

DECEMBER
2010

PROGRESS REPORT

PROGRESS TOWARDS HEALTHY RESILIENT LANDSCAPES

IMPLEMENTING THE STANDARD, TARGETS
AND CATCHMENT ACTION PLANS

natural
resources
commission



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List of acronyms

CAP	Catchment Action Plan
CMA	Catchment Management Authority
COAG	Council of Australian Governments
DECCW	NSW Department of Environment, Climate Change and Water
EPBC Act	Environment Protection and Biodiversity Conservation Act
I&I	Industry and Investment NSW
GWMA	groundwater management area
IBRA	Interim Biogeographic Regionalisation of Australia
MER	Monitoring, Evaluation and Reporting
NRC	Natural Resources Commission
NRAC	Natural Resources Advisory Council
NRM	Natural resource management
NSW	New South Wales
SOG	Senior Officer Group

The NRC acknowledges the contribution of staff from NSW CMAs and agencies in preparing this report.

The NRC also appreciates the valuable contribution of the members on our Technical Review Panel: Dr Neil Byron, Heather Campbell, Dr Matt Colloff, Dr Mark Dangerfield, Professor Terry Hillman, Dr Gary Jones, Professor Peter Kanowski, Professor Ted Lefroy, Professor Stewart Lockie, Associate Professor Darryl Low Choy, Professor Warren Musgrave, Dr Mark Stafford-Smith, Dr Richard Stirzaker and Dr Brian Walker.

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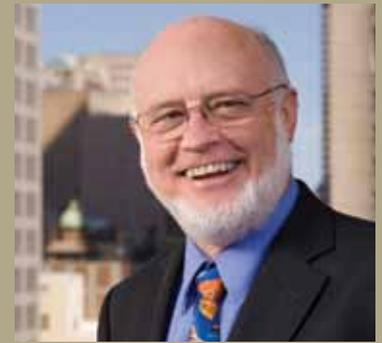
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Document No. D10/3327

ISBN: 978 1 921050 63 3

Commissioner's foreword



Since 2003, 13 Catchment Management Authorities across NSW have been responsible for working with their communities to plan and manage their landscapes in order to reconcile community aspirations with the capacity of our natural systems. This regionally-focussed planning and project delivery is set within a framework of agreed targets, a standard to ensure high quality practice and locally-developed and driven Catchment Action Plans that set out investment and action priorities.

It is now almost six years since the NSW government put these elements in place, and it is an important moment to reflect on how we are tracking towards healthier, more resilient landscapes. The Natural Resources Commission has the great privilege of independently testing and assessing how well these arrangements are working on the ground and what progress we are making. One of the Commission's central roles is to rigorously audit how effectively the Catchment Action Plans are being implemented.

My assessment is that NSW now has institutional arrangements and maturing organisations that are giving us the best chance we have had to truly implement an integrated approach to catchment management, where all components of the landscape are managed together in partnership with the community. This has been a policy aim of governments for several decades, but the previous governance arrangements and institutions have not been able to truly realise this aspiration.

Now, with well established regional organisations, a growing culture of collaboration at the state-wide scale and a commitment to whole-of-government and community planning, I think we are well on our way. Of course it is not yet perfect, but we have established strong foundations and it is headed in the right direction.

This maturity and professionalism in the natural resource management field is also evident in a shift we are seeing in the way we think about our landscapes. We now understand that the processes operating in a landscape are essential for providing goods and services - clean air, water, food, fibre, and biodiversity – and that our management should be aiming to maintain the integrity of these processes, rather than return the landscape to an impractical pre-development state. This is an exciting development and Catchment Management Authorities are leading the way in applying some of the best new thinking to this complex area.

However, as well as CMAs and communities have performed, we are not going to turn the tide of landscape degradation until we harmonise the other programs and regulatory settings around regional planning and voluntary landscape stewardship. That is the real challenge for us now, and it will take a new approach at state and national levels to remove the institutional barriers stopping Australia from fully implementing an integrated approach to catchment management.

To get the most out of this community driven approach to natural resource management we should be prepared to scale back top-down prescription to let regional creativity and innovation more effectively show us how to reconcile the complex needs of communities with the limits and possible futures of our landscapes. However, this must be backed up by rigorous, performance-based auditing.

I believe NSW now has the institutional capacity to support continued innovation that will keep NSW at the forefront of landscape management. I look forward to seeing NSW build on this success to deliver a truly coordinated approach to managing whole landscapes, harnessing all the experience and expertise within the community, industry and all arms of government.

Sincerely,

A handwritten signature in blue ink, appearing to read 'John Williams', written over a light blue circular graphic element.

John Williams

Commissioner

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Chapter 1

Introduction and executive summary

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1 Introduction and executive summary

Governments and communities around the world are trying to reconcile the needs and expectations of our communities with the biophysical realities of our natural systems.

In 2003 the NSW Government adopted a pioneering set of reforms for managing natural resources – the latest in an evolving set of institutional arrangements for landscape management. The reforms were designed to develop a professional, outcomes-based approach to natural resource management (NRM) and to give local communities a more direct say in how their natural resources are managed.¹

The NRC is required to report on the progress towards: the 13 state-wide targets for resource condition improvement; the Standard for Quality NRM (the Standard); and the effectiveness of Catchment Action Plan (CAP) implementation.²

2010 is a milestone year for the NRM system in NSW. It is the midpoint for implementation of the 10 year state-wide targets and the 10 year CAPs.³ Our collective understanding of the system's potential and how it can best operate has been growing and improving as we learn from experience in implementing a previously untried approach. By understanding what is working well, and any constraints to progress, we can grasp the opportunities to accelerate progress on our way to 2015 and beyond.

This progress report addresses four key questions:

- **What have we done?**

How has the current regional model for NRM evolved and been implemented?

- **What results are Catchment Management Authorities (CMAs) achieving?**

How effectively are CMAs implementing their CAPs with their communities? Is this making a difference on the ground?

- **What do we know about resource condition and trend in each CMA region?**

What do we value in the region? What is the current condition of natural resources and what are the NRM challenges in the region?

- **Where are we going?**

What are the future directions and main priorities for improving the way NSW manages natural resources?

The following sections describe the NRC's main findings and recommendations for action to build on what has been achieved and take NRM in NSW to the next level.

1.1 Findings

Overall, the NRC has found that the NSW regional model for NRM is an effective mechanism for supporting land managers to voluntarily manage their land better for both public and private benefit. Giving regional communities a more direct say in the complex task of reconciling community needs with ecosystem health is succeeding where previous top-down approaches have failed.

The NRC's audits verify that good projects are being delivered across NSW. These projects are well designed which gives confidence that they are likely to produce good results in the longer term. Significantly, even though the NRC audited CMAs during the recent drought, almost half of the audited projects showed observable resource condition improvement at the site scale.

NSW's NRM institutions are well established and have provided relative continuity over the last six years, in a field that has typically changed regularly. CMAs have had time to build their own capacity and that of their communities. NSW is now seeing the benefits of sustained and relatively consistent efforts to encourage private land holders to manage their land, water and soil resources more sustainably for their own and everyone else's long term benefit.

CMAs are maturing into credible, regional organisations that are allowing adaptive management to really start working. This is best exemplified by the results of Murray CMA's second audit which shows significant improvement over a two year period, and the innovative draft upgraded CAPs recently developed by Central West and Namoi CMAs.

There is a shift occurring in the way we think about and manage natural resources. The theory and practice of NRM is moving away from the conservation-based thinking of restoring landscapes to pre-1750 conditions, and there is a growing understanding that landscapes are made up of human communities and biophysical processes that interact and shape each other and are constantly changing.

CMAs are trialling resilience thinking as a new frame for helping communities understand how their catchments are working and where and how they should intervene to keep landscape systems operating in harmony. Resilience thinking aims to identify the few most important things that influence how complex landscape systems are behaving and how they can best be managed to support increased environmental, economic and social values over the longer term. This fresh thinking has the potential to better inform: how we can reconcile social, economic and environmental values across landscapes in upgraded CAPs; where we should target our interventions to make our landscapes more resilient; and what we should monitor to demonstrate results and test our assumptions about how natural systems will react to management.

1 Second Reading Speech for the *Native Vegetation Bill*, *Catchment Management Authorities Bill* and *Natural Resources Commission Bill*, NSW Hansard Articles: LA: 12/11/2003 #51.

2 Under s 15(2)(b) of the *Natural Resources Commission Act 2003*. "The Commission is to provide the Minister with annual reports on its work and activities including on (b) the progress in achieving compliance with the state-wide standards and targets adopted by Government, including the effectiveness of the implementation of catchment action plans in achieving compliance with those standards and targets."

The NRC's previous, stand-alone progress reports were published in 2006 and 2008 at major milestones in the implementation of the CAPs. (a) Natural Resources Commission (2006), *Progress of Catchment Action Plans: their place in current and future natural resource management in NSW*. This report drew together lessons from the NRC's first eight reviews and recommendations for approval of draft CAPs. (b) Natural Resources Commission (2008), *Progress report on effective implementation of Catchment Action Plans*. This report drew together lessons from the NRC's first seven audits of effective implementation of the CAPs.

3 The Standard and targets were adopted in 2005, following legislative and organisational changes in 2003–2004.

The experience of the last six years shows the value of giving local communities a more direct say in how natural resources are managed. Environmental, social and economic challenges that frustrate national and international policy efforts are being addressed and solved at the local and regional scale. The lessons from these new methods can be shared to inform how we can design policy settings from the local through to the international level in ways that better harness the inherent creativity of citizens, land managers, non-government organisations, industry and governments. Given sufficient flexibility, all these parts of the community can contribute to reconciling the needs and expectations of society with the biophysical realities of our natural systems. If rigorous audit processes are in place to ensure learning and improvement, top-down rules and directions can be scaled back so that regional innovation can flourish.

These lessons inform five priorities for government to build more cohesive and collaborative landscape management across all of government and the community:

1. **Implement whole-of-government and community catchment planning** – to make sure that the left and right hands of government-funded investment programs are all targeted at the key issues in specific landscapes.
2. **Improve science and knowledge base to better inform decisions** – to cut through the complexity of linked natural and socio-economic systems so different natural resource managers understand where they sit in those systems and how to collaborate on multi-scale problems.
3. **Implement whole-of-government adaptive management** – to build on and share what is working and avoid re-inventing the wheel.
4. **Match funding to landscape need** – to invest in the maintenance of landscapes at a scale commensurate with the value of the services they provide, such as clean water and air, food and biodiversity.

5. **Design sound policy to complement stewardship** – to make sure that our laws don't create perverse incentives that undermine communities' efforts to voluntarily steward natural resources.

1.2 Recommendations

The NRC has developed a set of recommendations that should form the foundation for ongoing improvement in NRM over the next period of CAP implementation (**Table 1.1**). The NRC's recommendations build on existing collaborative initiatives of agencies, CMAs and the NSW Government NRM Senior Officer Group (SOG), and are explained in more detail in **Chapter 5**.

1.3 Structure of this report

The following chapters explain the NRC's findings and recommendations in more detail:

- **Chapter 2** describes how the model for NRM in NSW has evolved and been implemented
- **Chapter 3** describes how effectively CMAs are implementing CAPs with their communities
- **Chapter 4** describes available resource condition data and provides an overview of the main NRM values, challenges and management efforts in each CMA region
- **Chapter 5** describes future directions and the priorities for government to improve the management of natural resources in NSW.



Table 1.1: Recommendations for the NSW Government and next steps to improve progress

Recommendation	Next steps
Implement whole-of-government and community catchment planning	
<p>1 That the NSW Government prioritise development of upgraded, whole-of-government and community CAPs, so that new CAPs are in place by the end of 2012.</p>	<ul style="list-style-type: none"> • build agency and CMA capacity to apply resilience thinking through collaborative assessments across CMA boundaries, and establishing a community of practice (SOG, NRC, CMAs) • develop guidance material for agencies and CMAs on how to develop upgraded CAPs (NRC, SOG) • use the CAP upgrade process to align CAPs and identified priority policies, such as Water Sharing Plans, the draft Biodiversity Strategy, Climate Change Adaptation Plans and Local Government Community Strategic Plans (SOG, CMAs)
<p>2 That the NSW Government seek greater coherence among state-wide plans and policies, focusing within NRM initially and working with other government policy areas in the longer term.</p>	<ul style="list-style-type: none"> • review, align and update priority state-wide policies and strategies: <ul style="list-style-type: none"> • using the knowledge and priorities being generated through the CAP upgrade planning process (SOG) • prioritising water management plans, regional strategies, land management planning, climate change adaptation, and plans of management for public land (SOG) • facilitate collaborative planning and sharing of common evidence base with other government policy areas such as mining, transport, emergency services and health planning (SOG)
Improve science and knowledge base to better inform decisions	
<p>3 That the NSW Government supports revision of the state-wide targets.</p>	<ul style="list-style-type: none"> • work with agencies, CMAs and communities to recommend a revised set of targets to government (NRC)
<p>4 That the NSW Government implement and effectively resource its MER Strategy 2010–2015 and further improve its decision-making capacity at multiple scales.</p>	<ul style="list-style-type: none"> • invest in the collection of the essential data program identified in the MER Implementation Plan at a minimum (Government) • review and rationalise indicators and data collection based on conceptual and predictive models of landscape function and resilience in the upgraded CAPs and revised state-wide targets (NRC, SOG) • link catchment monitoring and evaluation to revised CAP targets and conceptual models of landscape change (SOG, NRC, CMAs) • integrate monitoring and evaluation of investment, performance, outputs and outcomes spatially and in open access systems (SOG, NRC, CMAs) • use MER to inform and calibrate conceptual and predictive modelling of expected change as a result of management actions, and the impacts of climate change, land use and other activities (SOG, NRC, CMAs) • prioritise evaluation of community capacity for NRM and its contribution to landscape change (SOG, NRC, CMAs)

Recommendation	Next steps
Implement whole-of-government adaptive management	
<p>5 That the NSW Government institutionalise system-wide learning and improvement processes.</p>	<ul style="list-style-type: none"> formalise the whole-of-government co-ordination function provided by the Senior Officer Group (Government) work with other jurisdictions to develop COAG- and Ministerial Council-level agreements on NRM policy, investment and performance-based adaptive management (Government) create formal processes to continually improve NSW Government NRM efforts, including independent evaluation of policy and program delivery (SOG) use the State of the Catchment reporting process to evaluate CAP implementation across government and communities (NRC) maintain and improve use of the Standard and CAP audit processes, and revise the state-wide targets (Recommendation 3) (NRC)
Match funding to landscape need	
<p>6 That the NSW Government better co-ordinate and increase funding in the health of NSW biodiversity, water, land and communities.</p>	<ul style="list-style-type: none"> advocate to the Australian Government for a recommitment to regional planning and increased investment in CAP implementation as part of the mid-term review of Caring for our Country (Government) facilitate alignment between state and local government investment programs and priorities outlined in regional CAPs (SOG) establish a common system for spatially tracking total Australian, NSW and local government investment (SOG) increase the amount of investment funding through CAPs (Government) research innovative markets and economic tools to better capture third-party investment (SOG, NRC) modify budgetary arrangements for CMAs by: <ul style="list-style-type: none"> immediately introducing measures to inform CMAs of their forward estimate budgets at least 12 months in advance (Government) introducing trust arrangement so that CMAs can commit to multi-year payments and buffer variation in government funding sources (Government)
Design sound policy to complement stewardship	
<p>7 That the NSW Government promote design of regulatory and other policy tools to complement voluntary landscape stewardship.</p>	<ul style="list-style-type: none"> facilitate systems for regional-scale knowledge to inform policy design at state, national and international scales (Government) ensure that policy and regulatory design considers the implications for voluntary landscape stewardship (Government) research and advocate to the Australian Government that emerging policies on carbon pricing and sequestration, water recovery purchases, water infrastructure investment, energy security, food security and sustainable population should consider and support voluntary landscape stewardship and integrated landscape management (Government)

Chapter 2

NRM: What have we done?

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2 NRM: What have we done?

The current approach to NRM in NSW is the latest in an evolving set of arrangements to respond to the ongoing ‘wicked’⁴ public policy problem of how to balance the many – often competing – environmental, social and economic benefits we derive from our natural landscapes.

The following sections explain the history and context for the current NSW regional delivery model for NRM, describe how the model has been implemented and evolved, and examine where it is heading.

In summary:

- Australian and state governments have tried a range of approaches over many decades to encourage and institutionalise sustainable management of our natural assets.
- The NSW NRM reforms initiated in 2003 – establishing the regional delivery model and the Standard and targets framework – were pioneering and remain at the forefront of international thinking on NRM.
- The fundamental institutional arrangements are in place and operating reasonably well.
- We are moving into a ‘response’ phase in development of the model where we need to revisit our planning frameworks and policy settings with the benefit of the lessons of the last six years.



Audited project site

Source: Western CMA



Native grass seed

Source: Border Rivers-Gwydir CMA

2.1 The business of natural resource management

Governments and communities around the world have been grappling with sustainability, and sustainable development for decades. From the Club of Rome in 1972⁵, through to global Earth Summits and recent international negotiations on climate change, global awareness of the linkages between human quality of life and the health of our natural environment has grown.

In Australia we are acutely aware of how our past use of natural resources has affected their current condition, and how their likely future state will constrain or support our potential enjoyment of clean air, water and healthy, productive soils. How we decide to use and manage our land, coasts, rivers and catchments influences our landscape’s ability to provide us with food and fibre, support key industries, and sustain our communities and our quality of life.

NRM is about managing the way in which people and natural landscapes interact. From the most localised plans for rehabilitation of a river reach, to the global agreements seeking co-operative action for climate change and biodiversity conservation⁶ – governments at all levels are trying to find ways to better manage the tightly linked social and ecological processes that shape our world, and its possible futures. Over time, we need to build a reinforcing cycle where our natural systems keep improving, and can therefore support greater social and economic uses that society wants now and may want in the future.

NRM aims to improve production, conservation and community outcomes. It is not just about reserving large areas of land;

4 ‘Wicked’ problems are generally seen as complex, open-ended and intractable, where the nature of the problem and the solution are highly contested. Head, B (2008), ‘Wicked problems in public policy’, *Public Policy*, Vol 3, No 2.

5 Meadows, D, Randers, J, Meadows, D, and Behrens, W (1972), *The Limits to Growth: A report for the Club of Rome’s Project on the Predicament of Mankind*.

6 For example, the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity.



Pitfall trapping

it is about keeping people in the landscape and engaged in sustainable activities. Australia needs people to manage and care for its diverse landscapes. In this way, the NRM sector can offer opportunities for employment growth in rural, regional and coastal communities.

In NSW, NRM aims to improve the health of our landscapes by building community capacity for sustainable management of natural assets. With 89 per cent of NSW land privately managed⁷, the health of our diverse natural landscapes depends heavily on voluntary private stewardship of environmental assets.

NRM is about making sound decisions now, so we avoid future costs – whether these take the form of higher prices for food and fibre, compensation payments or planning appeals, the costs of repairing degraded land, high water rates to offset expensive infrastructure, or higher treatment and purification costs as we lose the natural functions that produce clean air, water and soil.

2.2 The NSW NRM framework in context

The current regional delivery model for NRM in NSW is the latest in an evolving approach to encouraging stewardship of private land for overall landscape health. It reflects the trends over recent decades towards:

- integrated management of natural assets at a regional scale

- extension and encouraging voluntary effort for landscape stewardship
- evidence-based decision-making.⁸

Figure 2.1 illustrates some of the important international-, national- and state-scale milestones that have influenced the evolution of the current regional model.

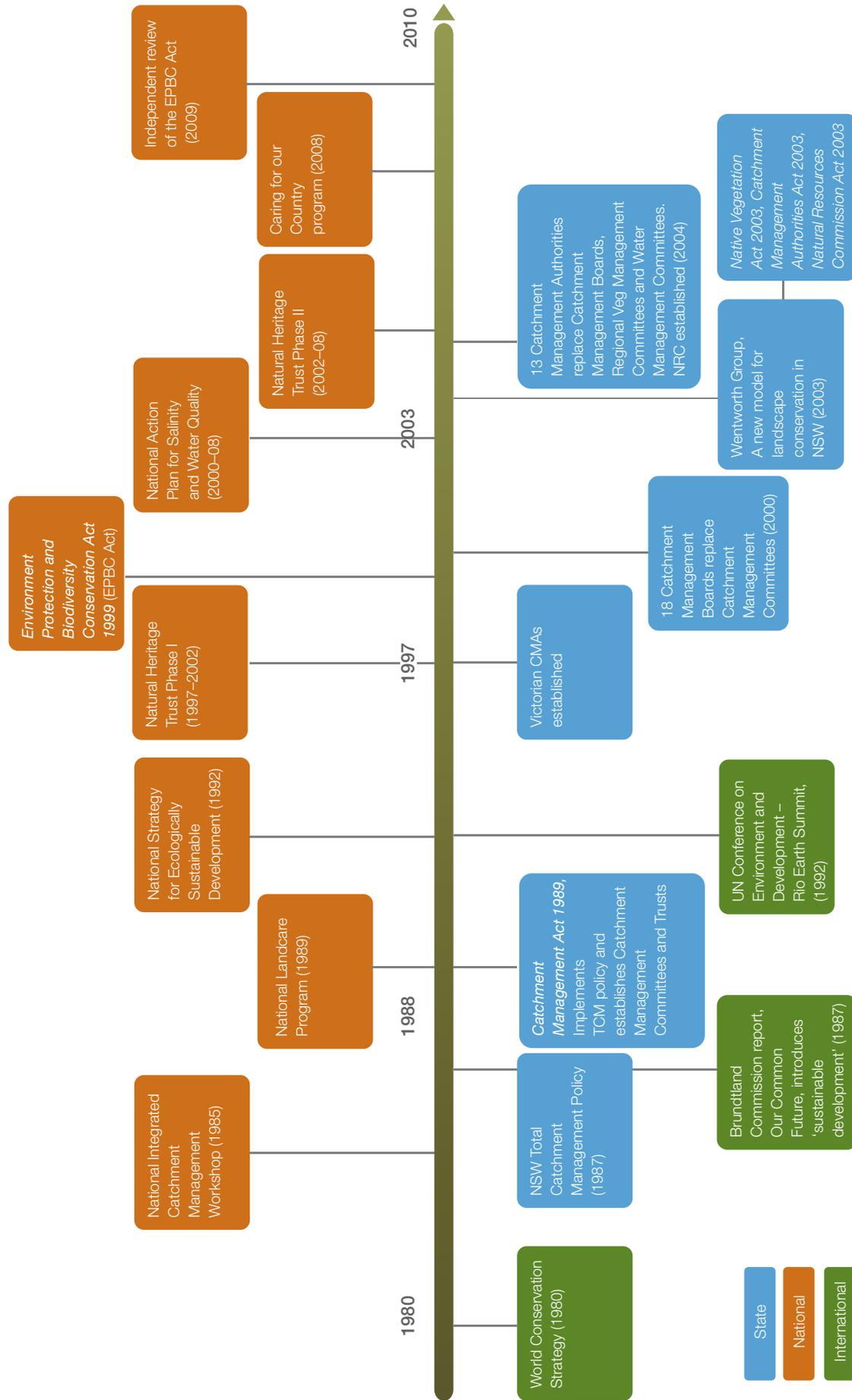
The current approach to NRM in NSW has its roots in the philosophy of total catchment management (or integrated catchment management). These concepts were formally developed in the 1980s, but their roots can be traced back even further.⁹ The basic principles of total catchment management are to: integrate the management of land and water resources at the water-catchment scale; involve communities in planning and managing their landscapes; and find a balance between resource use and resource conservation. NSW was the first Australian state to institutionalise total catchment management through the *Catchment Management Act 1989* – which included creating 18 catchment management committees, overseen by a state catchment management co-ordinating committee.

