's monitoring and evaluation systems remained, including inconsistencies across CMA projects and gaps identified in the collection and use of project data, and in the integration of analysis and reporting of financial and performance data.</li> <li>▪ The CMA had focused on applying new knowledge to increase the effectiveness of investment to improve landscape function and resilience.</li> </ul>	<p>The audit team suggests that the CMA take the following action:</p> <p>8. Continue to develop the internal audit function to monitor and encourage ongoing contract compliance and property scale monitoring.</p>	<p>The Murray CMA agrees with the suggested action.</p> <p>The Audit and Risk Management Committee will continue to identify internal auditing requirements.</p> <p>The Murray CMA will complete the action by <b>30 June 2011</b>.</p> <p>The CMA notes that continuation of a dedicated internal audit position is contingent on future funding.</p>
<p>Criteria 4.3: <i>whether the CMA maintained an information management system necessary to support adaptive management</i></p> <ul style="list-style-type: none"> <li>▪ The Murray CMA is continuing to develop an information management system necessary to support adaptive management processes. The CMA had established a number of relatively sophisticated information management systems to</li> </ul>	<p>The audit team suggests that the CMA take the following action:</p> <p>9. Ensuring plans to integrate the information management systems (through CIMS) are developed and implemented in sufficient time to support the</p>	<p>The Murray CMA agrees with the suggested action.</p> <p>CIMS will be fully operational by 30 June 2011.</p>



Conclusion	Suggested actions	CMA response
<p>support investment decisions, reporting requirements and continual improvement. Strong spatial analysis and investment modelling capabilities were demonstrated in real time.</p> <ul style="list-style-type: none"> <li>▪ However there were significant gaps, particularly in linkages between discrete elements of the information management system. The CMA planned to introduce a new integrating system, Catchment Information Management System (CIMS), which is used other CMAs, and had begun training and software installation at the time of the audit.</li> <li>▪ The CMA did not have information management systems which kept track of new knowledge derived from the monitoring and evaluation system. The CMA had established an MER program in collaboration with DECCW and ANU to collect catchment-wide MERI data. Linkages between systems that stored MERI data and other CMA systems had not been established. The CMA needs analysis had identified requirements for MERI systems.</li> <li>▪ The CMA had a shared understanding of the information management system. CMA Board and staff agreed systems provided adequate access to accurate data. However, there was a shared view that linkages between systems needed to be improved.</li> </ul>	<p>upcoming CAP review.</p>	<p>The CMA notes that corporate support similar to that provided for the LMDB is required to ensure CIMS provides a common and fit for purpose business system across all CMAs.</p>

## Attachment 2 About this audit

- Audit mandate** The NRC is required to undertake audits of the effectiveness of the implementation of catchment action plans (CAPs) in achieving compliance with those state-wide standards and targets as it considers appropriate.<sup>2</sup>
- The NRC contracted the Environmental Risk Science and Audit (ERSA) to undertake the audit of the implementation of the CAP prepared by the Murray Catchment Management Authority (CMA). The NSW Government has adopted an aspirational goal to achieve resilient landscapes that support the values of its communities<sup>3</sup> It intends to achieve this by encouraging natural resource managers, such as each CMA, to make high quality decisions, focused through a coherent set of targets.<sup>4</sup> The NSW State Plan<sup>5</sup> establishes the state-wide targets for natural resource management (NRM).
- CMAs have developed CAPs that express how each specific region can contribute to the aspirational goal and the state-wide targets. The *Murray Catchment Action Plan*<sup>6</sup> identifies the key natural resource assets (or themes) that need to be managed in the region, including Community, Biodiversity, Water and Land. Within each of these assets, the CMA has identified:
- resource condition targets, for longer-term improvements in resource condition that will contribute to achievement of the state-wide targets; and
  - management targets, which identify shorter-term investment priorities that will contribute to achievement of the resource condition targets.
- Audit objective** This audit assessed the effectiveness of Murray CMA in promoting resilient landscapes that support the values of its communities, within the scope of the CAP.
- Murray CMA is now implementing the CAP, through a mix of programs and projects that simultaneously contribute to more than one management target, and more than one resource condition target. Many of these integrated programs and projects use vegetation to enhance landscape function, to lead to the aspirational goal of resilience.
- Lines of inquiry**
- In order to assess the effectiveness of CMA work, the NRC directed the audits to answer the following questions:
  - Is the CMA effectively prioritising its investments to promote resilient landscapes that support the values of its communities?
  - Are the CMA's vegetation projects contributing to improved landscape function?
  - Is the CMA effectively engaging its communities?
  - Is the CMA effectively using adaptive management?
  - The NRC identified that these four key aspects of CMA work should strongly influence effectiveness in achieving resilient landscapes, and promote maximum improvement for Murray CMA for this stage in their development.