⁷ Freehold and leasehold, AUSLIG land tenure database 1993. NSW has a total of 801.6 thousand square kilometres of land of which approximately 50.6% is private freehold title, 38.5% is crown leasehold managed privately and 10.7% is public land.

⁸ Campbell, A (2009), 'It's time to renew Landcare', *Agricultural Science*, No 2, accessed at www.triplehelix.com.au.

⁹ For example, a 1948 report into flood mitigation in the lower Hunter recommended forestry and soil conservation measures to complement the traditional engineering solutions that were favoured at that time. The report also recommended a body be established by legislation to collect a levy to fund and manage the works, perhaps one of the first times a catchment management body was recommended in Australia. It also recommended expenditure over a 20-year time period to complete the full set of recommendations. NSW Department of Conservation (1948), *Report of Hunter River Flood Mitigation Committee*.

Figure 2.1: Some important events in the evolution of the regional delivery model for NRM ¹⁰



10 Adapted from (a) Griffith, R (2009), NRM models and frameworks: Advantages and pitfalls. Available at www.nrc.nsw.gov.au. (b) Reeve, I (2002), Agriculture and NRM in the Murray Darling Basin: A policy history and analysis, Report to the Murray Darling Basin Commission, Institute of Rural Futures.

In 2003, the NSW Government sought to update and improve the institutional arrangements for NRM, at the same time as it legislated to end broad-scale land clearing. It enacted legislation and created new organisations to manage at a regional scale the relationship between government and private landholders to promote healthy rivers, productive soils, diverse native species and thriving communities throughout our state.

There were several key objectives underpinning the 2003 reforms:

- to move away from the traditional conflict between conservation and production that had previously characterised the natural resources debate
- to develop a professional, outcomes-based approach to NRM
- to ensure clear articulation of roles and responsibilities
- to encourage greater involvement of communities in managing their landscapes
- to establish targets so that we can track progress and know when we have achieved our goals
- to audit progress so that good practice can be supported and problems can be identified and fixed early.¹¹

The reforms are based on the idea that issues are best managed by the most devolved level of authority that has the capacity to do so satisfactorily.¹²

2.3 Elements of the 2003 reforms

The 2003 reforms included new legislation¹³, new organisations and innovative assurance and accountability mechanisms. The main elements of this reform were:

- establishing 13 regionally based CMAs to work with their communities to deliver regionally relevant NRM
- establishing state-wide targets outlining the goals for NRM, and the *Standard for Quality NRM* (the Standard) describing how we should go about NRM to achieve the targets (see **Boxes 2.1** and **2.2**)
- charging CMAs with developing and implementing CAPs that set out their region's strategic priorities for investment and action, promote the targets and comply with the Standard

- establishing the NRC to independently review CAPs and audit their implementation to drive accountability and continual improvement
- clarifying the role of central agencies such as the now Department of Environment Climate Change and Water (DECCW)¹⁴ and Industry and Investment NSW (I&I) as lead policy and technical organisations
- establishing the Natural Resources Advisory Council (NRAC) as a forum for diverse stakeholder views to be shared with the Government.

Guiding natural resource managers' efforts is an aspirational goal recognising that people are integral to our landscapes. In NSW we are aiming for:

Resilient, ecologically sustainable landscapes functioning effectively at all scales and supporting the environmental, economic, social and cultural values of communities.



Source: Western CMA

11 Second reading speech for the *Native Vegetation Bill, Catchment Management Authorities Bill and Natural Resources Commission Bill*, NSW Hansard Articles: LA: 12/11/2003 #51.

12 The principle of 'subsidiarity', which says that tasks should be decentralised to the lowest level of governance with the capacity to conduct it satisfactorily; Marshall, G (2008), 'Nesting, subsidiarity, and community-based environmental governance beyond the local level', *International Journal of the Commons*, 2, 75–97.

13 *Native Vegetation Act 2003, Catchment Management Authorities Act 2003 and Natural Resources Commission Act 2003.*

14 The central agencies have changed a number of times since 2003. Policy, technical and corporate support to CMAs was originally provided by the then Department of Infrastructure, Planning and Natural Resources, followed by the Department of Natural Resources, then the Department of Environment and Climate Change, which is now DECCW.

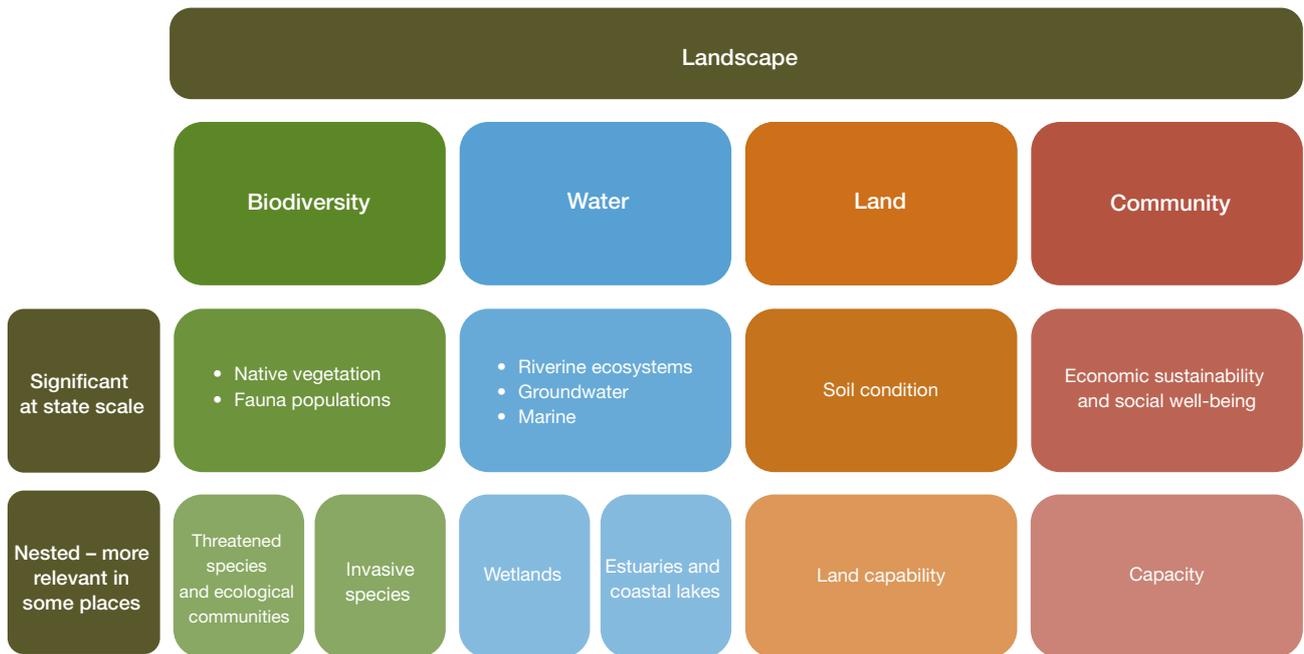
Box 2.1: State-wide targets for NRM

The state-wide natural resource targets identify what we need to achieve by 2015 if we are to realise the longer-term goal of healthy, productive and resilient landscapes.

The state-wide targets were designed to provide CMAs with the right balance of state-level guidance and flexibility so they could incorporate community values to prioritise investment at the regional level. These targets, while being interdependent, are intended to be pursued in different ways across landscapes, according to the current and desired balance between competing uses in each region.

The intent of the state-wide targets is to provide us with the goal posts our combined efforts are aiming for. They should provide a consistent focus to co-ordinate investment, policy and action in NRM, and help us track our progress.

The figure below illustrates the landscape elements covered by the 13 state-wide targets. The full wording of the targets can be found at www.nrc.nsw.gov.au and in **section 4.2** of this report.



Box 2.2: The Standard for Quality NRM

The NSW **Standard for Quality Natural Resource Management** (the Standard) underpins high-quality NRM practice in NSW. While the targets define what we want to achieve, the Standard defines how we should go about the business of NRM to deliver them. With so many people involved it is important that decisions support investment where it is most needed, aim for the highest quality results and stand up to public scrutiny.

The Standard defines required levels of quality for seven components of NRM. These seven components support high-quality decision-making in all four phases of adaptive management: planning, implementation, audit and response.

The figure below lists the seven components of the Standard, and describes what the Government expects all good natural resource managers to do (required outcomes).

Collection and use of knowledge	<ul style="list-style-type: none">• Use the best available knowledge to inform decisions in a structured and transparent manner
Determination of scale	<ul style="list-style-type: none">• Management of natural resource issues at the optimal spatial, temporal and institutional scale to maximise effective contribution to broader goals, deliver integrated outcomes and prevent or minimise adverse consequences
Opportunities for collaboration	<ul style="list-style-type: none">• Collaboration with other parties to maximise gains, share or minimise costs or deliver multiple benefits is explored or pursued wherever possible
Community engagement	<ul style="list-style-type: none">• Implementation of strategies sufficient to meaningfully engage the participation of the community in the planning, implementation and review of natural resource management strategies and the achievement of identified goals and targets
Risk management	<ul style="list-style-type: none">• Consideration and management of all identifiable risks and impacts to maximise efficiency and effectiveness, ensure success and avoid, minimise or control adverse impacts
Monitoring and evaluation	<ul style="list-style-type: none">• Quantification and demonstration of progress towards goals and targets by means of regular monitoring, measuring, evaluation and reporting of organisational and project performance and use of the results to guide improved practice
Information management	<ul style="list-style-type: none">• Management of information in a manner that meets user needs and satisfies formal security, accountability and transparency requirements

CAPs guide NRM in the 13 catchment regions across the state. They bring together government priorities, best available science and the values of catchment communities into a strategic plan for making improvements in NSW's natural resources.

CAPs act as prospectuses for collaborative action and investment by government agencies, communities, local-level organisations, and industry. However, CAPs aren't the only mechanisms that influence landscape health and NSW's ability to meet the targets. It is important to view the role of the CMAs and CAPs within the broader policy and regulatory framework for managing the environment, and land use and management in NSW.

2.4 The path to sustainable landscape management

The fundamentals of the governance system envisaged in 2003 are in place and operating reasonably effectively:

- new organisations have been established (CMAs, NRC, NRAC)
- the Standard and targets framework has been adopted to guide NRM effort across the state¹⁵
- each regional CMA is operating under an approved strategic plan (CAP) outlining NRM priorities for their region¹⁶
- the NRC has audited how effectively each of these CAPs is being implemented and CMAs are responding to recommendations to improve their performance¹⁷
- a revised Monitoring, Evaluation and Reporting (MER) Strategy is operating to generate information on resource condition and trend¹⁸

- the NRC has reported to the Government on progress to the Standard and targets.¹⁹

Some of the important milestones in implementation of the 2003 reforms are illustrated in the timeline, **Figure 2.2**.

During this reform process there have been several significant shifts in agency responsibilities as a result of restructures, and a major shift in program design away from joint Australian-state government funding of NRM to unilateral funding of CMAs. Despite these considerable changes in governance, CMAs have been able to reorganise their operating arrangements and continue to effectively implement their CAPs. CMAs have demonstrated skill in managing changes in the external environment to become stable institutions in their regions.

The reforms of 2003 described in very broad terms how the institutional arrangements should work. While the legislation provided the basic structure of the new model, much of the detail of its operation has evolved and been developed through the experiences of implementing the new approach. We are now in a 'response' phase where CMAs and government have the opportunity to learn from the experiences of implementing the regional model so far, and take steps to improve performance.

Through implementing the basics we are learning about what else is needed for a more coherent and effective framework for sustainably managing natural resources. CMAs are responsible for delivering quality projects with durable results that will cumulatively add up to landscape-scale change. We need to recognise that this work at a local scale is part of a bigger system where CMAs will not always have the role or scope to directly influence the stronger drivers of landscape health.



Source: Border Rivers-Gwydir CMA

¹⁵ The Standard and targets were recommended in September 2005. Natural Resources Commission (2005), *Recommendations: State-wide Standard and Targets*.

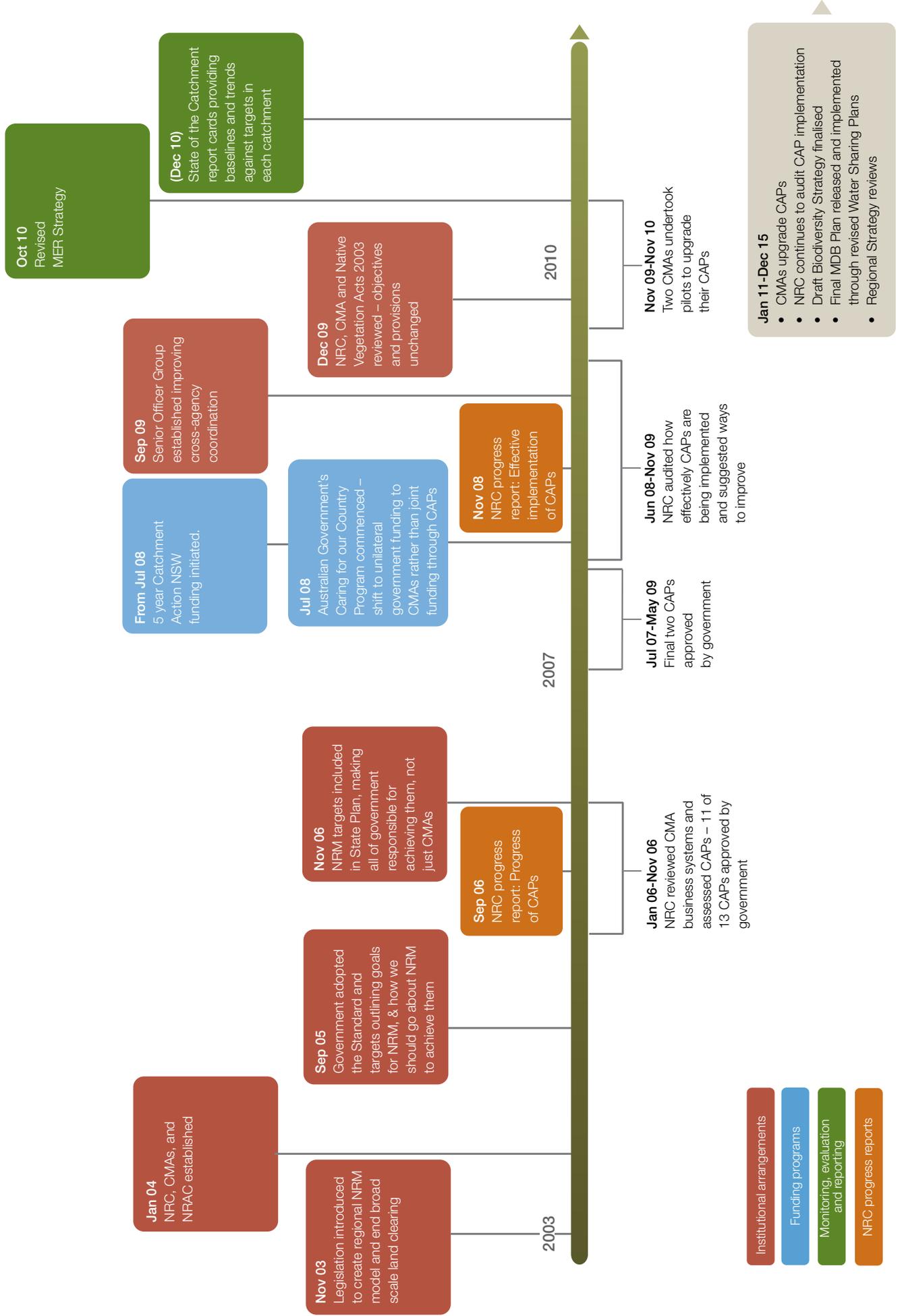
¹⁶ Most CAPs were developed in 2005 and 2006 and approved by Cabinet in 2007. Sydney Metro CMA's CAP was reviewed in 2008 and approved by Government in 2009. Each CAP was recommended subject to a number of recommended actions to improve CMA planning and performance over time.

¹⁷ A full set of the NRC's audit reports can be accessed at www.nrc.nsw.gov.au.

¹⁸ Department of Environment, Climate Change and Water (2010), *NSW Natural Resource Monitoring Evaluation and Reporting Strategy 2010–2015*.

¹⁹ NRC's previous progress reports from 2006 and 2008 can be accessed at www.nrc.nsw.gov.au.

Figure 2.2: Important milestones in implementing the NSW regional model for NRM





Source: Border Rivers-Gwydir CMA

The NRC has identified five principles that need to work together to get the most out of governments' investments in CMAs, but also to build a more co-ordinated and effective approach to broader landscape management, encompassing all government functions. The five principles are:

1. Whole-of-government and community catchment planning

Initially, CAPs were seen as being principally owned by CMAs; now CAPs are increasingly becoming whole-of-government and community strategic NRM plans. For greater investment efficiency we should continue to build capacity and momentum in aligning investment, improving prioritisation and enabling on-ground collaborative work. We can achieve greater benefits from investment if the policies, priorities, and programs from the local to the Australian Government scale are better aligned and explicitly reconciled on the ground through the non-statutory CAPs and programs co-ordinated by CMAs.

2. More relevant science to support decisions at all scales

Management interventions in the landscape are most effective when underpinned by knowledge of landscape function and what needs to be done at what scale to achieve the most effective outcome. We must continue to invest in, and value, knowledge about how our landscapes work.

3. Whole-of-government adaptive management

Continual learning and improvement at all scales is the way to manage the complexity and uncertainty of how people and natural systems interact and co-evolve. Institutional continuity enables structured, adaptive learning over a long timeframe.

4. Sustainable, adequate funding

Sustained funding to overcome inherent market failures is needed to encourage long-term stewardship of landscapes for both public and private benefit. Reliable, co-ordinated, long-term funding that recognises the public good generated through private land management is essential.

5. Better policy design to complement stewardship

The CMA experience can inform where voluntary action can be most effective and where other government levers are needed for the best outcomes. Regulation, taxation and other government policy tools should be designed to consider and support stewardship. CMAs have data and methodologies that government can use in designing regulatory tools.

These elements are explored further in **Chapter 5** where we outline priorities for improving effectiveness and provide recommendations to more fully implement these principles in NSW.

Chapter 3

What results are CMAs achieving?

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3 What results are CMAs achieving?

The role of the CMAs is to work with local communities to deliver real natural resource improvements²⁰ and CAPs are the vehicle for co-ordinated government and community action. The NRC has audited how effectively all CMAs are implementing their CAPs.

Overall, the NRC has found that:

- CMAs are effectively engaging communities and delivering on-ground works that are likely to lead to local resource condition improvement. The NRC's audits give confidence that the project outputs being delivered are likely to lead to resource condition change over time.
- Some CMAs are effectively prioritising investments and adaptively managing, but many need to improve in this area.
- We are learning about the real business of CMAs. For example, CMA staff are very skilled and experienced in building relationships with landholders to encourage behaviour change and landscape stewardship, and they are good at bringing the best science to projects in a way that is practical and easy to apply for landholders.
- CMAs are taking a sophisticated, professional approach to NRM and there is evidence that the audit process can effectively drive improvements in organisational performance.

The following sections explain:

- the overall results of the NRC's audits on how effectively CMAs are implementing the CAPs
- how effectively CMAs are delivering on-ground results
- the CMAs' successes in engaging their communities
- how well CMAs are prioritising and adaptively managing their investments.

3.1 NRC's audits of CAP implementation

In 2009 the NRC completed its first complete round of 13 CAP implementation audits. These audits test how effectively CMAs are implementing their CAPs, including how well they are building resilient landscapes through promoting the state-wide targets and complying with the Standard. In late 2010, the NRC audited Murray CMA for the second time, two years after this CMA's first audit.

Most CMAs are now four years into implementing 10-year CAPs. The first round of audits focused on the effectiveness of CMAs since they are the principal organisations leading CAP implementation. However, the audits recognise that all natural resource managers contribute to CAP achievement.

The NRC audits examined CMA performance across four lines of inquiry:

- effective **prioritisation** to ensure its investment decisions are guided by the CAP and investments are targeted to areas in the catchment that will achieve the best possible NRM results
- effective **community engagement** to ensure processes are in place to identify and foster partnerships, leverage continued participation and build community capacity
- achieving **on-ground results** to ensure projects are credibly contributing to longer-term targets, that projects deliver their intended outcomes and that the results will last
- using **adaptive management** principles and practices to continually improve and become more efficient.

The NRC audits were conducted by experienced auditors and NRM experts, combining recognised audit methodologies and standards²¹ and expert opinion. The NRC used a range of audit activities to test performance including:

- **site inspections** (over 100 state-wide) – involving desktop report analysis, data review, expert judgement, fieldwork and interviews with CMAs and third parties²² to assess actual natural resource change and engagement strategies against aims contained in plans
- **report verification** – involving fieldwork and interviews with CMAs and third parties to verify whether claims outlined in reports reflected what was happening on the ground
- **logic modelling reviews** – involving expert judgement, fieldwork and CMA interviews to examine the logic of targets set in plans and the links to outcomes at different scales
- **systems design review** – desktop report analysis and CMA interviews to assess whether business systems were adequate and appropriate (i.e. whether they were likely to meet the required outcomes of the Standard), fieldwork and interviews with CMAs and third parties to assess whether CMAs are using their systems effectively.

20 NSW Hansard Articles (2003), op. cit.

21 For example, The Institute of Internal Auditors Australia (2007), *International Standards for the Professional Practice of Internal Auditing*, and related *Practice Advisories* effective 2007; Standards Australia (2003), *ISO 19011:2003 Guidelines for quality and environmental management systems auditing*; Standards Australia and Standards New Zealand (2006), *Delivering assurance based on AS/NZS 4360:2004 Risk Management*, Handbook 158-2006; Auditing and Assurance Standards Board (2007) *Auditing and Assurance Standards and Guidance Statements*.

22 The auditors interviewed a range of stakeholders including Landcare groups, local government, state agencies, landholders, industry groups and other community groups.

All of the NRC's audit results are publicly available.²³ The audit reports contain descriptions of how CMAs are performing against each line of inquiry, case studies and recommended actions for CMAs to improve. CMA Boards periodically report to the NRC on progress in addressing recommended actions.

When the NRC last reported on progress in 2008,²⁴ it had completed audit field work for seven of 13 CMA audits. At that time the NRC concluded that the CMAs were implementing their CAPs in a way that achieved appropriate compliance with the Standard, given their early stage of development.

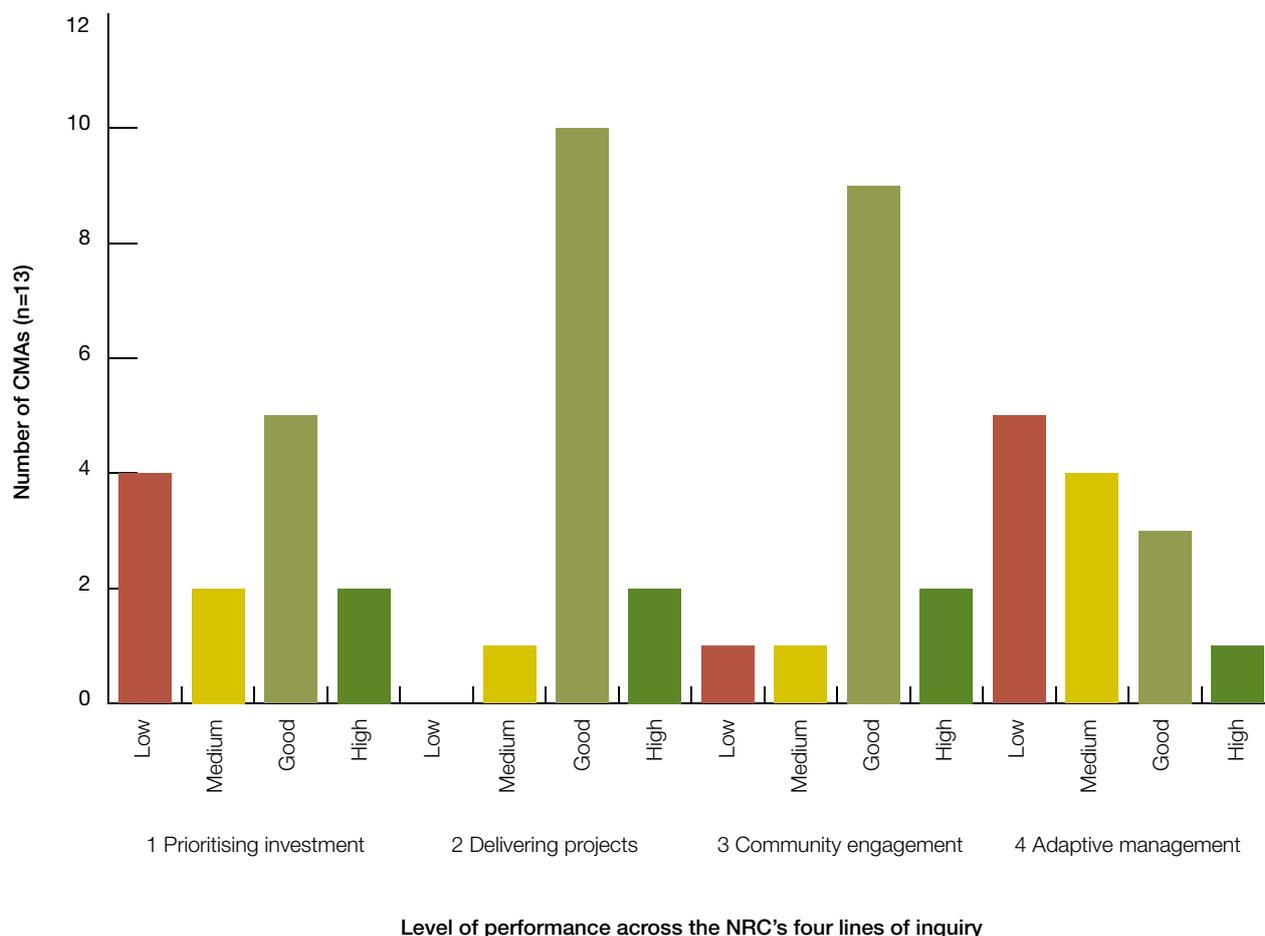
The remaining six audits were reported on by November 2009, and the results followed the same trend as the earlier audits. Some CMAs perform better than others and different CMAs have different strengths. However, nearly all CMAs showed strong performance in achieving on-ground results and effectively engaging their communities, particularly engaging landholders through training and on-ground activities.

While all CMAs understand the basic elements of adaptive management principles, many were not yet applying best-practice adaptive management to their business practices. A few CMAs were found to need improved prioritisation systems to get the best possible return on investments. **Figure 3.1** summarises the results from the first complete round of 13 audits across all lines of inquiry.



Hunter Valley

Figure 3.1: Snapshot of CMAs' levels of effectiveness across four lines of inquiry (first round of 13 audits)



²³ All NRC audit reports are available at www.nrc.nsw.gov.au/Workwedo/Catchmentactionplanimplementationaudits.aspx.

²⁴ Natural Resources Commission (2008), *Progress report on effective implementation on Catchment Action Plans*. In 2008 the NRC had audited the following seven CMAs: Border Rivers–Gwydir, Central West, Hawkesbury–Nepean, Hunter–Central Rivers, Lower Murray Darling, Murray and Western.



Tree planting at Bunnor

Source: Border Rivers-Gwydir CMA

During October–November 2010 the NRC audited the Murray CMA for the second time. Murray CMA is the only CMA to be audited twice by the NRC, providing the opportunity to reflect on how well one CMA is improving its performance. Since its first audit in 2008 the Murray CMA's leadership has led an observable improvement in organisational culture and business systems. The second audit of Murray CMA has found substantial improvements across most lines of audit inquiry, especially in the way they prioritise investments and adaptively manage.

For example, in 2008 the NRC found the CMA did not have a transparent, consistent or repeatable approach to the way it prioritised its investments, nor did it use the best available information or consider achieving multiple outcomes. In the latest audit the NRC found the CMA had established a clearly documented and well-defined system that ranked investment options, and this was well understood across the organisation by staff. There was evidence that the system was being implemented in a consistent manner, best available information was used and staff explicitly considered multiple outcomes in their decision making.

These results show how improvements can be made in a relatively short period of time when the right institutional structures are in place at different scales, namely improved governance at the CMA scale complemented by the audit process. The CMA considers that their previous audit results and the suggestions for ways to improve gave the organisation the necessary mandate to drive change throughout the organisation and improve their performance.

Based on the audit results against lines of inquiry and other observations through the audit process, the NRC identified three key factors which consistently distinguished between stronger and weaker performing CMAs. They were:

- the extent to which they had built (or not) a proactive organisational culture
- the extent to which they had established good governance and decision-making processes
- their commitment to continual improvement and learning, in particular as demonstrated by their attitude and approach to the NRC's audit process.

The NRC has also identified characteristics of strong performance against each line of inquiry. There are summarised in **Table 3.1**.

Overall, the NRC considers the performance across the state is suitable at this stage in the adaptive management cycle.

Outside of the audit process, the NRC has also seen that CMAs are working together more closely to collaborate and share information to improve collective performance. For example, the CMA Chairs Council is proving an effective mechanism for collective initiatives, and as a group CMAs have helped to inform policy with local knowledge and advocate for greater alignment and a whole-of-government approach to NRM. In 2010 CMAs held an inaugural CMA forum attended by over 150 CMA staff from across the state to share experience and knowledge. NSW is also participating in the National NRM Regions Working Group which is sponsoring initiatives such as national governance reviews²⁵ and piloting regional environmental accounts.

CMAs are demonstrating that one of their strengths is in generating new scientific knowledge and understanding of their landscapes. They have an important role as knowledge holders and knowledge brokers both outwards to their communities and upwards to other government agencies.

3.2 Delivering on-ground results

The NRC audited CMA projects that used vegetation to improve landscape function. This is because vegetation plays a key role in maintaining landscape processes and resources such as water recycling, providing habitat for native fauna and supporting economic production and other human uses. As such, vegetation restoration and management remains a key tool for CMAs to achieve integrated NRM outcomes.

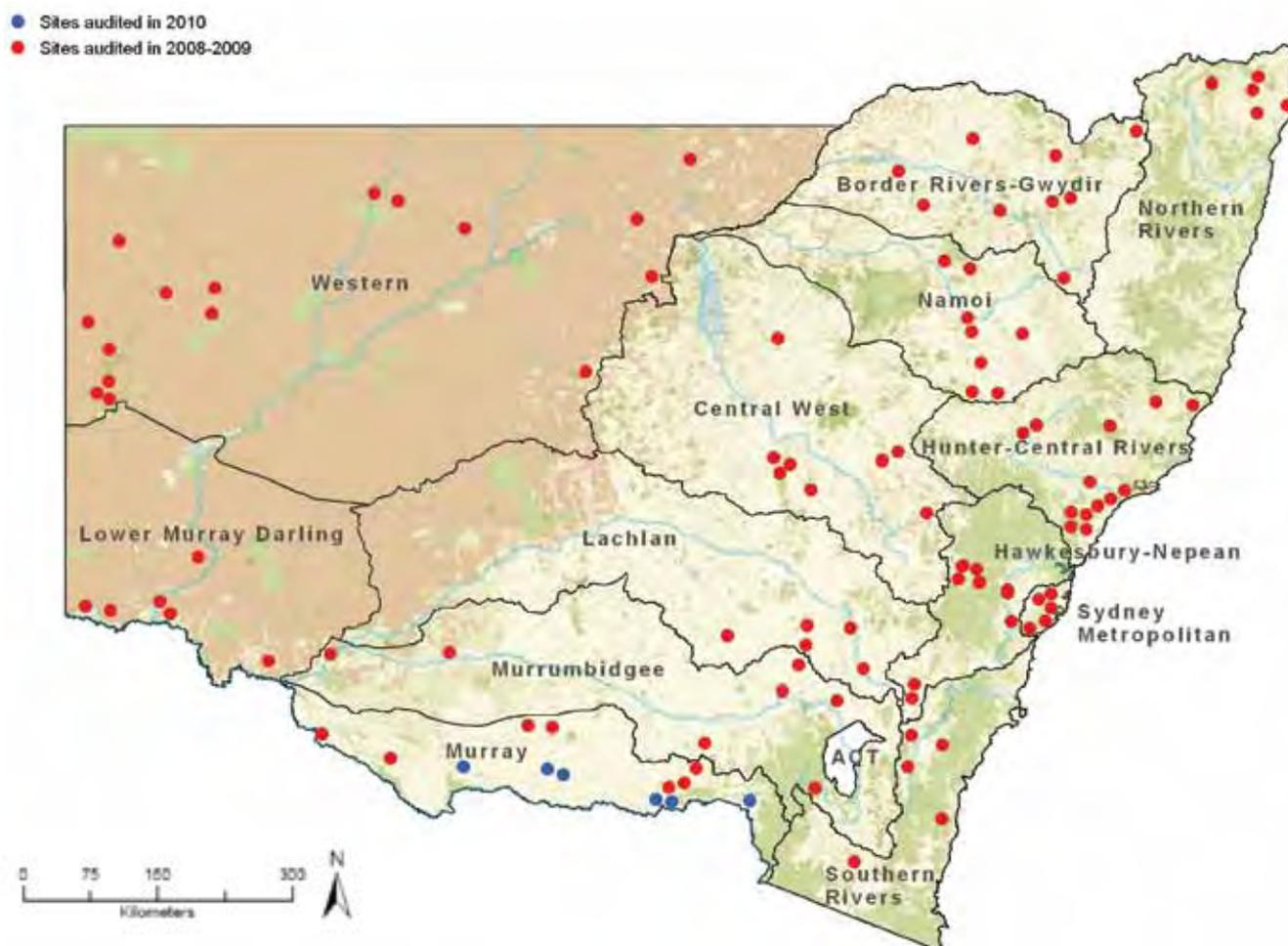
CMAs also have a primary role under the *Native Vegetation Act 2003*, assessing clearing applications and approving Property Vegetation Plans to maintain and improve environmental outcomes.

25 Ryan, S, Broderick, K, Sneddon, Y and Andrews, K (2010), *Australia's NRM Governance System: Foundations and principles for meeting future challenges*, Australian NRM Chairs, Canberra

Table 3.1: Key characteristics of strong CMA performance against each line of inquiry

NRC line of inquiry	Key characteristics of strong CMA performance in this area
<p>Did the CMA effectively prioritise its investments to promote resilient landscapes that support the values of its communities?</p>	<ul style="list-style-type: none"> • Strong, clear vision for the landscape carried consistently through a wide variety of documentation • Good understanding of resilience from a biophysical, social and economic systems perspective • Clearly documented prioritisation systems • Systems that considered multiple benefits across investments • Board and executive review of priorities for investment across the region • Prioritisation system enabled rapid adjustment to fluctuations in funding without stressing the organisation
<p>Did the CMA's vegetation projects contribute to improved landscape function?</p>	<ul style="list-style-type: none"> • Documented links between long-term outcomes and shorter-term management actions and a consistent understanding of these links across the CMA and by stakeholders • Highly efficient delivery mechanisms • Well-developed contract management systems • Well-designed projects that met CMA and landholder interests • Project delivery supported by good project management systems and sound logic assumptions based on good knowledge
<p>Did the CMA effectively engage its communities?</p>	<ul style="list-style-type: none"> • Strong culture of community and stakeholder engagement through entire organisation • Strong community engagement networks and systems to manage ongoing engagement and identify new groups • Community benchmarking to better inform business decisions and practice • Adjustment to funding approaches to better meet community needs • Specific engagement plans for each project, supported by an overarching engagement strategy • Formalised local government partnerships
<p>Did the CMA effectively use adaptive management?</p>	<ul style="list-style-type: none"> • A good understanding of current best practice in adaptive management • Documented adaptive management principles and consistent application • Well-developed monitoring, evaluation and reporting frameworks and practices • Open attitudes to audit processes, including opportunities for improvement • Previous use of external parties to undertake extensive audits and reviews • Well-developed information management systems

Figure 3.4: Location of projects audited by the NRC



The NRC audited over 100 CMA projects across the state (Figure 3.4) to assess:

- whether CMAs were achieving short-term project outputs
- the likelihood that these would lead to longer-term outcomes
- whether desired long-term outcomes were well understood between project partners
- whether the CMAs were attracting additional resources to match its funding
- whether systems were in place to track ongoing progress of projects.

3.2.1 Effectiveness of project delivery

In 2008, the NRC reported that CMAs were effectively delivering projects that contribute (or are likely to contribute) to improved landscape function based on the audit field work for seven CMAs.²⁶ The final six audits, and the second Murray CMA audit, have confirmed this finding.

The NRC audits found:

- over **90 per cent** of all audited projects had achieved their expected short-term outputs (e.g. the planting of native vegetation in a specific riparian zone or the fencing of conservation areas to keep stock out)
- nearly **90 per cent** had strong, logical links between the activities undertaken and the expected long-term outcomes
- around **50 per cent** of the projects showed evidence of local improvements in resource condition.²⁷

²⁶ Natural Resources Commission (2008), *Progress report on effective implementation of Catchment Action Plans*, November. This finding was based on a sample of 59 projects.

²⁷ The project statistics in the following sections represent data from the first complete set of 13 audits. They do not include the most recent projects audited in 2010 during the second Murray CMA audit.

In many cases, the then drought and (expected) lags between on-ground activity and biophysical response made it difficult to identify clear evidence of change in resource condition and function. However, for half of audited projects to show observable change during a drought is an impressive success rate.

All CMAs performed strongly in this area of the NRC's audit investigation. As such, the NRC had relatively few suggested actions CMAs could implement to build on this area of solid performance. Most of the NRC's suggested actions focused on improving monitoring of project performance to promote and support long-term outcomes.

3.2.2 Different approaches to managing vegetation

Many CMAs used a range of traditional on-ground actions to promote their CAP vegetation targets, for example:

- planting native trees to revegetate areas denuded of original vegetation cover
- fencing areas to encourage regrowth of native vegetation
- removing weeds to help rehabilitate native vegetation species and communities.

Most of the CMA projects audited used several of these activities depending on the project objectives, cost, site location and constraints and landholder capacity to maintain the long-term outcomes.

The NRC found:

- **nearly 60 per cent of projects focused on native vegetation rehabilitation**, which largely involved fencing to exclude livestock and removing and managing weeds
- **around 35 per cent of projects revegetated areas** with native plants to replace vegetation previously cleared or to achieve other objectives such as stabilising river banks (and in many cases, also included fencing to exclude livestock)
- **20 per cent of projects focused on conservation**, usually protecting Endangered Ecological Communities²⁸ and using Property Vegetation Plans.²⁹

The NRC audits also found CMAs employed other approaches, such as engineering, in their project design to work towards their vegetation and other CAP targets. For example:

- **30 per cent of projects had used built components** (such as stream structures to complement riparian revegetation or rehabilitation) or laser levelling and earth moving machinery to re-contour land

- **24 per cent of projects were designed to test new techniques or generate new knowledge**, such as testing assumptions about the links between project outputs and outcomes, or developing vegetation mapping at a more useful scale.

The NRC also audited some projects where CMAs had begun to explore opportunities in carbon markets with partners and landholders. For example, the Namoi CMA, Northern Inland Forestry Investment Group and local landholders have been working to integrate large-scale commercial tree plantings into existing agricultural systems. The benefits include future income from timber, potential carbon credits, shelter for livestock and improved soils for pasture and cropping. The tree plantings are also designed to promote biodiversity outcomes, for example, connecting remnant vegetation patches with tree plantings to help native animals move through the landscape. The project incorporated a rigorous monitoring and evaluation to test the project's assumptions and support adaptive learning.

3.2.3 Attracting additional investment

The NRC reported in 2008 that CMAs were attracting cash and in-kind contributions from third parties, for example through cost-sharing arrangements with landholders as well as the labour of landholders and volunteers.

However, reliable information about the magnitude of co-contributions was difficult to accurately collect and report. The following audits confirmed this observation.

In its audits the NRC found that most CMA projects were attracting fifty cents (50c) or less for every CMA dollar (\$1). However, nearly 40 per cent of audited projects attracted one dollar or more for every CMA dollar (\$1), while some projects attracted up to two dollars fifty (\$2.50) for every CMA dollar (\$1).³⁰

By comparison, the CMAs report that they have attracted \$2.20 in cash and in-kind support for every CMA dollar invested, but the NRC cannot independently verify this statistic.³¹

All CMAs had systems in place to document additional cash and in-kind investment by project partners. However, many CMAs continued to find it difficult to properly estimate or account for in-kind contributions. The NRC observed many instances in its audits where CMAs were significantly underestimating in-kind contributions, particularly from landholders. As such, the NRC suggested most CMAs improve their systems to better recognise, value and monitor additional resources to match CMA funding.

With a trend of diminishing federal government funding and the scale of NRM issues, it will be important CMAs continue to leverage third-party investment.

28 As listed under the *Threatened Species Conservation Act 1997* (NSW) and/or the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth).

29 As made under the *Native Vegetation Act 2003*.

30 These statistics are calculated using cash and in-kind contributions, and are based on a smaller sample of audited projects (around 50% of total audited projects) where the NRC collected complete data.

31 NSW Catchment Management Authorities (2009), *Celebrating Five Years of Achievements: Healthy and Resilient Landscapes for NSW*, October.



Murray Audit

3.2.4 Promoting multiple state-wide targets

The NRC audits found that most audited CMA projects are likely to promote two or three of the 13 state-wide targets simultaneously. Only a small portion of projects were likely to promote one state-wide target only. Significantly, nearly 20 per cent of CMA projects were likely to promote four or more state-wide targets simultaneously (and up to seven or eight state-wide targets in a few cases).