<sup>2</sup> *Natural Resources Commission Act 2003, Section 13 (c)*

<sup>3</sup> As recommended by the NRC in *Recommendations – state-wide standard and targets, September 2005*.

<sup>4</sup> *Ibid.*

<sup>5</sup> See Chapter 5 Green State, in NSW Government (2010) *NSW State Plan, Investing in a Better Future, 2010*

<sup>6</sup> Murray CMA, *Murray Catchment Action Plan, 2008*

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<b>Audit criteria</b>	<p>To help answer each line of inquiry, the NRC formulated the criteria identified below in Table 1, the audit plan summary.</p> <p>These criteria address:</p> <ul style="list-style-type: none"><li>▪ expected documentation of the particular key aspect of CMA work</li><li>▪ expected implementation of plans and decisions</li><li>▪ expected evaluation and reporting of the performance of the CMA work.</li></ul> <p>The criteria were derived from the elements of each line of inquiry, and from the general criteria of the Standard and state-wide targets.</p> <p>The NSW Government adopted the <i>Standard for Quality Natural Resource Management</i> (the Standard), which identifies seven components that are commonly used to reach high quality natural resource decisions. CMAs must comply with the Standard<sup>7</sup>, using it as a quality assurance standard for all planning and implementation decisions.</p>
<b>Audit scope</b>	<p>As a sample of the entire range of NRM investments, the audit work was focused on CMA programs and projects that use vegetation to improve landscape function.</p> <p>The NRC considered this to be the appropriate focus as vegetation remains a key tool for CMAs to use to achieve integrated NRM outcomes. This is due to a number of factors, including the lack of certainty in the management framework for other aspects of NRM such as water.</p> <p>As most NRM programs and projects contribute to more than one NRM target, the NRC expects audited projects to also contribute to other targeted outcomes, such as river health and threatened species. The audit sought to audit the effectiveness of these contributions as they arise.</p>
<b>Audit approach</b>	<p>In October and November 2010, the audit team performed the following audit work:</p> <ul style="list-style-type: none"><li>▪ interviewing a number of CMA Board and staff members, landholders and stakeholders external to the CMA</li><li>▪ reviewing a range of CMA and public documents</li><li>▪ visiting multiple sites on five projects.</li></ul> <p>At the close of the audit field work, the audit team shared preliminary observations with the CMA.</p>
<b>Audit methodology</b>	<p>To plan and conduct this audit, the audit team followed the methodologies set out in the <i>Framework for Auditing the Implementation of Catchment Action Plans</i>, NRC 2007, and the draft <i>NRC Audit Manual</i>.</p>
<b>Acknowledgements</b>	<p>The audit team gratefully acknowledges the cooperation and assistance provided by the Murray CMA and landholders in the Murray region. In particular we wish to thank the Murray CMA Board, the General Manager (Mr David Leslie), Program Manager (Mr Jack Chubb) and Catchment Coordinator – Implementation (Mrs Helen Wilson).</p>

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<sup>7</sup> Section 20 (c), *Catchment Management Authorities Act, 2003*