This result reinforces the important functional role that vegetation plays in the landscape as it has influence on many other components of landscape health.

The NRC observed that while CMA staff are good at planning for multiple outcomes at a site scale, they are not as well practised at applying their knowledge to wider landscapes and systems. In many cases there are barriers to this; for example, the decision tools for developing Property Vegetation Plans under the *Native Vegetation Act 2003* can only consider one site at a time, which does not sufficiently allow for a landscape perspective.³²

3.3 Engaging communities in landscape management

Around 89 per cent of land in NSW is in private management.³³ Therefore it is critical for CMAs to effectively engage private land managers and other stakeholders who manage natural resources across their catchments.

In its audits, the NRC was testing whether the CMA:

- had identified the key community groups and stakeholders it should consider in planning and undertaking its work, and the staff and Board had a shared understanding of these groups, including their knowledge, capacity and values

- was implementing an appropriate engagement strategy for each key group in its community, which is designed to build trust in the CMA and promote two-way knowledge sharing
- was implementing a communication strategy that promotes collaboration, sustainable behavioural change and feedback.

In 2008, the NRC reported that CMAs were effectively engaging their communities to understand what is most important to them and build their trust and willingness to work with the CMA in delivering projects to improve landscape function. The NRC believes this was a major achievement at the time, because of the widespread landholder antagonism towards the introduction of the *Native Vegetation Act 2003*, which restricted broad-scale land clearing in NSW. We also reported that the CMAs employed a range of effective approaches to engage their communities, such as leveraging existing networks, establishing reference groups and building trust through continuity and one-on-one relationships.

The final audits have confirmed this finding, with a trend towards even stronger performance in this area.

Nearly all CMAs demonstrated a good to high level of effectiveness in community engagement. Most CMAs had effectively implemented communication strategies that promoted collaboration, sustainable behaviour change and feedback. Many of the stronger performing CMAs had undertaken community benchmarking to better inform their business decisions and practice, including developing specific engagement plans for each project.

The NRC notes that with shifts in institutions and funding programs over time, there has been some concern over the ongoing role of and collaboration with other community NRM

³² Natural Resources Commission (2007), *A landscape approach to vegetation management: Final report*, June.

³³ See footnote 7.



groups such as Landcare. In its audits the NRC has found some encouraging examples of CMA and Landcare partnerships, although this is not uniform across all CMAs.

For example, the audits found the Southern Rivers CMA had developed strong relationships with Landcare in its region. The CMA recognised Landcare had already established a strong presence within the region and would be critical in effectively delivering the CAP. As such, the CMA put significant resources into building a working partnership with Landcare through regular contact, collaboration and capacity building.

In practice, this included: developing an overall communications strategy between the CMA and Landcare to identify target audiences and promote consistent messages; establishing a Landcare 'portfolio' within the CMA's business model (and having a CMA Board member responsible for its carriage); having regular meetings between the CMA Board, executive and management team and the District Landcare Association; and funding full-time support positions for Landcare staff and continuing support from the CMA's community support officers. The success of this partnership was verified in interviews with third parties through the audit process.

Working closely and developing shared priorities with Landcare, and other non-government community groups in their regions, will remain a priority for CMAs. Coordination of local-level action towards strategic goals at a regional level will bring greater return on investment.

As most CMAs performed strongly in this area of audit inquiry, the NRC's suggested actions for CMAs to build on this solid performance focused on monitoring future performance and sharing insights with other CMAs. Community benchmarking or social profiling has either occurred or is underway in CMAs that were lacking these initiatives. Some CMAs have also continued to improve their communications, education and extension services.³⁴

3.4 Prioritising investment and adaptively managing

Effective CAP implementation depends on effective investment prioritisation and adaptive management. Good prioritisation and adaptive management lead to actions and investments that maximise landscape benefits over the long term.

3.4.1 Prioritising for better outcomes

CMAs' investment prioritisation should be based on:

- sound science about biodiversity, water, land and community assets and their interactions
- balancing environmental, economic and social priorities across regional, state and national scales
- capturing opportunities for collaboration – including opportunities to leverage additional funding and seeking synergies between local community priorities and policies and programs delivered by local, state and Australian governments
- consciously managing risks.

In 2008, the NRC reported that CMAs' effectiveness in prioritising their investments was inconsistent. The NRC found CMAs often directed their investments to improving specific aspects of the landscape (such as native vegetation or soil) without systematically considering the potential to generate multiple benefits across the landscape. The following audits found an improving trend in effective prioritisation.

Most of the CMAs audited in 2008 demonstrated a low to medium level of effective prioritisation. Only two CMAs demonstrated a good level of effective prioritisation. However, in the final six audits the NRC found most CMAs demonstrated a good to high level of effective prioritisation.

³⁴ See for instance Hawkesbury–Nepean's video segments at www.hn.cma.nsw.gov.au.



Landholder training

Source: Lower Murray Darling CMA

Murray CMA's second audit showed significant improvement in this area. Many of the stronger performing CMAs had documented prioritisation systems, clearly understood across the organisation. Conversely, some of the weaker performing CMAs could not demonstrate a common vision on priorities between Board, management and staff.

Since then CMAs have implemented a range of activities to improve prioritisation, including:

- improving mapping to help decide where to invest in the landscape
- improving program logic to help better understand investment assumptions including linkages between short-term investment and long-term goals
- revising, documenting and sometimes even rebuilding prioritisation systems.

3.4.2 Adapting approaches for better outcomes

Adaptive management is learning by doing. It is a structured, iterative process of decision-making that should 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.

In its audits, the NRC expected to see CMAs had:

- documented the practical application of adaptive management principles to its planning and business systems
- established monitoring and evaluation systems that test its underlying investment assumptions and use appropriate experts to assess planned and actual achievements

- maintained information management systems necessary to support the adaptive management process.

In 2008, the NRC reported that CMAs' ability to adaptively manage and improve performance at the institutional level over time is restricted by underdeveloped information systems and MER systems and data. The final six audits have confirmed this finding.

Overall, most CMAs demonstrated a low to medium level of effectiveness in adaptive management, although there was a slight trend towards more effective implementation in the second round of NRC audits. Again, Murray CMA showed substantial improvement in this area. Only a few CMAs could demonstrate that they had effectively documented the practical application of adaptive management principles, or implemented effective MER and information systems. Only one CMA performed strongly across all three criteria used to assess effective adaptive management.

Many of the stronger performing CMAs had healthy attitudes to audit processes, including opportunities for improvement, and had previously used external parties for extensive audits and reviews. Some of the weaker performing CMAs lacked any clear strategies for continual improvement, including effective audit programs.

At the time of its 2008 audits, the NRC found the state MER Strategy and the CMAs' MER systems were not well integrated. CMAs were finding it difficult to access resource condition information (particularly baseline data) from state agencies.³⁵ The NRC considered that this prevented CMAs and other CAP stakeholders from making the best decisions about the timing, place and nature of specific activities and manage adaptively. The NRC still found this to be the case for the final audits. As a result, many CMAs have been directing resources towards generating new knowledge to better inform their investments.

Since the audits, CMAs have:

- finalised or begun to implement monitoring, evaluation, reporting and information frameworks underpinned by program logic
- established processes and systems that allow better access to information for interested parties
- developed knowledge strategies to address information gaps
- audited their own business systems and practices to better comply with the Standard.

³⁵ The State of the Catchment reports have now provided many of these baselines.

Chapter 4

Using resource condition data to assess progress

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4 Using resource condition data to assess progress

The NRC assesses progress towards the state-wide targets using multiple sources of evidence. Over the last six years the NRC has:

- audited CMA business systems
- reviewed CAPs to ensure that planning is sound
- audited CMA operations and on-ground projects
- reviewed investment plans and reporting.

We also intend to verify effectiveness using resource condition data as it becomes available.

In addition to the results of our audits, the NRC has collated and analysed available resource condition data from the current NSW state-wide MER program, and other sources, to get a snapshot of resource condition across the state and to see if there are any discernible trends against the targets.

Overall, the NRC found that:

- There is still insufficient data to offer certainty on measuring the condition, and any trends, for many of the state-wide targets.
- While the NRC has confidence that CMA activity is producing local resource condition improvement, this cannot (yet) be detected in the state and CMA-scale monitoring.
- The data does indicate that NSW has halted broad-scale land clearing.
- Resource condition data is only one input to evaluating progress, and we need to continue assessing progress based on multiple lines and levels of evidence, at scales that are relevant for decision-making.
- Having come from a very low base, NSW has made good progress in building the culture and systems to effectively monitor at multiple scales. The challenge ahead is to maintain the effort, ensure we learn from experience and integrate monitoring with CAP planning, investment decisions and audits.

The following sections:

- describe the available resource condition data
- use a range of information sources to provide snapshots of what is happening in each catchment.

4.1 Available resource condition data

In 2010 NSW agencies (DECCW and I&I NSW) generated the first ever State of the Catchment reports covering all 13 CMA regions, and the 2009 State of the Environment Report published condition and trend information against the individual indicators that support the state-wide targets.³⁶ The State Plan Performance Report also gives an additional high-level picture of condition and trends against the 13 targets.³⁷

These reports are important milestones. We now have enough information at the state and CMA scales to set baselines for the 2005–2015 targets. However, there is some way to go before we can independently verify the trends in condition and attribute them to the efforts of CMAs, agencies, local governments or other NRM managers.

This is to be expected because:

- most interventions are too immature to have had any measurable impact – there are long time lags between interventions (e.g., riparian fencing) and response (e.g., improved river condition, reduced turbidity, improved habitat)
- the scale of current NSW monitoring programs is not at the fine resolution that could pick up the scale of interventions occurring through CMA (or other) investments; as such, we are unlikely to see the improvements occurring at a site scale being picked up in coarser resolution catchment- or state-scale monitoring results for some time
- critical scales of intervention have probably not been reached – works at individual sites have greater value when part of a whole (vegetation corridor or river) than as single, isolated sites, and benefits are often produced in lumps and a certain amount of change may be required before there is evidence of any benefits³⁸
- systematic natural resource and environmental monitoring and evaluation is relatively new, and we are only now establishing some overall state and CMA regional benchmarks of condition that we can be confident to measure progress against
- there are many variables influencing the health of a landscape or an asset and progress will not necessarily be linear
- there is a lot of natural variation.

For now, we engage with panels of experts to use their judgement and experience to help inform our assessments. **Chapter 3** explained that in about half of the audited projects there was evidence of local resource condition improvement. This was assessed by direct site observation, landholder interviews and photographic records, rather than analysis of monitoring data.

36 The Department of Environment, Climate Change and Water (2009), *New South Wales State of the Environment Report 2009*.

37 NSW Government (2010), *NSW State Plan Performance Report*, November, available at http://www.stateplan.nsw.gov.au/sites/default/files/PerformanceReport_Nov2010_0.pdf.

38 Stoneham G (2008), *Creating Markets for Environmental Goods and Services: A mechanism design approach*, final report to Land and Water Australia, Canberra, ACT.



Source: Lower Murray Darling CMA

Decision-makers need access to nested layers of data that answer management questions at different levels. Monitoring should explicitly link management hypotheses and predictive models, in ways that can inform adaptive management. In the future, we expect that monitoring programs will be modified to link with the management hypotheses that should be articulated in upgraded CAPs.

The NRC will be taking on the role of co-ordinating the next round of State of the Catchment reporting and will aim to implement the principles described above. Ideas and options for refocusing MER effort are explained more fully in **Chapter 5**.

4.2 Observations on state-wide resource condition and trends

Through the audits we are seeing success at a project scale, but we need to understand whether it is all adding up to, or is likely to add up to, broader landscape change, or whether the successes are being overwhelmed by ongoing degradation elsewhere.

At this stage it is difficult to attribute resource condition information to the efforts of CMAs or agencies, but we can make some broad, qualified statements about condition and trend to get a sense of key issues across the state.

In 2009, the NRC advised the NSW Government of progress towards the state-wide target for native vegetation after an independent assessment.³⁹ The NRC found there was no net change in the extent of woody native vegetation (trees and shrubs) across NSW between 2002 and 2008. This indicates that the *Native Vegetation Act 2003* has been successful in halting broad-scale land clearing. A trend in the extent of native non-woody vegetation (grasses) could not be reliably assessed and reported, but baselines have now been established. The

NRC also found the trend in condition of native vegetation could not be assessed or reported with the information currently available.

The NRC has not yet conducted an independent assessment for the remaining 12 state-wide targets. However, data available in the 2009 State of the Environment Report, State of the Catchment Reports, and the NSW State Plan Performance Report give some indication of whether or not the trends against the targets are going in the right direction. **Figure 4.1** illustrates the condition and trend reporting from the recently released State Plan Performance Report.

The reporting indicates:

- there has been an end to broad-scale land clearing and **no net change in native vegetation extent** (the trend in vegetation condition remains uncertain) (**target 1**)
- for **two state-wide targets the trend is likely going in the right direction**, as there has been no decline in the condition of marine waters and there is evidence of improved economic and social wellbeing as a result of natural resource decisions (**targets 7 and 12**).

These condition and trend statements are useful, albeit highly qualified in their current form. The State Plan Performance Report notes that for some targets data are limited and the confidence in the trend assessments is low. For each state-wide target, state agencies monitor a number of indicators and expert judgement is required to aggregate condition and trend measures across these indicators (some more so than others). There are also varying levels of confidence in the data and information.

³⁹ Mandated by s 15(2)(b) of the *Natural Resources Commission Act 2003*. The reports can be found at <http://nrc.nsw.gov.au/Publications.aspx>. To evaluate progress, information was collated and evaluated from a range of sources, including state and federal agencies and CMAs and independently analysed and verified by a panel of recognised experts in NRM.

Figure 4.1: Condition and trend against targets as reported in the NSW State Plan Performance Report, November 2010

State-wide targets		Resource condition and trend
1	By 2015 there is an increase in native vegetation extent and an improvement in native vegetation condition	
2	By 2015 there is an increase in the number of sustainable populations of a range of native fauna species	
3	By 2015 there is an increase in the recovery of threatened species, populations and ecological communities*	
4	By 2015 there is a reduction in the impact of invasive species* ^	
5	By 2015 there is an improvement in the condition of riverine ecosystems	
6	By 2015 there is an improvement in the ability of groundwater systems to support groundwater dependent ecosystems and designated beneficial uses*	
7	By 2015 there is no decline in the condition of marine waters and ecosystems	
8	By 2015 there is an improvement in the condition of important wetlands, and the extent of those wetlands is maintained*	
9	By 2015 there is an improvement in the condition of estuaries and coastal lake ecosystems*	
10	By 2015 there is an improvement in soil condition	
11	By 2015 there is an increase in the area of land that is managed within its capability	
12	Natural resource decisions contribute to improving or maintaining economic sustainability and social well-being	
13	There is an increase in the capacity of natural resource managers to contribute to regionally relevant natural resource management*	

Key:

Good condition	Condition improving
Fair condition	Condition deteriorating
Poor condition	Condition remaining the same

* The trends for targets are determined by scientists within agencies that manage natural resources after consultation with scientific experts working in the relevant field. The trends are based on available data, modelling and the expert opinion of these scientists. For some targets the data are limited and the confidence in the accuracy of this trend analysis is low at this stage.

^ For the invasive species target the assessment indicates an increase in the trend in impacts of invasive species which, unlike for all other indicators, denotes a deterioration in resource condition as indicated above.

Source: NSW State Plan Performance Report November 2010, Green State available at www.stateplan.nsw.gov.au

This level of monitoring and reporting is enough to conclude that the *Native Vegetation Act 2003* has been successful in halting broad-scale land clearing. However, this high-level reporting is not designed to display positive outcomes – or continued degradation – occurring at different scales. DECCW produced a NSW Annual Report on Native Vegetation which was reproduced in the 2009 State of the Environment Report. It concluded that *'the total area of land being conserved, restored or undergoing improved management is substantially greater than the area approved for clearing. However, it is too early to determine whether the [management actions] are producing changes in vegetation extent or condition that are detectable by monitoring systems'*.

4.3 Individual catchment snapshots

By moving to a smaller geographic scale a more varied and detailed story emerges. We can get a better appreciation for the changes and effort happening across the state by considering the CMA scale, and drawing on multiple sources of evidence, including CMAs' own monitoring programs.

NSW agencies have generated 13 State of the Catchment report cards covering each target in every CMA region. The quality of the information on which assessments are based varies considerably both between indicators and geographically across the state.⁴⁰ The NRC notes some caveats on the data used in the report cards:

- They do not incorporate data collected by CMAs – the reports only use data which has been collected and reported across the whole state.
- The sampling size for several indicators within a catchment is very small, due to it being a state-wide program.
- There is a high degree of variation in the quality of data across data sets and across catchments.

In summary, the catchment scale report cards tell us that:

for biodiversity:

- **native vegetation** is in good condition in coastal and Western Division CMA regions, with fair condition in the sheep-wheat belt CMA regions
- the condition of **fauna** populations is either poor or very poor across all of the CMA regions, with uncertainty around the future trend
- the condition of **threatened species** is fair or worse across all CMA regions, with uncertainty around the future trend
- **invasive species** are impacting all CMA regions; however, the impact of foxes has been reduced in coastal CMA regions and one western CMA region

for water:

- some key parameters of **river ecosystem** health are showing very poor to poor condition in many CMA regions, with uncertainty around the future trend
- condition indicators for **groundwater** systems and dependent ecosystems varies widely across the CMA regions from very poor to very good
- **marine waters** are in good to very good health in all coastal CMA regions; however, pressures vary across all CMA regions, with many experiencing increasing pressure
- the condition of **wetlands** is very poor to poor across all CMA regions, with high pressure on wetlands across all CMA regions
- **estuaries and coastal lakes** in northern and southern coastal CMAs are in good condition, with fair condition in CMAs regions in Sydney

for land:

- **nearly all CMA** regions have good soil condition, with stable or increasing condition in most soil types across the CMA regions
- **sustainable land use** is fair across nearly all CMA regions, having increased by 30 per cent across a range of soil types within different CMA regions

for community:

- natural resource decisions are mainly increasing **social and economic wellbeing** across all CMA regions
- most CMA regions have 'fair' condition in the **capacity** of natural resource managers and community, with uncertainty around the future trend in around half of the CMA regions

To draw on other lines of evidence about different issues across the state, the NRC has produced snapshots of each catchment using:

- available information on the economic, social and environmental values supported by the catchment
- CMA knowledge of the key challenges facing the catchment
- available information about resource condition and trend from State of the Catchment reports
- findings from the NRC's audits
- available information about some of the activity happening outside of CMAs, for example, investments through other government programs and other statutory and non-statutory plans that influence the region.

⁴⁰ The confidence levels in the data used for the reports varied. Medium to low levels of data confidence were reported in around half of the state-wide targets, while the remainder reported medium or higher levels of confidence.

Snapshots 1 to 13 are illustrated on the following pages and a summary of the information sources is at **Attachment 1**.

Also, the CMAs have published a report summarising their achievements during 2004–2009 that provides some context for these individual snapshots.⁴¹ This report indicates that CMAs have worked with their communities to:⁴²

- protect, repair, enhance, treat or rehabilitate almost 5 million hectares (equivalent to about six per cent of the area of NSW)
- negotiate over 13,000 voluntary management agreements and 1,064 conservation covenants
- enhance and rehabilitate 2.6 million hectares of native vegetation
- protect over 306,000 hectares of important habitat by fencing
- improve soil condition over 2 million hectares (over 3 million football fields).

Figure 4.2 provides the state-wide context for the individual snapshots.

4.3.1 Overall observations

The individual catchment snapshots also provide the following insights about cross-regional issues and trends.

- **Many of the big pressures influencing catchment health occur at a scale above or different from the CMA region.** The snapshots show that groups of CMAs have many issues and drivers in common, and that the pressures in coastal regions are very different to those in the more heavily cleared sheep-wheat belt, which again are distinguished from the challenges in the rangelands. For example, development pressure is an issue all along the coast, fragmented vegetation and water allocation between agriculture and the environment are critical in central NSW, and feral pests, particularly goats are a big challenge in the rangelands.

This shows the need to look above the CMA scale to appreciate some of the big drivers of landscape change and that a combination of policy instruments are needed to deal with some of these larger scale drivers and complement the region-specific work of the CMAs.

- **There are diverse streams of funding.** The snapshots show that investment through CMAs and CAPs are only one way that governments invest in NRM. In some regions, it appears that a large proportion of NRM funding is co-ordinated through the CAP priorities, for example, in the Western and Namoi region.

However, in some other regions there are large investments targeting specific issues, for example, in the many coastal regions the Australian Government Water Smart program is investing hundreds of millions in upgrading water infrastructure which has a bearing on river health, and in the Murray and Murrumbidgee programs there has been substantial investment through the Living Murray and River Bank programs.

- **The natural resource base supports economic development.** In every region the natural resource base supports significant economic activity, for example estuary-based production of oysters and prawns along the coast, and irrigated agriculture in central NSW that relies on healthy river and groundwater systems. The snapshots also indicate that many of these systems supporting industry are under high pressure and often have poor condition.

This shows, at a regional scale, the choices and trade-offs that are made between community social and economic values and condition of the resources that support these values. For example, poor water quality can be the result of agricultural systems that are driven by economic pressures and result in groundcover reduction. The snapshots demonstrate the close links and feedbacks between our social and ecological systems.

41 NSW Catchment Management Authorities (2009), op. cit.

42 The NRC has not independently verified these results. They have been included to provide context for the challenges and achievements described in the individual snapshots.

Figure 4.2: Map of NSW to provide context for individual catchment snapshots



1 Snapshot of the Northern Rivers CMA region

What do we value in this CMA region?

- **Tourism and recreation** – nature-based tourism and recreation generates some \$2 billion per annum and the region is a popular 'sea/tree change' lifestyle destination.
- **Primary industries** – around \$1 billion generated annually, with over \$100 million from fisheries within the region's estuaries. Over 70% of coastal and estuary management plans completed. Compared to other NRM regions, there are a large number of individual landholders in the region (over 7,000).
- **Biodiversity** – the southern part of the Border Ranges is a national biodiversity hotspot, and a large proportion of the catchment is reserved in national parks. The region also hosts three of the six marine parks in NSW and two World Heritage Areas.

What are the key NRM challenges in the CMA region?

- Increasing collaboration between NRM stakeholders and integrated delivery of NRM priorities.
- Aligning and focusing NRM priorities across institutions and development of potential climate change impact strategies.
- Responding to pressures on agricultural land, employment and natural assets due to increasing population growth (likely to increase by 26% over the next 25 years) through land-use planning.

What is the condition of key elements in the landscape?

- Overall native vegetation extent and condition health is good, with over 60% of the region having intact vegetation.
- Overall hydrological condition of the region's rivers is moderate (and coastal and lowland river systems such as Tweed and Richmond Rivers are rated as good), electrical conductivity is falling, water temperature is stable at most monitoring sites. Recent intermittent flooding has damaged infrastructure, and has accelerated river bed and bank instability.
- Overall soil health is good; however, erosion has accelerated due to recent heavy rainfall.
- Marine environments have remained stable over the last decade and the overall condition of the region's estuaries and coastal lakes is good to very good. However, over 60% are under moderate to high pressure (primarily due to coastal urban development), which is higher than other areas of coastal NSW.
- NRM decisions are improving the social and economic wellbeing of the region's communities with increasing trends across all indicators (e.g. business profitability, community networks, employment).

What significant work has the CMA done?

- Significant works include developing regional state of the environment reporting with local councils; supporting local councils with a suite of land-use planning tools and guides; engaging over **160** commercial fishing operators in best practice; installing over **300** watering points for livestock; mapping over **13,000 ha** of marine habitat; sustainably managing over **10,000 ha** of terrestrial and aquatic ecosystems; actively managing nearly **3,000 ha** of acid sulfate soils; and controlling nearly **800 ha** of coastal weeds.

How much is invested in NRM in the region?

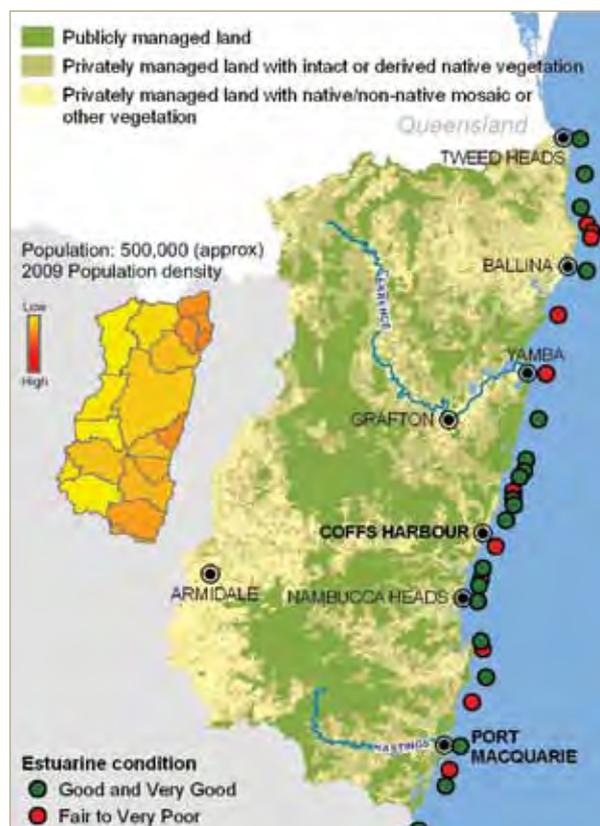
- Overall, over **\$88.9 million** is invested through the CMA (2004–10).
- In recent years, examples of significant NRM investment co-ordinated outside of the CMA include: over **\$8 million** invested under the Commonwealth's Caring for our Country program (2008–10); over **\$13.8 million** invested under the NSW Government's Urban and Coastal Water Strategy grant program (2005–10).

What did the NRC audit tell us about the performance of the CMA?

- The CMA demonstrated a medium overall level of effectiveness in implementing the region's catchment action plan, performing well across most areas of enquiry.

What are some of the key NRM and planning strategies in the region at the moment?

- Far North Coast Regional Strategy (NSW Government)
- Mid North Coast Regional Strategy (NSW Government)
- Northern Rivers Catchment Action Plan (NSW Government)
- 11 Water Sharing Plans (NSW Government)
- Northern Rivers Regional Biodiversity Management Plans (Australian Government and NSW Government)
- Draft Regional Conservation Plan (NSW Government)
- NSW Biodiversity Strategy (NSW Government)
- Community Strategic Plans (NSW Local Government)



2 Snapshot of the Hunter–Central Rivers CMA region

What do we value in this CMA region?

- **Tourism and recreation** – the region is a popular destination for nature-based tourism and recreation and is a popular ‘sea/tree change’ lifestyle destination.
- **Coasts** – 85% of the region's population is on the coastal fringe and approximately \$100 million per annum is generated from fisheries in the region's estuaries.
- **Agriculture and resources** – the region generates over 40% of the state's electricity and hosts one of the largest and most significant ports (Newcastle) on the east coast. The region also supports substantial coal mining, forestry, fishing, viticulture, horse breeding and a wide range of other industries
- **Biodiversity** – around 17% of the region's vegetation is conserved in reserves including the World Heritage Areas of the Barrington Tops and the northern edge of the Greater Blue Mountains National Parks. The region also hosts the Myall and Hunter Estuary Ramsar wetland sites and the Port Stephens–Great Lakes Marine Park.

What are the key NRM challenges in the CMA region?

- Aligning and focusing NRM priorities across institutions responsible for land-use planning to address pressures from major urban, industrial, mining and infrastructure development, population growth and predicted impacts from climate change.
- Cumulative loss of biodiversity due to pressures described above, but particularly through development approvals outside the Native Vegetation Act 2003 (which requires any approval to maintain or improve environmental outcomes).

What is the condition of key elements in the landscape?

- Overall native vegetation health is good, with 50% of the region having intact vegetation that has not been substantially altered or has since recovered.
- Overall hydrological condition of rivers is good, overall fish assemblage condition is very poor, there are increasing trends in turbidity in some catchments and mostly stable or improving trends in electrical conductivity.
- Overall condition of estuaries and coastal lakes is good, with over 60% under moderate to high pressure.
- The integrity of the region's sandstone aquifers is poor to very poor (and declining), likely due to the influence of land uses such as mining.

What significant work has the CMA done?

- Significant works include engaging over **11,500** landholders and managers in NRM (including on-ground works and community monitoring programs); protecting over **18,000 ha** of native vegetation; rehabilitating over **700 km** of riparian vegetation; rehabilitating and reinstating over **2,000 ha** of wetlands and estuarine processes, including Hexham and Kooragang wetlands; and implementing over **10,500 ha** of sustainable grazing practices.

How much is invested in NRM in the region?

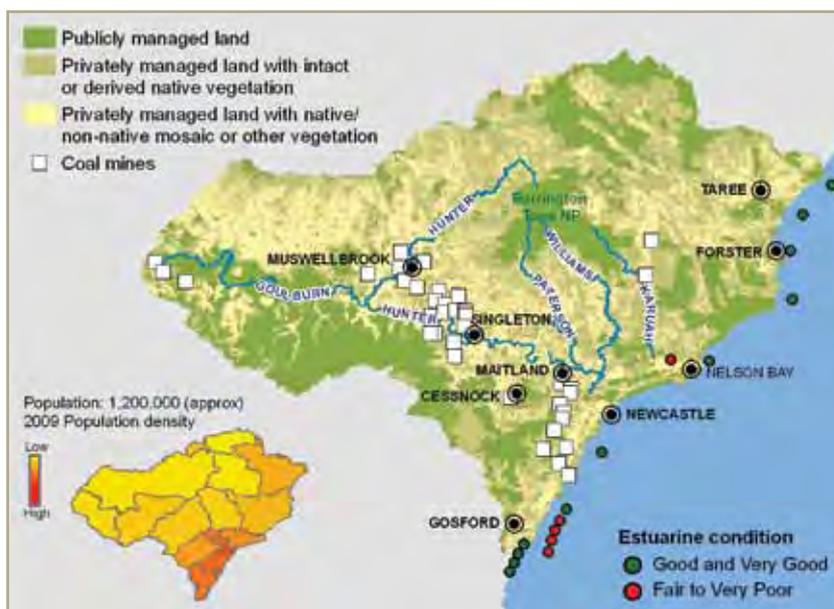
- Overall, over **\$99 million** is invested through the CMA (2004–10)
- In recent years, examples of significant NRM investment co-ordinated outside of the CMA include: over **\$120 million** invested under the joint Commonwealth–LGA-funded WaterSmart Mardi Mangrove Link project (2010–11); over **\$22 million** invested under the NSW Government's Urban and Coastal Water Strategy grant program (2005–10).

What did the NRC audit tell us about the performance of the CMA?

- The CMA demonstrated a high level of effectiveness in implementing the region's catchment action plan.

What are some of the key NRM and planning strategies in the region at the moment?

- Hunter–Central Rivers Catchment Action Plan (NSW Government)
- Central Coast Regional Strategy (NSW Government)
- Lower Hunter Regional Strategy (NSW Government)
- Mid North Coast Regional Strategy (NSW Government)
- 9 Water Sharing Plans – gazetted (NSW Government)
- Strategic Assessment – Coal Mining Potential in the Upper Hunter Valley (NSW Government)
- NSW Biodiversity Strategy (NSW Government)
- Lower Hunter Regional Conservation Plan (NSW Government)
- Community Strategic Plans (NSW Local Government)



3 Snapshot of the Hawkesbury–Nepean CMA region

What do we value in this CMA region?

- **Water** – the region supplies drinking water for the greater Sydney metropolitan area. The estuary environment of the Hawkesbury River has high social and economic values and is the state's second largest estuarine trawl industry for prawns and squid.
- **Industry** – the region supplies 23% of the state's power and includes major employment areas in Western Sydney such as Norwest and the Western Sydney Employment Hub. The catchment has 19 coal mines and produces 80% of Sydney's sand and gravel for construction.
- **Agriculture** – the region generates around \$1 billion per annum (12% of the state's agriculture production) including market gardens, turf, poultry and grazing.
- **Biodiversity** – the Greater Blue Mountains World Heritage Area is almost wholly contained within the catchment. Almost half of the catchment is reserved as national park, supporting a number of endangered ecological communities.

What are the key NRM challenges in the CMA region?

- Managing pressure from Sydney's growing population and urbanisation, which are impacting rural and natural areas.
- Weed 'hotspots' – the region is a source of many of the original weed plantings such as Privet (*Ligustrum spp.*) and African olive (*Olea europaea*).
- Diversion of surface water for drinking, management of aquatic weeds, the discharge of treated sewage effluent into rivers and creeks, extraction of sand and gravel, increasing extraction of groundwater and interference with aquifers and rivers by underground coal mining.

What is the condition of key elements in the landscape?

- Overall condition and extent of native vegetation is high, with large areas of reserved lands resulting in intact native vegetation covering 70% of the region. However, it is very poor in areas subject to urban development, with only 13% vegetation intact in Western Sydney (Cumberland Plain).
- Overall macroinvertebrate condition in rivers is moderate and overall fish assemblage condition is poor, deteriorating away from the coast. Rivers and creeks in protected areas are generally in fair to good condition. Rivers and creeks in the urban areas are highly modified and have poor water quality and habitat provision.
- Land is generally managed within its capability. Trends are stable across most hazard indicators except for organic carbon decline and salinity.

What significant work has the CMA done?

- Significant works include developing and implementing the Hawkesbury Nepean River Health Strategy; engaging over **1,300 landholders** in on-ground NRM works; protecting over **12,000 ha** of native vegetation; restoring nearly **900 km** of riverbank; and improving nearly **15,000 ha** of degraded land.

How much is invested in NRM in the region?

- Overall, over **\$72 million** is invested through the CMA (2004–10).
- In recent years, examples of significant NRM investment co-ordinated outside of the CMA include: over **\$77 million** invested under the Commonwealth's WaterSmart Hawkesbury–Nepean River Recovery project (2009–ongoing); over **\$5.8 million** invested under the NSW Government's Urban and Coastal Water Strategy grant program (2005–10).

What did the NRC audit tell us about the performance of the CMA?

- The CMA demonstrated a high level of effectiveness in implementing the region's catchment action plan, showing particularly strong performance in delivering projects and community engagement.

What are some of the key NRM and planning strategies in the region at the moment?

- Hawkesbury–Nepean Catchment Action Plan (NSW Government)
- Hawkesbury–Nepean River Health Strategy (NSW Government and Hawkesbury–Nepean CMA)
- Metropolitan Water Plan (NSW Government)
- Sydney Catchment Authority Healthy Catchments Strategy (NSW Government)
- Sydney Metropolitan Strategy (NSW Government)
- Sydney Canberra Corridor Strategy (NSW Government)
- Water Sharing Plans – exhibition (NSW Government)
- Biodiversity Strategy (NSW Government)
- Community Strategic Plans (NSW Local Government)



4 Snapshot of the Sydney Metropolitan CMA region

What do we value in this CMA region?

- **To live, work and visit** – the region is highly valued for housing, employment, amenity, recreation and tourism.
- **Waterways and beaches** – Sydney's image and economy are highly dependent on its amenity and the health of its major waterways and coastline.
- **Urban biodiversity** – Sydney provides unique access to bushland within a highly urbanised environment.

What are the key NRM challenges in the CMA region?

- Intensive and growing urban, industrial, transport and recreational land-use pressures, high national and international exposure, multi-institutional strategic interests, and the ecological footprint of the region's population and visitors.

What is the condition of key elements in the landscape?

- Marine indicators such as bacterial counts (conducted by Beachwatch), algal blooms and eastern rock lobster are rated as good, but abalone numbers are very low although now stabilised (a rocky reef health indicator).
- Overall condition of the region's estuaries and coastal lakes is fair; however, individual indicators such as salt marsh, fish and *chlorophyll-a* are rated as good.
- The Parramatta and Cooks Rivers are in poor condition, while the Georges, Woronora and Hacking Rivers are in moderate to good condition.
- There are low levels of consideration of NRM across state and local government agencies in planning and works. Within the community, shared understanding of NRM issues and networks of NRM champions across community and public sector organisations are inconsistent (indicators of human and social capital).

What significant work has the CMA done?

- Significant works include engaging closely with councils to deliver **on-ground works**; promoting and improving **urban water-sensitive design**; improving water quality in **Botany Bay**; implementing the **Kurnell Program**; rehabilitating native vegetation through **Sydney Community Bushcare**; and improving the health of the **Cooks River**.

How much is invested in NRM in the region?

- Overall, over **\$34 million** is invested through the CMA (2004–10).
- In recent years, examples of significant NRM investment co-ordinated outside of the CMA include: over **\$9 million** invested under the Commonwealth's Caring for our Country program (2008–10); over **\$25 million** invested under the NSW Government's Urban and Coastal Water Strategy grant program (2005–10).

What did the NRC audit tell us about the performance of the CMA?

- Overall, the CMA is performing fairly effectively, and its performance is consistent with the overall trend of better performance in delivering projects and engaging the community.

What are some of the key NRM and planning strategies in the region at the moment?

- Sydney Metropolitan Strategy (NSW Government)
- Sydney Metro Catchment Action Plan (NSW Government)
- Metropolitan Water Plan (NSW Government)
- Community Strategic Plans (NSW Local Government)



5 Snapshot of the Southern Rivers CMA region

What do we value in this CMA region?

- **Tourism and recreation** – increasingly popular destination for nature-based tourism and recreation, and ‘sea/tree change’ lifestyles.
- **Agriculture** – supports a high-value dairy industry worth \$1 billion annually and one of the nation’s most important beef and sheep (wool) breeding stocks is based on the Monaro grasslands. The region also supports an extensive, high-value oyster industry.
- **Estuaries, marine areas and aquaculture** – significant areas of the region’s estuaries and marine environments are protected in marine parks including Jervis Bay Marine Park and Bateman’s Bay Marine Park, and around \$38 million per annum is generated from the region’s estuaries, particularly through oyster farming.
- **Biodiversity** – large proportion of the catchment is publicly managed as national parks or state forest, which support the tourism and timber industries.

What are the key NRM challenges in the CMA region?

- Co-ordinating whole-of-government responses and employment opportunities in NRM for Aboriginal communities.
- Integrate land-use planning to address pressures of housing, population growth and plantation development on agricultural land and natural assets, and expected impacts from climate change (especially in coastal areas).
- Impacts of weeds on agricultural and natural assets.

What is the condition of key elements in the landscape?

- Overall native vegetation extent and condition is good, with 70% of the region having intact vegetation.
- Overall hydrological condition of rivers is good (except for the Snowy River), overall macroinvertebrate condition is moderate and overall fish assemblage condition is poor away from the coast.
- Overall condition of estuaries and coastal lakes is good, with nearly half under moderate to high pressure, mostly in the developed and populated northern parts of the region.
- Land managed within its capability is rated as poor to fair (with large variations across all measures) with improving or stable trends across most hazard indicators except for organic carbon decline and structure, which are declining.

What significant work has the CMA done?

- Significant works include engaging community and Landcare in **native vegetation conservation**; rehabilitating the **Snowy River**; implementing the **Bega Cheese** and **South Coast Dairy** programs; implementing programs and on-ground works to sustainably manage the **Monaro grasslands** and the **Shoalhaven, Clyde and Tuross Rivers**; and engaging and working with the region’s **oyster industry**.

How much is invested in NRM in the region?

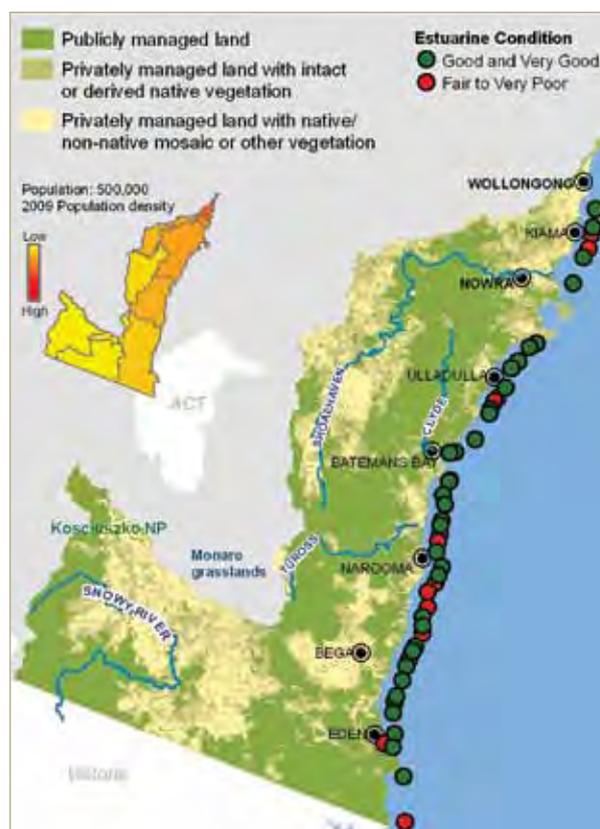
- Overall, over **\$78.8 million** invested through the CMA (2004–10).
- In recent years, examples of significant NRM investment co-ordinated outside of the CMA include: over **\$92 million** invested under the joint Commonwealth–State–LGA-funded WaterSmart projects (2005–10); over **\$9 million** invested under the NSW Government’s Urban and Coastal Water Strategy grant program (2005–10).

What did the NRC audit tell us about the performance of the CMA?

- The CMA demonstrated a very high level of effectiveness in implementing the region’s catchment action plan, with a particular strength in community engagement.

What are some of the key NRM and planning strategies in the region at the moment?

- Illawarra Regional Strategy (NSW Government)
- South Coast Regional Strategy (NSW Government)
- Southern Rivers Catchment Action Plan (NSW Government)
- 2 Water Sharing Plans (NSW Government)
- Draft Regional Conservation Plan (NSW Government)
- NSW Biodiversity Strategy (NSW Government)
- Community Strategic Plans (NSW Local Government)
- Draft Illawarra Biodiversity Strategy (Wollongong, Kiama and Shellharbour Councils)



6 Snapshot of the Border Rivers–Gwydir CMA region

What do we value in this CMA region?

- **Agriculture and soils** – these dominate land use in the region with grazing and cropping. The value of irrigated agricultural commodities is high.
- **Water** – Communities are dependent on the region’s water resources. The catchments support internationally significant wetlands.
- **Biodiversity** – the region supports critically endangered species such as the Regent Honeyeater and has a high diversity of ecosystems. The southern part of the Brigalow Belt (IBRA) is a national biodiversity hotspot, and the under-represented IBRA regions are very high priority to include in the National Reserve System.

What are the key NRM challenges in the CMA region?

- Likely socio-economic impacts in the roll out of the Murray Darling Basin Plan, decline in population and regional services, on-farm employment opportunities, landholder viability and climate change adaptation.
- Legacies of historical land clearing, wetland management, riverine stability, declining soil structure and carbon and soil erosion.

What is the condition of key elements in the landscape?

- Overall soils are in good condition and largely stable with issues around sheet erosion and soil structure.
- Land managed within its capability is rated as fair, with stable trends across all indicators except for wind erosion and acidification, which are improving.
- Overall hydrological condition of rivers is good, overall macroinvertebrate and fish assemblage condition is poor to moderate, and a high to very high percentage of samples exceed total phosphorous guidelines at most monitoring sites, although turbidity is not exceeding guideline levels at some monitoring sites.
- Groundwater management areas (GWMAs) are generally in good to very good condition; however, there is very poor ranking for the impacts of localised and regional groundwater use in the Lower Gwydir and Border Rivers GWMAs, causing large variations in groundwater levels.
- Overall native vegetation extent and condition is fair, with intact native vegetation covering 30% of the region (below state average).