**Table 1. Audit plan summary**

<b>Line of Inquiry 1</b>	<b>Is the CMA effectively prioritising its investments to promote resilient landscapes that support the values of its communities?</b>
This line of inquiry was tested against the following criteria:	
<b>Criterion 1.1</b>	The CMA has a commonly understood definition of what constitutes resilient landscapes in their region.
<b>Criterion 1.2</b>	The CMA has a system that ranks investment options, which incorporates factors including scientific and local knowledge, socio-economic information, community and investor preferences, leverage of investment and multiple CAP target achievement.
<b>Criterion 1.3</b>	The CMA has a system that ensures short and long-term investment priorities are consistent with each other and integrated with other planned NRM targets.
<b>Line of Inquiry 2</b>	<b>Are the CMA's vegetation projects contributing to improved landscape function?</b>
This line of inquiry was tested against the following criteria:	
<b>Criterion 2.1</b>	The CMA has documented expected long-term project outcomes.
<b>Criterion 2.2</b>	The CMA is successfully achieving project outcomes, and maximising opportunities to add further value.
<b>Criterion 2.3</b>	The projects are attracting additional resources to match CMA funding.
<b>Criterion 2.4</b>	The CMA has a system to monitor ongoing achievements of projects.
<b>Line of Inquiry 3</b>	<b>Is the CMA effectively engaging its communities?</b>
This line of inquiry was tested against the following criteria:	
<b>Criterion 3.1</b>	The CMA has identified community groups and stakeholders it must consider in planning and undertaking work.
<b>Criterion 3.2</b>	The CMA is implementing an engagement strategy appropriate for different community groups and stakeholders.
<b>Criterion 3.3</b>	The CMA is implementing a communication strategy that promotes collaboration, sustainable behavioural change and feedback.
<b>Line of Inquiry 4</b>	<b>Is the CMA effectively using adaptive management?</b>
This line of inquiry was tested against the following criteria:	
<b>Criterion 4.1</b>	The CMA has documented the practical application of adaptive management principles in its planning and business systems.
<b>Criterion 4.2</b>	The CMA has monitoring and evaluation systems that test underlying investment assumptions and employ appropriate expertise to assess planned and actual achievement.
<b>Criterion 4.3</b>	The CMA maintains an information management system necessary to support adaptive management processes.

## Attachment 3      The CMA and its region

CMAs have a challenging task to encourage communities across their particular regions to improve how they manage natural resources on private land for the benefit of the landholders, the broader community and future generations.

This section provides context for the audit by summarising key features of the Murray region and Murray CMA. This context is important in considering both the way in which a CMA's effectiveness should be assessed and the options for improving that effectiveness.

### The region at a glance

Spanning an area of 35,170 square kilometres, the Murray region is bounded by the Murray River to the south (NSW/Vic border), Murrumbidgee River catchment to the north, the Australian Alps to the east, and the confluence of the Murrumbidgee and Murray Rivers to the west.<sup>8</sup> The region includes the Kosciuszko National Park, Murray River and the Barmah-Millewa River Red Gum forest. The region also contains three of the six icon sites to be protected under the Murray Darling Basin Commission's Living Murray Initiative.<sup>9</sup>

The region contains three major landscape regions:

- the Upper Murray (higher rainfall and high elevations peaking at Mt Kosciuszko)
- the South West Slopes (gently undulating hills in the eastern part of the region), and
- the Riverine Plain (floodplain in the central and western parts of the region).

Much of the region has been cleared of native vegetation, with travelling stock routes and reserves containing some high conservation vegetation. Preservation of remnant vegetation, management of groundcover and erosion, and management of salinity hazards from dry-land farming and irrigation are priorities for the region.

A current NRM challenge is the allocation of available water. Agricultural communities are facing hardship after severe drought, yet past over-extraction of water threatens landscape functions supporting the state and national communities' environmental values. The CMA has a limited direct role in water, but the management of water across the Murray Darling Basin is crucial to the health of all natural resources in the region, and involves multiple layers of governments and regulatory authorities.