What significant work has the CMA done?

- Significant works include engaging **1,700 landholders** and other stakeholders in NRM; protecting over **15,000 ha** of remnant native vegetation; improving over **700 km** of river ecosystems; improving water use irrigation water efficiency covering more than **22,000 ha** of land; managing invasive species across **350,000 ha** of land; combining farm forestry (nearly **1.5 million trees**) and biodiversity conservation on private land; and rehabilitating Aboriginal burial grounds.

How much is invested in NRM in the region?

- Overall, over **\$66.6 million** invested through the CMA (2004–10).
- In recent years, examples of significant NRM investment co-ordinated outside of the CMA include: over **\$5 million** invested under the Commonwealth’s Caring for our Country program (2008–10); over **\$33 million** invested under the joint Commonwealth–NSW Government Rivers Environmental Restoration Program (2006–10).

What did the NRC audit tell us about the performance of the CMA?

- The CMA demonstrated a fair level of effectiveness in implementing the region’s catchment action plan.

What are some of the key NRM and planning strategies in the region at the moment?

- Guide to the Murray Darling Basin Plan (Australian Government)
- Border Rivers–Gwydir Catchment Action Plan (NSW Government)
- 7 Water Sharing Plans – gazetted (NSW Government)
- NSW Biodiversity Strategy (NSW Government)
- Community Strategic Plans (NSW Local Government)



7 Snapshot of the Namoi CMA region

What do we value in this CMA region?

- **Agriculture and soils** – agricultural land uses dominate and the value of agricultural production in the region is high. Namoi is valued for its rich alluvial floodplain soils.
- **Groundwater** – irrigated agriculture depends heavily on groundwater, which is a defining characteristic of the region.
- **Mineral resources** – mining activity is increasing, particularly for coal.
- **Biodiversity** – the region's under-represented IBRA regions are high priority for the National Reserve System. Pilliga Forest National Parks and reserves are large stands of native vegetation in relatively good condition.

What are the key NRM challenges in the CMA region?

- Decline in government funding, managing tensions and trade-offs between environmental, economic and social values, for example likely socio-economic impacts in the roll out of the Murray Darling Basin Plan.
- Mining development, population change, technology change and fluctuations in commodity prices.
- Information and data to improve understanding of the social-ecological systems, infrastructure changes (e.g. dam upgrades).
- Predicted climate change, particularly in western areas of the region.

What is the condition of key elements in the landscape?

- Overall soils are rated in good condition and largely stable (improving in some areas).
- Land managed within its capability is rated as fair, with stable trends across all indicators except for wind erosion and acidification, which are improving, and organic carbon and soil structure, which are declining.
- Groundwater management areas (GWMAs) are generally overall in good to very good condition; however, there is a very poor ranking for the impacts of localised and regional groundwater use in the Upper Namoi Zones and Lower Namoi GWMAs, causing large variations in groundwater levels; land-use change is causing the most pressure on the Upper Namoi Zones, Lower Namoi and Peel Valley Alluvium GWMAs.
- Overall hydrological condition of rivers is good, overall macroinvertebrate and fish assemblage condition is poor to moderate, and a high to very high percentage of water quality samples exceed total phosphorous guidelines across the whole region. Water assets are generally trending down.

What significant work has the CMA done?

- Significant works include community-wide **scenario planning**; benchmarking and monitoring **community attitudes and awareness**; **mapping** and benchmarking all natural resource assets catchment-wide; engaging specific community groups in **landscape planning**; sustainably managing over **90,000 ha** of perennial pasture; improving and conserving over **600 ha** of river riparian zones; rehabilitating over **2,500 ha** of saline land; controlling pest animals over **10,500 ha** of land; and conserving biodiversity over nearly **30,000 ha** of land.

How much is invested in NRM in the region?

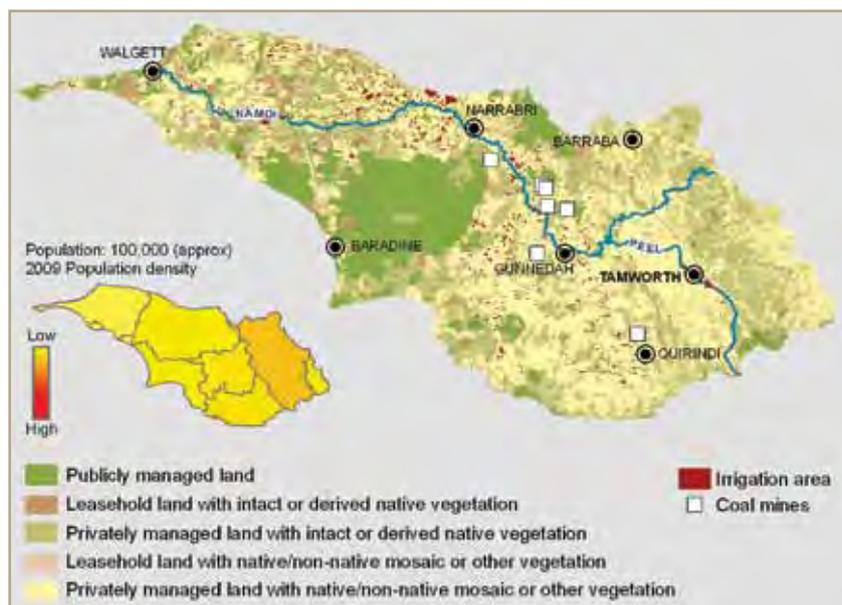
- Overall, over **\$66.5 million** is invested through the CMA (2004–10).
- In recent years, examples of significant NRM investment co-ordinated outside of the CMA include: over **\$2 million** invested under the Commonwealth's Caring for our Country program (2008–10) and Strengthening Basin Communities program (2009–10); over **\$1 million** invested under the NSW Government's Urban and Coastal Water Strategy grant program (2005–10).

What did the NRC audit tell us about the performance of the CMA?

- The CMA demonstrated a very high level of effectiveness in implementing the region's catchment action plan, and notably showed the highest level of performance in adaptive management.

What are some of the key NRM and planning strategies in the region at the moment?

- Guide to the Murray Darling Basin Plan (Australian Government)
- Namoi Catchment Action Plan (NSW Government)
- 5 Water Sharing Plans – gazetted (NSW Government)
- Biodiversity Strategy (NSW Government)
- Community Strategic Plans (NSW Local Government)



8 Snapshot of the Central West CMA region

What do we value in this CMA region?

- **Agriculture** – agricultural land uses dominate the region, generating over \$1 billion annually from cropping and grazing. Relative to other regions, the use of water on farms in the region is moderate.
- **Water** – the region contains the Ramsar-listed Macquarie Marshes – one of the largest semi-permanent wetlands in south-eastern Australia and an important bird breeding site.
- **Biodiversity** – the region is heavily cleared, so the under-represented IBRA regions are a high priority to include in the National Reserve System.

What are the key NRM challenges in the CMA region?

- Mobilising the region’s communities to respond to NRM issues, creating opportunities for collaboration between NRM stakeholders for integrated delivery of NRM priorities across the catchment.
- Addressing the decline in ecosystem services through partnerships with land managers.
- Developing innovative solutions with land managers to address both terrestrial and aquatic ecosystem decline and production outcomes.

What is the condition of key elements in the landscape?

- Overall the region’s soils are rated in good condition with largely stable trends, with key issues around sheet erosion, soil structure and salinity.
- Land managed within its capability is rated as fair with increasing trends across all indicators except for sheet erosion, which is stable, and acidification, which is declining.
- Overall hydrological condition of rivers is moderate to good (with Macquarie and Castlereagh Valleys in good condition), overall macroinvertebrate condition is poor to moderate, overall fish assemblage condition is very poor, a high to very high percentage of samples exceed total phosphorous guidelines at nearly all monitoring sites, but the percentage of samples exceeding turbidity guidelines was very low to low at most monitoring sites.
- The Macquarie Marshes are rated overall as in poor health but showing good measures against water quality condition indicators (such as nitrogen and phosphorus loads, turbidity and salinity).
- Overall native vegetation extent and condition is fair, with intact native vegetation covering around 30% of the region (below the state average).

What significant work has the CMA done?

- Significant works include engaging over **25,000 community members** in NRM; building a strong **evidence base** to support catchment-wide **decision making**; **collaborating with 22 local councils** to develop regional state of the environment reports and catchment-wide water-sensitive urban design policy; integrating traditional **indigenous cultural knowledge** into NRM practice; supporting **indigenous training and employment** through traineeships and university cadetships; rehabilitating over **103,000 ha** of native vegetation; improving over **405,000 ha** of groundcover and soil health; reducing biodiversity impacts of pest animals and plants over **400,000 ha** of land; and rehabilitating over **11,500 ha** of riparian and wetland ecosystems.

How much is invested in NRM in the region?

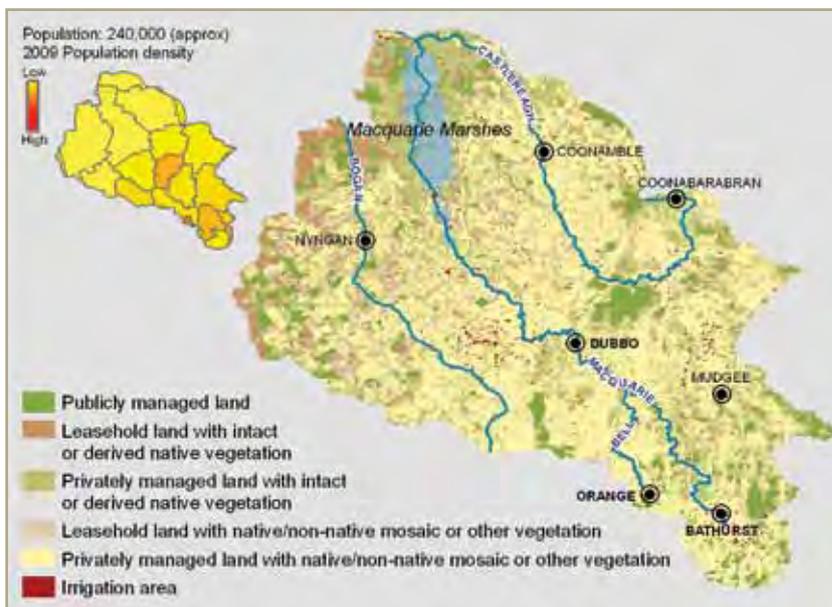
- Overall, over **\$90 million** invested through the CMA (2004–10).
- In recent years, examples of significant NRM investment co-ordinated outside of the CMA include: over **\$13 million** invested under the Commonwealth’s Caring for our Country program (2008–10) and **\$1.2 million** under its Strengthening Basin Communities program (2009–10); over **\$56 million** under joint Commonwealth–NSW Government Rivers Environmental Restoration Program (2006–10).

What did the NRC audit tell us about the performance of the CMA?

- The CMA demonstrated a high level of effectiveness in implementing the region’s catchment action plan, showing consistently good performance across all areas of enquiry.

What are some of the key NRM and planning strategies in the region at the moment?

- Guide to the Murray Darling Basin Plan (Australian Government)
- Central West Catchment Action Plan (NSW Government)
- 4 Water Sharing Plans – gazetted (NSW Government)
- NSW Biodiversity Strategy (NSW Government)
- Community Strategic Plans (NSW Local Government)



9 Snapshot of the Lachlan CMA region

What do we value in this CMA region?

- **Agriculture** – irrigated and dryland cropping, beef and sheep livestock and horticultural enterprises dominate the region accounting for 22% of the region's workforces and 14% of the state's agricultural production.
- **Water** – the region contains the Lachlan River, the only terminal river system in the Murray Darling Basin. 30% of surface water in the valley is held for environmental use and contains nine nationally listed wetlands of importance including the Great Cumbung Swamp covering 16,000 ha.
- **Biodiversity** – The region is heavily cleared; the majority of the catchment is under reserved and is a high priority for inclusion in the National Reserve System.

What are the key NRM challenges in the CMA region?

- Likely socio-economic impacts in the roll out of the Murray Darling Basin Plan.
- Managing red fragile soils (covering 45% of the region, supporting cropping and mixed farming enterprises), soil organic matter and soil carbon.
- Historical broad-scale clearing including vegetation fragmentation, edge effects and on larger remnants, ongoing loss of paddock trees, invasive native scrub, pest animals and weed incursions.

What is the condition of key elements in the landscape?

- Overall the region's soils are rated in fair condition with largely stable trends; however, there is concern over organic carbon in soil, soil structure, soil acidification, wind and water erosion, and salinity.
- Land managed within its capability is rated as fair with decreasing trends across all indicators except for sheet erosion, gully erosion, and salinity/water logging, which are all stable. However, the highest pressure indicators driving this value were identified as poor to very poor with respect to organic carbon decline, structure decline, soil acidification, and wind and water erosion.
- Overall hydrological condition of the rivers is moderate to good, overall macroinvertebrate condition is poor to moderate, overall fish assemblage condition is very poor, and a moderate to high percentage of samples exceed phosphorous and turbidity guidelines. The drought and low flows have concentrated water contaminants, reducing water quality.
- Overall native vegetation extent and condition is fair, with intact native vegetation covering 40% of the region (below the state average); however, vegetation extent varies markedly across the catchment, with over-clearing in the middle and upper catchment (areas with as little as 3% remaining vegetation) contrasting with vegetated rangelands to the west.

What significant work has the CMA done?

- Significant works include implementing the Lake Brewster Land and Water Management Plan; rehabilitating over **197,000 ha** of native vegetation; engaging over **250 landholders** in sustainable soil management covering almost **350,000 ha**, and rediscovering the presumed regionally extinct Olive Perchlet (*Ambassis agassizii*) and Yellow Spotted Bell Frog (*Litoria castanea*).

How much is invested in NRM in the region?

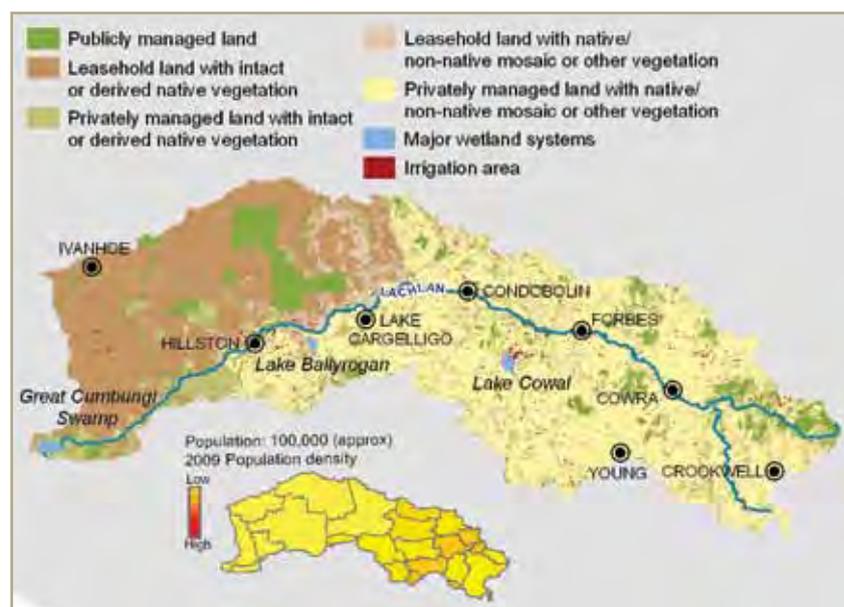
- Overall, over **\$98.5 million** invested through the CMA (2004–10).
- In recent years, examples of significant NRM investment co-ordinated outside of the CMA include: over **\$8 million** invested under the Commonwealth's Caring for our Country program (2008–10); over **\$16 million** invested under the joint Commonwealth–NSW Government Rivers Environmental Restoration program (2006–10).

What did the NRC audit tell us about the performance of the CMA?

- The CMA demonstrated a high level of effectiveness in implementing the region's catchment action plan, showing consistently good performance across all areas of enquiry.

What are some of the key NRM and planning strategies in the region at the moment?

- Guide to the Murray Darling Basin Plan (Australian Government)
- Land and Water Management Plans (Australian Government and NSW Government)
- Lachlan Catchment Action Plan (NSW Government)
- 3 Water Sharing Plans – gazetted (NSW Government)
- Biodiversity Strategy (NSW Government)
- Community Strategic Plans (NSW Local Government)
- 10 NRM Partnerships Plans (LCMA and NSW Local Governments)



10 Snapshot of the Murrumbidgee CMA region

What do we value in this CMA region?

- **Agriculture** – agriculture is the dominant land use in the region generating \$1.9 billion annually, producing half of the state's total rice output, 23% of its fruit and vegetables and 42% of its grapes. Relative to other regions, water use on farms is medium to high.
- **Biodiversity** – the region is heavily cleared, the majority of the catchment is under reserved and is a priority for inclusion in the National Reserve System.
- **Tourism** – growth in lifestyle or hobby farms is increasing and nature-based tourism generates approx \$500 million annually.

What are the key NRM challenges in the CMA region?

- Community access to economically viable NRM options and potential socio-economic impacts from the roll out of the Murray Darling Basin Plan.
- Dryland salinity impacts on production and urban areas (for example Wagga Wagga) and a range of other soil management issues, in particular water logging, irrigation salinity, erosion and soil acidity.
- Riverine issues such as surface-water quality, wetland health, river regulation and stream bank erosion.
- Legacies of historical land clearing and control of environmental pest animals and weeds.

What is the condition of key elements in the landscape?

- Overall hydrological condition of rivers is poor to moderate, overall macroinvertebrate condition is poor to moderate, overall fish assemblage condition is very poor and there are large variations in measures across phosphorus and turbidity indicators.
- Groundwater management areas (GWMAs) are generally in good to very good condition; however, there is very poor ranking for the impacts of localised groundwater use in the Lower Murrumbidgee Deep and Mid Murrumbidgee GWMAs, causing large variations in groundwater levels.
- Overall soils are rated as good, and land managed within its capability is rated as poor to fair, with increasing or stable trends.
- Overall native vegetation extent and condition is fair, with intact native vegetation covering 30% of the region (below the state average).

What significant work has the CMA done?

- Significant works include implementing **Land and Water Management Plans** in collaboration with local irrigation companies; delivering **\$30 million** in collaboration with Lachlan CMA and the Australian Government to protect Grassy White Box Woodlands; establishing **Traditional Owner River Restoration Teams**; engaging nearly **6,000 landholders** in NRM; rehabilitating over **83,000 ha** of native vegetation (**1,200 Property Vegetation Plans** in place); and improving nearly **5,000 ha** of riverine and wetland environments; and sustainably managing **450,000 ha** of soil.

How much is invested in NRM in the region?

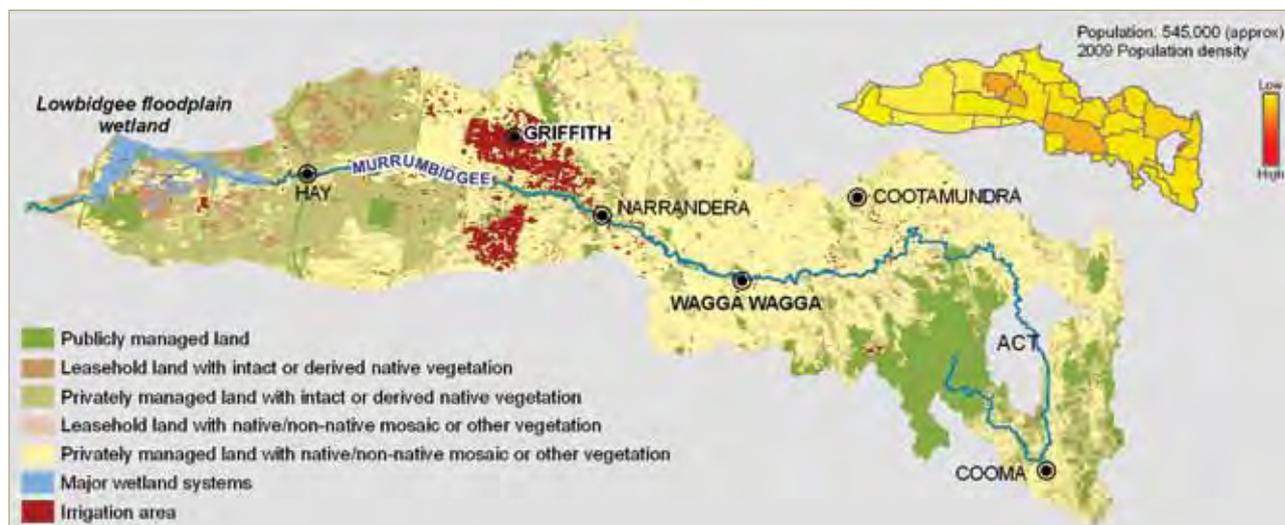
- Overall, over **\$132 million** invested through the CMA (2004–10).
- In recent years, examples of significant NRM investment co-ordinated outside of the CMA include: over **\$33 million** invested under the Commonwealth's Caring for our Country program (2008–10); over **\$24 million** under joint Commonwealth–NSW Government Rivers Environmental Restoration program (2006–10); over **\$32 million** under various Commonwealth–State–Private–CMA-funded WaterSmart projects (2005–10).

What did the NRC audit tell us about the performance of the CMA?

- The CMA demonstrated a high level of effectiveness in implementing the region's catchment action plan, with a particular strength in prioritising investments.

What are some of the key NRM and planning strategies in the region at the moment?