The catchment supports a highly developed, vibrant and diverse agricultural sector, with grazing, cropping, irrigation, forestry and horticulture being the main enterprises and a rural land capital value of about \$2.1 billion. The catchment plays a significant role in Australia's agricultural production with an annual farm gate value in excess of \$800 million.<sup>10</sup>

The region supports a population of 101,000 people and with the major land use of agriculture covering 75% of the region, direct engagement with landholders is a large part of Murray CMA's operations.

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<sup>8</sup> <http://www.murray.cma.nsw.gov.au/catchment/what-are-we.html>

<sup>9</sup> Part of the River Murray, the Barmah-Millewa Forest, and the Perricoota-Koondrook Forest.

<sup>10</sup> see footnote 8

However, community engagement in the Murray region is multi-layered. For example there are six Indigenous Nations<sup>11</sup>, fourteen local government areas<sup>12</sup>, Murray Irrigation Limited, a number of smaller water supply, drainage and irrigations organisations, and numerous producer groups that all have a significant part to play in managing the region.

The CAP notes that during 2004 to 2007, 60% of annual government investment in the Murray region was provided via Murray CMA to Murray Irrigation Limited (MIL) to support the implementation of long-standing Land and Water Management Plans and this was directed towards the 30% of the region that is effectively managed by MIL. This funding has now ceased and the Murray CMA is faced with addressing NRM issues across the whole catchment with approximately 30% of previous investment funding.

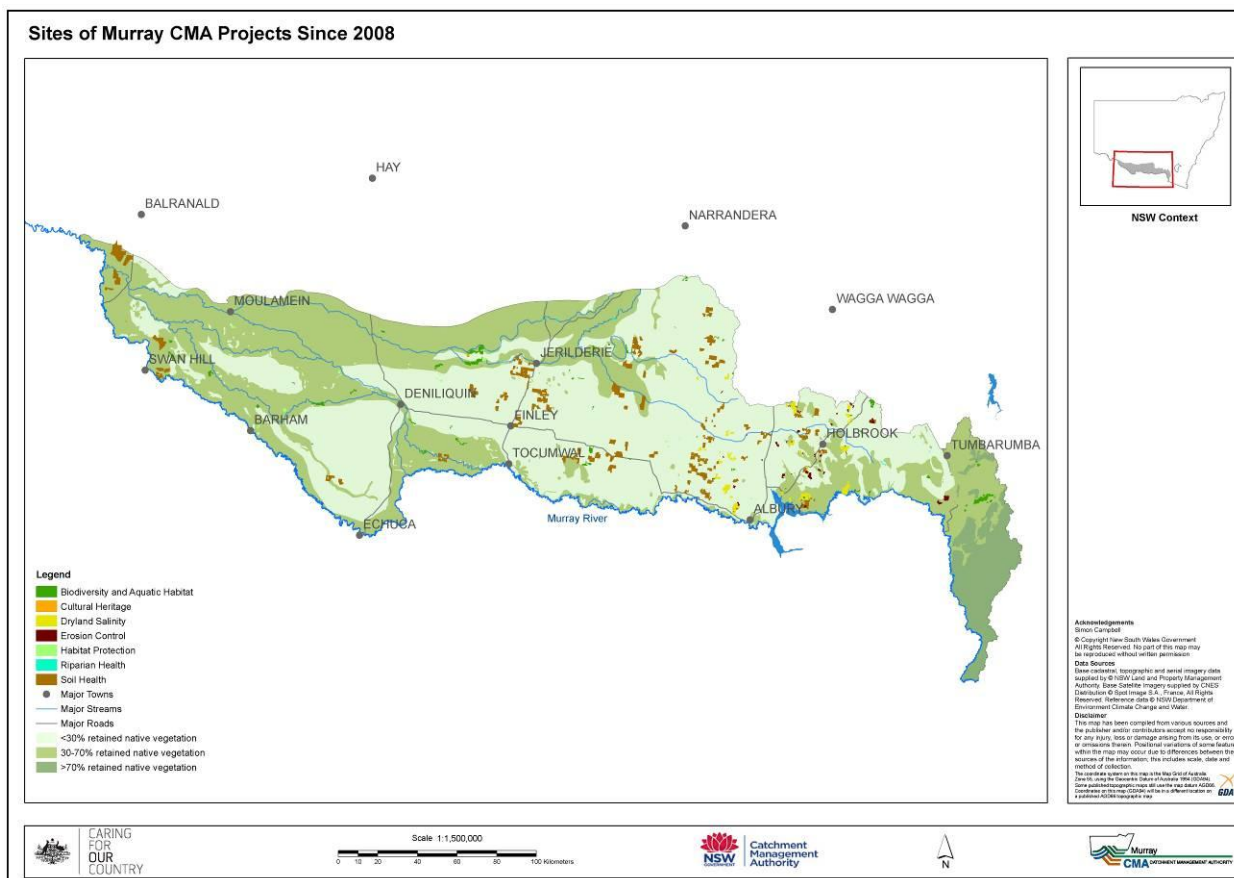


Figure A3.1: Murray region with Murray CMA projects since 2008<sup>13</sup>

### The CMA at a glance

The head office and principal service centre of the Murray CMA is situated in Deniliquin, with three regional offices located in Albury, Tumbarumba and Barham.

<sup>11</sup> The Birapa Birapa, Muthi Muthi, Wadi Wadi, Wamba Wamba, Wiradjuri and Yorta Yorta Nations

<sup>12</sup> Albury, Balranald, Berrigan, Corowa, Conargo, Deniliquin, Greater Hume, Jerilderie, Lockhart, Murray, Narrandera, Tumbarumba, Urana, and Wakool.

<sup>13</sup> Map of region provided by the CMA

The CMA was established in 2003 and the time of the audit, the Board consisted of Alex Anthony (Chair), Sally Dye, Angus Macneil and Judy Wettenhall, Andrew Urquhart, Brian Royal and Steven Ross.

The CMA consists of about 40 staff, reduced from approximately 60 in 2006/07 in response to funding cuts and changed investment priorities.

At the time of the audit the CMA management team was a General Manager, two Program Managers and one Business Manager. Below this level were six Catchment Coordinator positions including a recently appointed Catchment Coordinator – Auditor.

In 2008 the CMA was audited by the NRC and the Audit Report identified a range of significant issues that warranted attention. Since 2008 the CMA has had five (5) new Board members and a new GM appointed. The CMA has restructured and implemented significant changes in its policies and systems including its investment prioritisation. The CMA has undertaken significant work needed to underpin a revision of its CAP and intends to undertake a formal review once the pilot CAP upgrades are complete.

In implementing its CAP in 2009/10 Murray CMA distributed \$9.9 mil to improve natural resource management through various delivery mechanisms, including incentive management agreements to undertake on-ground works and training.