- Guide to the Murray Darling Basin Plan (Australian Government)
- Murrumbidgee Catchment Action Plan (NSW Government)
- Land and Water Management Plans (Australian Government and NSW Government)
- 4 Water Sharing Plans – gazetted (NSW Government)
- Biodiversity Strategy (NSW Government)
- Community Strategic Plans (NSW Local Government)
- Lower Murrumbidgee Floodplain NRM Plan (Murrumbidgee CMA and Community)



11 Snapshot of the Murray CMA region

What do we value in this CMA region?

- **Agriculture and soils** – these account for 75% of the region's land use (irrigated industry, dryland cropping and grazing and forestry). The region has the state's highest unit value of agricultural production (\$/ha), and is among the state's largest producers of vegetables and rice.
- **Water** – the Murray River supports important wetlands and floodplain forests, reed swamps and lakes (including one Ramsar-listed wetland). Access to and use of surface- and ground-water drives a significant part of the region's economic and social infrastructure.
- **Biodiversity** – The region is heavily cleared, the majority of the catchment is under reserved and high priority for inclusion in the National Reserve System. It is home to many threatened species, including nationally significant Murray Cod, Superb Parrot and Southern Corroboree Frog.

What are the key NRM challenges in the CMA region?

- Balancing growing differences in societal values at local, state and national scales and helping water-dependent communities and industries adapt to a future with less water.
- Environmental water management, soil salinisation and landscape scale biodiversity conservation and management (primarily through landholder stewardship rather than regulation or establishment of formal reserves).

What is the condition of key elements in the landscape?

- Overall hydrological condition of rivers is moderate, overall macroinvertebrate condition is poor to moderate, overall fish assemblage condition is very poor.
- Groundwater management areas (GWMAs) are generally in good to very good condition.
- Overall soils are rated in good condition, and land managed within its capability is rated as fair, with increasing or stable trends across all indicators.
- Overall native vegetation extent and condition is poor, with intact native vegetation covering 25% of the region primarily in the west and eastern regions.

What significant work has the CMA done?

- Significant works include engaging over **38,000 landholders** and community members in NRM; actively managing, restoring and replanting over **63,000 ha** of native vegetation; engaging over **800 landholders** to improve soil condition and reduce erosion; improving nearly **1,500 km** of riparian corridors; and delivering nearly **37,000 ml** of environmental water to **114 wetlands** to reinstate wetting and drying cycles.

How much is invested in NRM in the region?

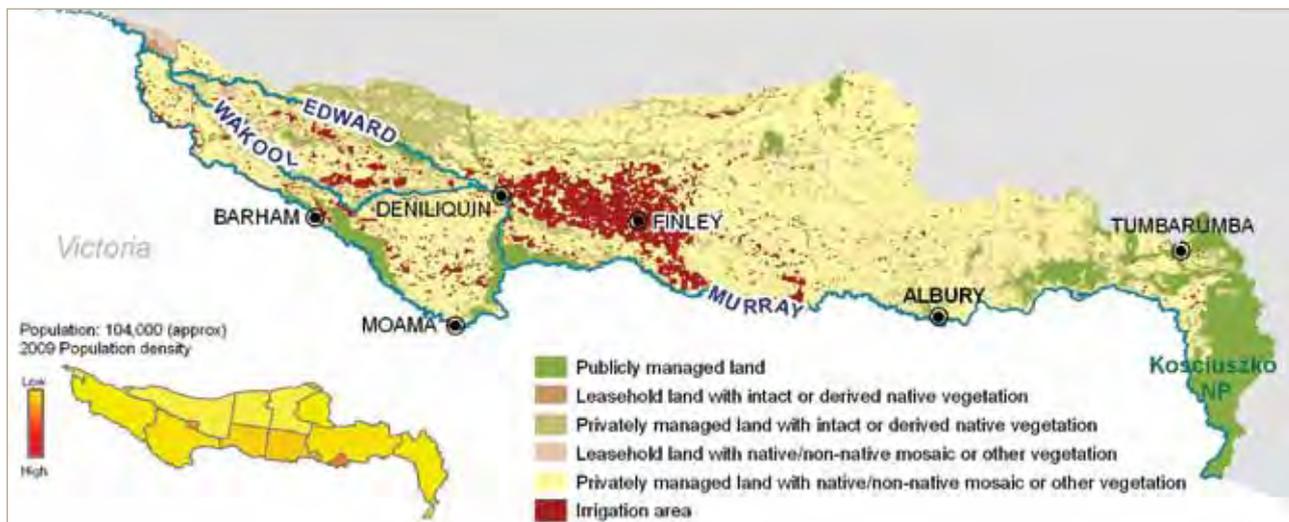
- Overall, over **\$123 million** is invested through the CMA (2004–10).
- In recent years, examples of significant NRM investment co-ordinated outside of the CMA include: over **\$25 million** invested under the joint Commonwealth–State-funded Living Murray Program (2008–10); over **\$1.8 million** invested under the Commonwealth's Strengthening Basin Communities program (2009–10).

What did the NRC audit tell us about the performance of the CMA?

- The CMA demonstrated a significant improvement from its first audit, now having a high level of effectiveness (previously fair) in implementing the region's catchment action plan, with particular strengths in prioritisation and adaptive management.

What are some of the key NRM and planning strategies in the region at the moment?

- Guide to the Murray Darling Basin Plan (Australian Government)
- The Living Murray Plan (Australian Government)
- Land and Water Management Plans (Australian Government and NSW Government)
- Murray Catchment Action Plan (NSW Government)
- Draft Murray Regional Strategy (NSW Government)
- 3 Water Sharing Plans – gazetted (NSW Government)
- Riverina Red Gum Regional Employment and Community Development Fund (NSW Government)
- Biodiversity Strategy (NSW Government)
- Community Strategic Plans (NSW Local Government)



12 Snapshot of the Western CMA region

What do we value in this CMA region?

- **Biodiversity** – the region contains significant areas of relatively undisturbed rangeland ecosystems and under-represented IBRA regions of high priority to be included in the National Reserve System.
- **Agriculture** – the region contains around 630 pastoral and agricultural holdings (predominantly grazing), which employ around 26% of the region's population.
- **Mineral resources** – mining activity is increasing although the decline in mining in the late 1990s significantly affected the urban communities, particularly Cobar.
- **Water** – the region contains the Paroo River, the last free-flowing river in the Murray Darling Basin, three Ramsar-listed wetlands and 50 nationally important wetlands. It also contains several high-priority groundwater-dependent ecosystems.

What are the key NRM challenges in the CMA region?

- Declining social capital required to manage extensive rangeland landscapes, and equitable water sharing between water users.
- Ground-cover retention and management, total grazing pressure management and invasive native scrub management.
- Retention of in-stream aquatic habitats and barriers to fish migration.
- Property scale biodiversity management and fire regime management, soil management in cropping areas, wind erosion and pest animals (particularly goats and pigs).

What is the condition of key elements in the landscape?

- Overall native vegetation extent and condition is good and under low pressure, with intact native vegetation covering 90% of the region; however, most vegetation communities show some degree of modification through grazing and invasive native scrub (27 species are listed in the region).
- Overall hydrological condition of the region's rivers is moderate, and macroinvertebrate and fish assemblage condition is poor (with fish assemblages in the Paroo River rated as good).
- Land managed within its capability is rated as good, with stable trends across all indicators.
- Goats, pigs and foxes are widespread invasive fauna species and Parkinsonia (*Parkinsonia aculeata*), Mesquite (*Prosopis spp.*) and several cacti and annual species threaten significant areas of pastoral land and biodiversity values, as well as several annual species across all land types.

What significant work has the CMA done?

- Significant works include engaging over **600 landholders and managers**; **large-scale collaborative projects** with community groups and government agencies; establishing an **Aboriginal Reference Advisory Group**; developing an **Indigenous Knowledge System**; addressing total grazing pressure over **600,000 ha** of land; protecting over **22,500 ha** of high conservation value areas; rehabilitating over **16,000 ha** of rangeland ecosystems; completing **21 wetland management plans** completed; implementing over **68,000 ha** of enterprise-based conservation; and installing over **1,000 km** of riparian fencing.

How much is invested in NRM in the region?

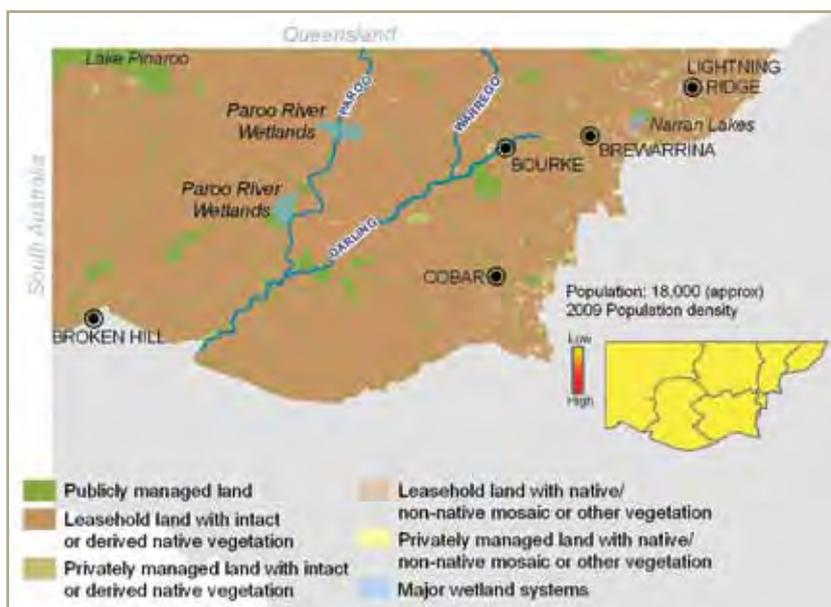
- Overall, over **\$43.9 million** invested through the CMA (2004–10).
- In recent years, examples of significant NRM investment co-ordinated outside of the CMA include: over **\$1.5 million** invested under the joint Commonwealth–NSW Government Rivers Environmental Restoration program (2006–10).

What did the NRC audit tell us about the performance of the CMA?

- The CMA demonstrated a medium level of effectiveness in implementing the region's catchment action plan, and performed consistently with the state-wide trend of stronger performance in engaging communities and delivering projects.

What are some of the key NRM and planning strategies in the region at the moment?

- Guide to the Murray Darling Basin Plan (Australian Government)
- Western Catchment Action Plan (NSW Government)
- 1 Water Sharing Plan (NSW Government)
- NSW Biodiversity Strategy (NSW Government)
- Community Strategic Plans (NSW Local Government)



13 Snapshot of the Lower Murray Darling CMA region

What do we value in this CMA region?

- **Biodiversity** – the region contains relatively undisturbed ecosystems and the Willandra Lakes World Heritage Area. Under-represented IBRA regions are of moderate priority to include in the National Reserve System and 95% of the catchment is covered by native vegetation, albeit modified by grazing.
- **Agriculture** – a high proportion of the region supports agricultural industries (predominantly grazing, with around 5% cleared for cropping and irrigated horticulture), and a further 3.5% is approved for clearing under previous native vegetation legislation.

What are the key NRM challenges in the CMA region?

- Diminishing employment opportunities.
- Saline groundwater accession, over-extraction of water for consumption purposes and reduced water allocations for efficient irrigation practices.
- Fragmentation in riverine ecosystems (between river channels, floodplains, lakes and wetlands) including in-stream structures that impede flood flow and recession.
- Ground-cover management, total grazing pressure, wind erosion, and pest animals and weeds.

What is the condition of key elements in the landscape?

- Overall native vegetation extent and condition is good and under low pressure, with intact native vegetation covering 90% of the region; however, most vegetation communities show some degree of modification.
- Groundwater management areas (GWMA) are generally overall in good condition; however, there is minimal use of groundwater due to high groundwater salinity.
- Overall soils are rated in good condition, and land managed within its capability is rated as fair, with increasing or stable trends across all indicators except for wind erosion and soil structure decline, which are improving.
- Overall, the Lower Murray Darling Hydrological Index shows impacts of regulation and diversion. While improvement in native to alien fish abundance ratios in the Darling River and in biomass ratios in the upper and lower Murray has been achieved, monitoring indicates that the CAP Riverine Health Target is unlikely to be met by 2015.
- A very high percentage of samples exceed total phosphorous guidelines along the Darling River but only a low to moderate percentage do so along the Murray and lower Murray.

What significant work has the CMA done?

- Significant works include implementing **eleven agreements** with traditional tribal groups covering over **346,000 ha**; reinstating fish passages and movement over **500 km** in the lower Darling River; protecting and rehabilitating over **14,500 ha** of riparian native vegetation; reconnecting nearly **2,000 ha** of wetlands with floodplain and river systems; re-establishing connectivity of **1,968 ha** of wetlands; establishing over **194,000 ha** of private conservation reserves; improving cropping practice over **80,000 ha** of land; improving over **2 million ha** of native vegetation: and controlling pest animals and plants over **2.5 million ha** of land.

How much is invested in NRM in the region?

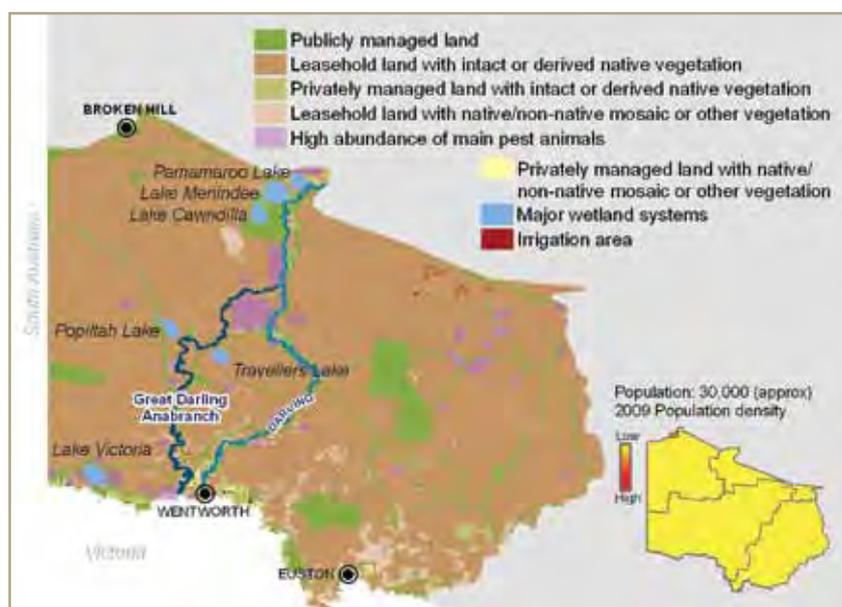
- Overall, over **\$49 million** is invested through the CMA (2004–10)
- In recent years, examples of significant NRM investment co-ordinated outside of the CMA include: over **\$54 million** invested under the NSW Government's Darling Anabranch Pipeline Scheme (2006–ongoing).

What did the NRC audit tell us about the performance of the CMA?

- The CMA demonstrated a fair level of effectiveness in implementing the region's catchment action plan, and performed consistently with the state-wide trend of stronger performance in engaging communities and delivering projects.

What are some of the key NRM and planning strategies in the region at the moment?

- Guide to the Murray Darling Basin Plan (Australian Government)
- The Living Murray Plan (Australian Government)
- Lower Murray Darling Catchment Action Plan (NSW Government)
- Draft Murray Regional Strategy (NSW Government)
- 1 Water Sharing Plan – gazetted (NSW Government)
- Biodiversity Strategy (NSW Government)
- Community Strategic Plans (NSW Local Government)



Chapter 5

Where are we going?

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5 Where are we going?

After six years of implementing the model and reviewing results, we should reflect on the lessons and consider how to improve effectiveness, both in the short and longer term.

Academic researchers and leading thinkers have written extensively on how to manage landscapes as integrated systems in theory⁴³, but the systematic practice of such approaches has proven to be difficult. Now, after six years of relative institutional continuity and institutionalised learning, we are starting to see the theory working in practice at the project and regional scales.

The challenge now is to embed integrated landscape management and learning processes further up the scales to state and national efforts. If we can build on the foundations we have established and avoid resetting the clock on every round of new reform, we can continue to build on this improvement.

The experiences and expertise generated since 2003 give us a good foundation to pursue more cohesive and collaborative approaches across all of government. Priorities for government are to:

- **Implement whole-of-government and community regional planning** – to make sure that the left and right hands of government-funded investment programs are all targeted at the key issues in specific landscapes.
- **Improve science and knowledge base to better inform decisions** – to cut through the complexity of linked natural and socio-economic systems so different natural resource managers understand where they sit in those systems and how to collaborate on multi-scale problems.
- **Implement whole-of government adaptive management** – to build on and share what is working and avoid re-inventing the wheel.
- **Match funding to landscape need** – to invest in the maintenance of landscapes at a scale commensurate with the value of the services they provide, such as clean water and air, food and biodiversity.
- **Design sound policy to complement stewardship** – to make sure that our laws don't create perverse incentives that undermine communities' efforts to voluntarily steward natural resources.

The following sections describe priorities for government to improve effectiveness of landscape management during the next period of CAP implementation.

5.1 Future directions

As described in **Chapter 2**, the regional NRM framework is one component of a longer and broader journey towards sustainable landscape management. The experience of CMAs in galvanising voluntary action for landscape stewardship at the local scale can inform how other functions of government grapple with the converging challenges of water availability, climate change, food security, energy use and urban expansion.

Figure 5.1 illustrates the foundations of successful landscape management that have been established through the regional model over the last six years, and the future directions that should build on this success. The figure demonstrates how governments at all scales need to work together, and creatively use a range of tools and methods to facilitate broader and enduring landscape health.

The lower steps describe what has already been achieved, and the top steps show the opportunities we now have to build on that success towards more effective landscape management. Leadership is required at each step to ensure effective execution and enable further innovation.

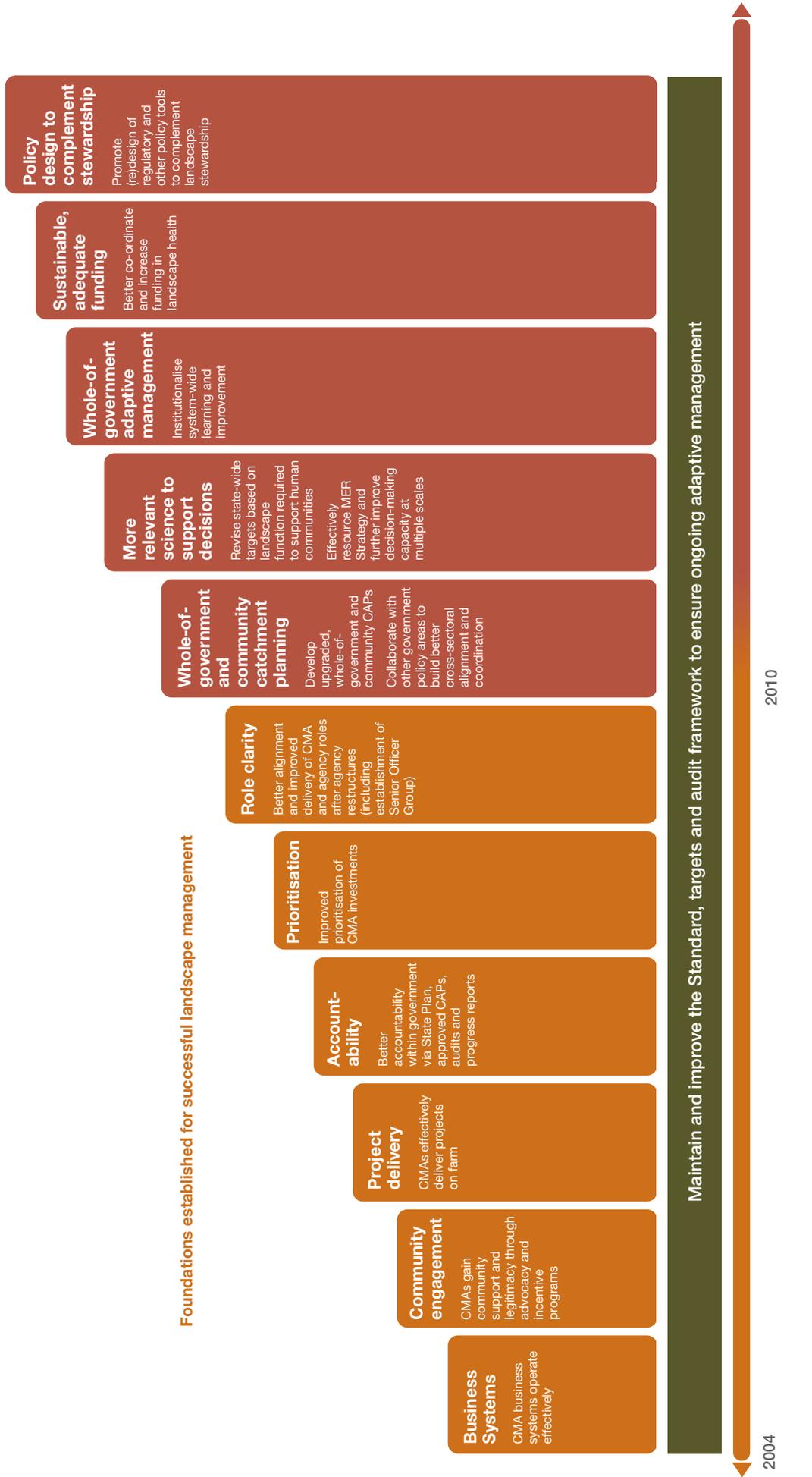


Source: Southern Rivers CMA

43 Recent examples include Curtis, A, and Lefroy, E (2010), 'Beyond threat- and asset-based approaches to natural resource management in Australia', *Australasian Journal of Environmental Management*, Vol 17, pg. 6-13; Stafford Smith, M, McKeon, G, Watson, I, Henry, B, Stone, G, Hall, W, and Howden M (2007), 'Learning from episodes of degradation and recovery in variable Australian rangelands', *PNAS*, Vol 104, No. 52.