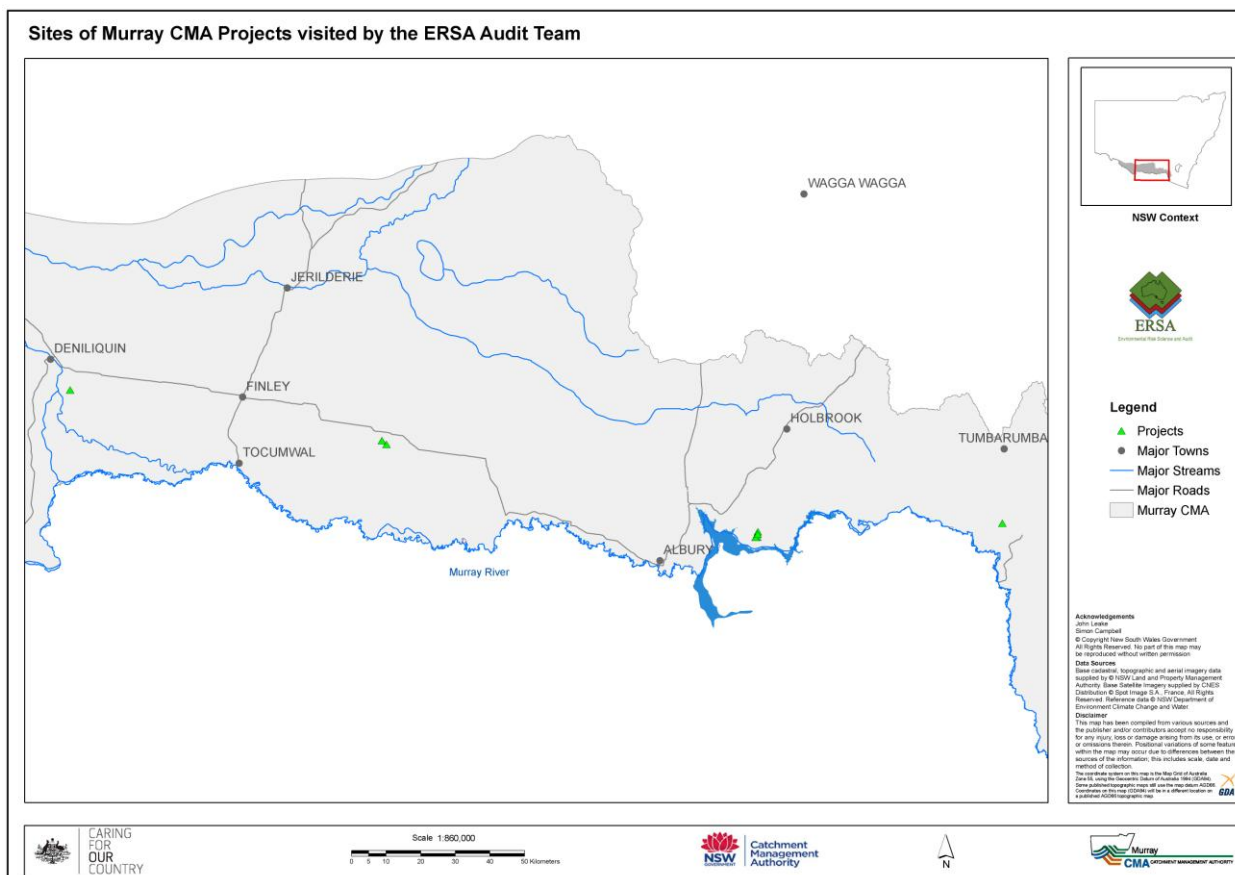


Figure A3.2: Murray region with projects inspected during the audit<sup>14</sup>

<sup>14</sup> Map of region provided by the CMA

Figure A3.2 provides a map illustrating some of the key characteristics of the region and sites visited by the NRC in its audit.

The amount of additional resources attracted against investment as reported by the CMA is shown in Table A3.1.

Table A3.1 Additional resources matched against investment<sup>15</sup>

<b>Investment Period</b>	<b>Invested Amount (\$ mil)<sup>16</sup></b>	<b>Additional Resources (\$ mil)<sup>17</sup></b>
2006/07	17.085	87.646
2007/08	28.484	146.123
2008/09	12.219	62.683
2009/10	4.356	22.346

<sup>15</sup> Figures provided by the CMA

<sup>16</sup> The sum of Category 2 (NSW and Federal Government) and Category 3 (all other sources) funding. This figure excludes Category 1 (recurrent expenditure) funding. **Investment Amount** has been drawn from Note 5 – Expenses (grants and subsidies) in the CMAs F2007-2010 Annual Reports.

<sup>17</sup> Additional Resources have been calculated by the CMA using survey information collected by Murray Irrigation Limited during the 15-year life of the Murray Land and Water Management Plans, as required by the Heads of Agreement. These surveys estimated that the plans leveraged \$5.13 from landholders for every dollar invested by government (8% cash, 92% in-kind).