Figure 5.1: Steps to success: improving how we manage natural resources

Priorities for next period of CAP implementation



5.2 Priorities for government

In **Chapter 2** we described five principles that need to work together for more effective landscape management in NSW:

1. Whole-of-government and community catchment planning
2. More relevant science to support decisions at all scales
3. Whole-of-government adaptive management
4. Sustainable, adequate funding
5. Better policy design to complement stewardship.

All of these need to be underpinned by the philosophy of total catchment management that has evolved over decades and which remains contemporary; that land, water and community resources need to be managed together as one system and at a scale that enables community ownership of that management.

The following sections describe some short- and longer-term priorities for more fully implementing these principles in NSW.

5.2.1 Implement whole-of-government and community catchment planning

We seek integration across different components of the landscape (biodiversity, water, land and community) so that efforts to manage one problem don't have adverse impacts on other parts of natural systems. We also seek better alignment between different parts of government and the community so

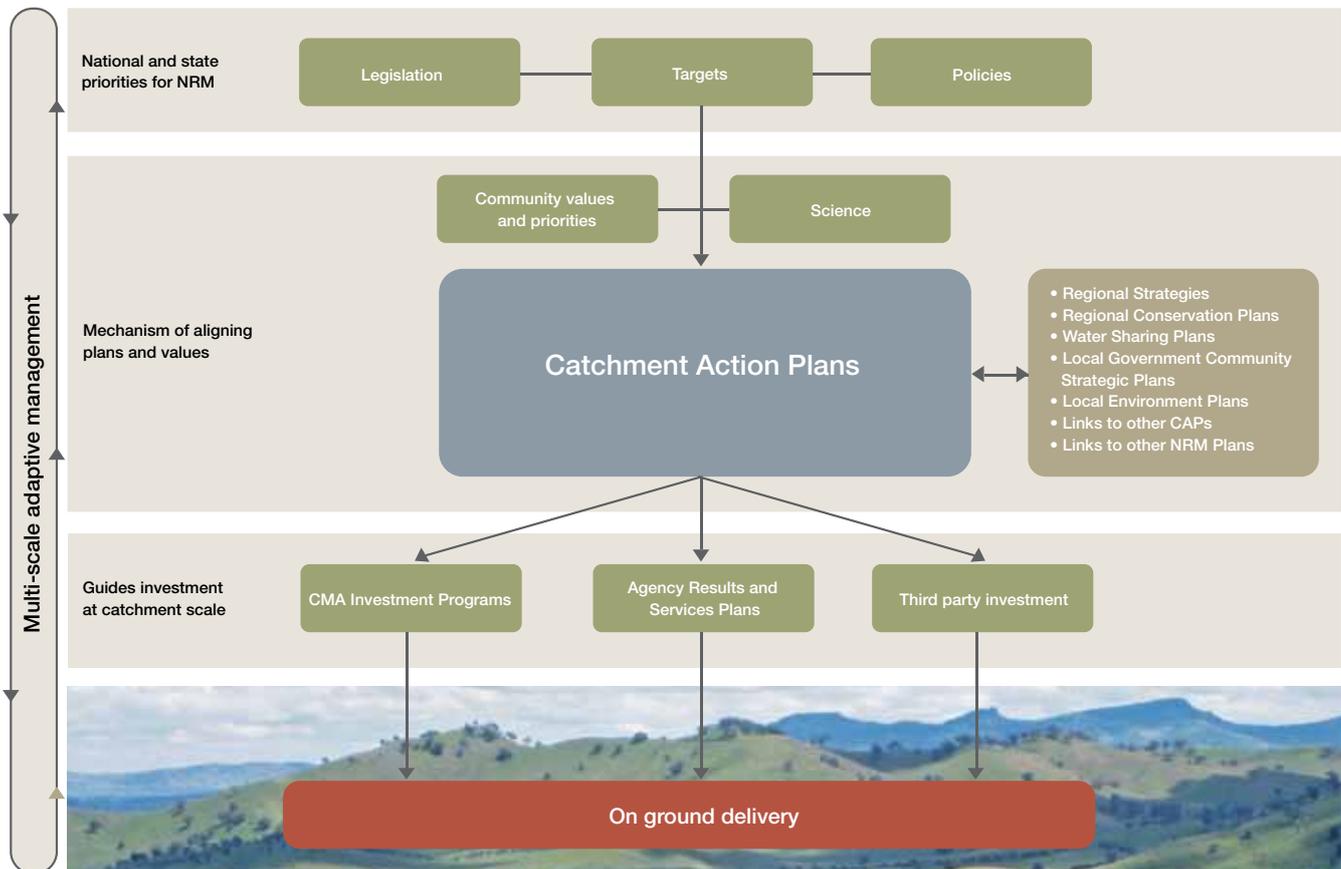
the efforts of one part of government don't undermine those of government at other scales, or of community initiatives.⁴⁴

CMA, agencies and local governments have made good progress in pursuing greater alignment and integration in recent years, particularly evidenced by:

- the strong commitment of the Senior Officer Group⁴⁵ for developing next generation whole-of-government and community CAPs that allow state-level policy to be implemented coherently at the regional scale
- good examples of collaboration between CMAs and local governments⁴⁶
- a successful project that developed a methodology for aligning water allocation planning and catchment planning, which will be rolled out across all CMA regions to inform upgraded CAPs and Water Sharing Plans.⁴⁷

A vision for a broader role for CAPs is emerging where the non-regulatory, community-based CAPs become a mechanism for aligning and helping deliver a range of state policies, non-statutory and statutory plans, and NRM-related Australian and NSW government programs. However, it is important to ensure that co-ordination and alignment does not slip into top-down control of regional planning. This model is illustrated in **Figure 5.2**.

Figure 5.2: The CAP as a proposed mechanism for aligning plans and values



This model recognises the critical role of local government in influencing landscape health, particularly along the NSW coast. Local government community strategic plans are relatively new instruments that guide both a local government's statutory planning instruments, such as the local environment plan, and its program of investment in environmental management. There is great potential for CMAs and local governments to work towards aligning the objectives of community strategic plans and CAPs.

In 2009, the NRC initiated a pilot process to facilitate a step-change improvement in catchment planning, as several CMAs were considering reviewing and updating their CAPs. Through a pilot process, Central West and Namoi CMAs, agencies and the NRC sought a structured, collaborative learning environment to test the feasibility of:

- whole-of-government and community catchment planning
- the use of resilience thinking to improve prioritisation and better manage our changing and co-evolving catchments and communities
- spatially representing priorities and values to align with statutory planning
- simultaneously meeting government investor needs and having a quality planning process.

One of the above criteria refers to resilience thinking. Resilience thinking is emerging as a new and valuable approach to dealing with complexity, uncertainty and inevitable future change. It has been developing since the 1970s⁴⁸ and its practical application to NRM is now being trialled internationally and in Australia.⁴⁹ Resilience is a measure of a landscape's capacity to cope with shocks and undergo change while retaining essentially the same structure and function. Applying resilience thinking means that we look at our landscapes as dynamic systems with interacting social and ecological components. Humans and their values are seen as an integral part of the landscape system.

Resilience thinking aims to identify a small number of important variables that control the way the landscape system is functioning, and the thresholds within which the system can continue to function in a desired way. Management can then be designed to maintain a functioning system by either remaining within thresholds or transforming to an alternative stable state. Managing for resilience involves promoting diversity and flexibility in those systems, and building the capacity to adapt and change.

The pilot CAPs prepared by the Central West and Namoi CMAs are the first examples world-wide of regional strategic plans based on resilience assessments.

The pilot process is still underway and the pilot plans have not been formally reviewed. However, through the process of developing draft attributes and criteria⁵⁰ for upgraded CAPs, and observing the CAP pilot process, the NRC made the following observations:

- **It is possible to align NRM policies at a regional scale through CAPs.** At this stage, alignment with Water Sharing Plans and the new draft Biodiversity Strategy are the most feasible. For the wide range of other policies and strategies that state agencies would like to see delivered through CAPs (at least 22 state plans and strategies have been identified) there is a need for policy restructuring at the state level to make regional-level alignment more practical. Policy alignment needs to be a two-way process where the agencies are informed by the knowledge and priorities developed through the CAP planning process, as well as the CMAs being informed by state policy.
- **Planning based on resilience thinking can work for the regional delivery of NRM programs.** The CMAs found that resilience concepts resonated with their communities, and this component of the pilots has been well received in state and Australian government agencies. The regional-scale resilience assessments, and identification of important variables and thresholds, are a useful frame for improving prioritisation.

44 (a) See NRC's previous reports on progress and its initial report recommending the Standard and targets. Natural Resources Commission (2005), *Recommendations: State-wide Standard and Targets*, September.

(b) The need for integrated and aligned planning has also been recognised in the State Plan and National Water Initiative, and by the NSW Legislative Assembly Standing Committee on NRM and climate change, which recommended an agency or taskforce be set up to identify mechanisms to align CAPs and local environmental plans. Legislative Assembly: Standing Committee on NRM (Climate Change) (2009), *Return of the Ark: The adequacy of management strategies to address the impacts of climate change on biodiversity*, Report No 5/54, December.

45 The Natural Resources and Environment Chief Executive Officers Cluster established a Senior Officer Group chaired by the Deputy Director General of DECCW and consisting of senior officers from DECCW (Office of Water), Department of Industry and Investment, Department of Premier and Cabinet, Treasury, Department of Planning, Aboriginal Affairs, Land and Property Management Authority, CMAs and the NRC. The Group aims to ensure Government activities across NRM, environment and water are consistent and complementary in order to progress State Plan targets.

46 For example, the Local Government and Shires Association worked with the Southern Rivers and Sydney Metro CMA to develop guidelines titled *Integrating NRM into Local Government Operations* (available at www.lgsa.org.au) and the Lachlan CMA developed a Natural Resource Management Delivery Plan that drives partnerships with the region's LGAs through mutually agreed NRM delivery plans covering areas of land-use planning, environmental regulation and local land management.

47 The National Water Commission funded a project involving CMAs, the NSW Office of Water, DECCW and the NRC to collaboratively develop a methodology for aligning water allocation planning and catchment planning. This methodology was piloted in the Hunter-Central Rivers CMA region and is now being implemented across NSW. The Central West CMA has demonstrated that the methodology can also be applied for the draft Biodiversity Strategy, and potentially other policies.

48 Holling, C (1973), 'Resilience and stability of ecological systems', *Annual Review of Ecology and Systematics*, Vol 4:1-23

49 Walker, B, and Salt, D (2006), *Resilience thinking – Sustaining ecosystems and people in a changing world*, Island Press, Washington DC; Bennett, E (2003), Scenario development and resilience: *local and global examples of resilience of social-ecological systems*, IHDP (International Human Dimensions of Global Change); Walker, B, Abel, N, Anderies, J, Ryan, P (2009), 'Resilience, adaptability and transformability in the Goulburn-Broken Catchment, Australia', *Ecology and Society*, Vol 14, No 1, Synthesis.

50 Natural Resources Commission (2010), *Criteria and attributes for upgrading catchment action plans (Working draft)*, July. Available at www.nrc.nsw.gov.au.

- **Spatial expression of landscapes and NRM priorities provides a solid basis for aligning the efforts of different organisations towards common objectives.** Experience has shown that combining data sets required and collected for different statutory purposes at a common, meaningful scale can provide an understanding of the landscape (in the form of agreed values and risks) that can form the basis for new planning approaches across institutions. This can be done easily and relatively cheaply.⁵¹ Planning at scales smaller than the CMA region facilitates greater community engagement and is a better scale at which to work with important stakeholders like local government.
- **The planning process is as important as the final plan.** The plan-making process is valuable for building strategic thinking capacity, and more importantly, building ownership of the plan by all partners, thus ensuring effective implementation.⁵²

Following the NRC's formal assessment, the remaining CMAs will begin preparing their region's CAPs. It is likely that resilience assessments will be conducted across CMA boundaries where common landscape systems are operating.

Recommendation 1:

That the NSW Government prioritise development of upgraded, whole-of-government and community CAPs so that new CAPs are in place by the end of 2012.

The next steps are for:

- the Senior Officer Group, the NRC and CMAs to collaboratively build agency and CMA capacity to apply resilience thinking through collaborative assessments across CMA boundaries, and establishing a community of practice on strategic NRM thinking
- the NRC and the Senior Officer Group to develop written guidance material for agencies and CMAs on how to develop upgraded CAPs
- the Senior Officer Group and CMAs to use the CAP upgrade process to align CAPs and identified priority policies, such as Water Sharing Plans, the draft Biodiversity Strategy, Climate Change Adaptation Plans and Local Government Community Strategic Plans.

The pilot CAP process is indicating that CAPs can readily align with many state-wide plans and policies (as described in **Recommendation 1**). In other cases, some restructuring is needed for greater coherence at the state-wide scale before CMAs can reasonably be expected to bring the plans and policies together at a regional scale.

In the first instance, government needs to focus on alignment among state-level NRM plans and policies. However, beyond NRM policies and plans there is an emerging understanding of the need for a policy framework that enables alignment and convergence of the policy agendas for the related areas of biodiversity, water, land management, carbon, energy, mining, transport, infrastructure, health and rural development. These issues cannot be dealt with effectively in isolation.

The next priority is to connect the planning processes for catchment management and water sharing with the land-use planning mechanism for urban and peri-urban development. The regional strategies are the land use planning instruments at the most appropriate scale to pursue this kind of strategic alignment of goals and processes. The currently disconnected planning processes for CAPs, water allocation planning and regional strategies all overlap in the provisions relating to maintaining and improving the condition of freshwater aquatic ecosystems within rivers, aquifers, wetlands, estuaries and near shore marine environments. CMAs and local government are innovating at the local and regional scale to find ways of working together and aligning their processes.⁵³ These experiences at the regional scale should inform what changes are needed at the state-wide scale to ensure that these different parts of government are all working towards the same outcomes.

Looking more broadly, there is scope to seek regional co-ordination between delivering NRM services and a range of other services from local government, health, and regional development initiatives. The Australian Government is refocusing on regional delivery through regional development authorities, and the relationships and opportunities to share and co-ordinate resources with CMAs should be explored in coming months as the authorities are established. Co-ordination among different types of service delivery should be facilitated and encouraged from central government, but mechanisms should not be imposed.

Recommendation 2:

That the NSW Government seek greater coherence among state-wide plans and policies, focusing within NRM initially and working with other government policy areas in the longer term.

The next steps are for:

- the Senior Officer Group to review, align and update priority state-wide policies and strategies:
 - using the knowledge and priorities being generated through the CAP upgrade planning process
 - prioritising water management plans, regional strategies, land management plans, climate change adaptation plans, and plans of management for public land

51 This was demonstrated by the National Water Commission project described in footnote 47.

52 For instance the Central West CMA applied components of the Investment Framework for Environmental Resources (INFFER) methodology to identify assets valued by the community. Twelve community workshops were held across the region and a further three with Aboriginal, local government and Landcare reference groups.

53 See footnote 46.

- the Senior Officer Group to facilitate collaborative planning and sharing of a common evidence base with other government policy areas such as mining, transport, emergency services and health planning.

5.2.2 Improve science and knowledge base to better inform decisions

To make better NRM decisions we need to continue investing in, and valuing, knowledge about how our landscapes work. The success of NRM in NSW depends on having appropriate information available to support decision making at each stage of the adaptive management cycle, by multiple decision makers.

The NRC believes we have an opportunity to better focus our investment and MER efforts on a smaller set of priorities that better reflect what matters most in the landscape. The current 13 state-wide targets were designed to be non-prescriptive and flexible so that they would be interpreted, integrated and prioritised at the regional, local and site scales. After six years observing implementation of the targets, the NRC believes the targets have in many cases been driven too much from the top down, particularly through program reporting processes that require CMAs to report on each target individually. This reporting can distort investment priorities and project choices by undermining a more sophisticated understanding of landscapes as linked social and ecological systems.

The NRC believes it may be beneficial to revise the state-wide targets and move towards a smaller set of nested targets based on landscape function and resilience. These targets would reflect the thresholds within which ecosystems can support human well-being.

In developing a smaller set of targets we should focus on the key components of land capability that have driven contemporary use: water availability, soils, vegetation, and social and economic values. The task is to balance competing values between the maintenance, restoration and protection of landscapes and the use of these landscapes to support peoples' needs and aspirations. Therefore, revised targets must be expressed at different scales in a way that relates to the actions that can be taken at each of those scales.

Revised targets would result in:

- different key targets in different regions, depending on the landscape systems operating
- greater flexibility for CMAs to plan and invest based on their whole landscape and the biophysical-social interactions, rather than discrete asset-based targets
- more efficient and effective investment that is targeted towards key issues rather than spread across all landscape assets
- more efficient monitoring systems based on fewer indicators and targeting the most important variables and thresholds.

This would enable managers to better prioritise and identify actions or interventions, thus strengthening resilience.

Recommendation 3:

That the NSW Government supports revision of the state-wide targets.

Under its legislative obligation to recommend standards and targets, the NRC will work with agencies, CMAs and communities over the next three years to recommend to government a revised set of state-wide targets. Some prioritisation among the current 13 targets may occur earlier, for example, when developing new State of the Catchment reports and as we learn from the priorities in updated CAPs.⁵⁴

Revising the targets will help to guide future MER efforts. NSW has made substantial progress in implementing a whole-of-government MER strategy⁵⁵ that will provide the information to underpin the management of natural resources in NSW. In 2010, the NSW Government revised and improved its MER strategy to have a clearer focus on scale, evaluation, program performance, collaboration, accountability and open access to data.

The 2010 State of the Catchment reports and the NRC's independent report on the vegetation target demonstrate that information is available to set baselines for some targets and the information regarding other targets is improving. This is a substantial improvement. Nonetheless, there remains much to be done and commitment, resourcing and implementation of the revised MER Strategy are important next steps. Currently, the MER Strategy Implementation Plan is insufficiently funded to deliver on its minimum core program.

Now that we have the data to set some baselines, this needs to be publicly available. The next steps are to systematically integrate data collection, evaluation and reporting with a formal adaptive management cycle at the state, and ideally the national, program scale. This will require explicit links between monitoring programs and decision support tools, which can use that data to make predictions about future resource conditions as resource management practices change.



⁵⁴ The current targets are in place until 2015 and any government approved change to the targets will occur in a structured and collaborative manner as it relates to CAP planning, implementation, MER and auditing processes.

⁵⁵ Department of Environment, Climate Change and Water (2010), op. cit.

While maintaining long-term continuity of a central set of data, MER programs should move towards the following:

- **Prioritising the most important things influencing landscape health.**

Limited monitoring resources are spread across more than 80 data sets and 40 indicators, covering all 13 of the state-wide targets. More attention can be given to evaluating program effectiveness, what variables most affect the resilience of our landscapes, testing assumptions within programs and landscape modelling.

- **Measuring the capacity of landscape systems and how well they are functioning.**

Monitoring programs should help us to understand the likely ongoing functionality of our landscapes and their future capacity to produce food, fibre, clean water and air, and recreational and amenity values, rather than comparing the condition of discrete assets with typically pre-1750 benchmarks or pre-development reference conditions. We should monitor and evaluate to understand the role of different assets in the landscape (for example, what wetlands are doing for the landscape, rather than how their condition is tracking).

- **Clearly linking to management actions.**

Unless monitoring is explicitly linked to management hypotheses as part of the adaptive management loop we are less likely to learn from experience, government is unlikely to be getting full value from its investments. With clear objectives (in upgraded CAPs), we need to determine metrics capable of detecting change in desired indicators, determine how to distinguish between human induced and other change and refocus data collection accordingly.

The upgraded CAPs are likely to be a key source of evidence for both reviewing the targets and informing what needs to be monitored in diverse landscapes. A monitoring program based on resilience will seek to measure how we are going in relation to thresholds that, if crossed, may change the way a landscape system is working to the point where it no longer supports the needs of the community. This monitoring can then be clearly linked to management actions that must occur if the monitoring indicates that we are approaching an important threshold.

Recommendation 4:

That the NSW Government implement and adequately resource its MER Strategy 2010–2015 and further improve its decision-making capacity at multiple scales.

The next steps are for:

- the NSW Government to invest in the collection of the essential data program identified in the MER Implementation Plan at a minimum
- the NRC and the Senior Officer Group to review and rationalise indicators and data collection based on conceptual and predictive models of landscape function and resilience in the upgraded CAPs and revised state-wide targets (**Recommendation 3**)
- the Senior Officer Group, NRC and CMAs to work together to:

- link catchment monitoring and evaluation with revised CAP targets and conceptual models of landscape change
- integrate monitoring and evaluation of investment, performance, outputs and outcomes spatially and in open-access systems
- use MER to inform and calibrate conceptual and predictive modelling of expected change as a result of management actions, and the impacts of climate change, land use and other activities
- prioritise evaluation of community capacity for NRM and communities' contribution to landscape change.

5.2.3 Implement whole-of-government adaptive management

The development of an adaptive management and learning culture has been a critical success factor in the implementation of the regional model so far. NRM is complex. We are dealing with complex, linked systems, natural variability, multiple stakeholders at different scales, incomplete knowledge, and non-linear change. Therefore, we need stable institutions that enable learning, experimentation and program innovation over the long term if we are to make progress.

The Standard, targets and audits were established as key components in institutionalising learning and continual improvement. There has been relative institutional continuity since 2003, which has allowed CMAs to learn from their experiences and improve practice over time. The results of the Murray CAP implementation audit demonstrated the benefits of independent audit and formal learning processes.

This culture of prediction, testing, reviewing and learning that we are observing at the regional scale should be institutionalised more widely through the NRM system. At the state and national levels there has been a history of frequent restructures; we need long-term institutionalised learning and continuity of focus. Formal accountability processes – using monitoring and auditing programs and predictive tools – would help institutionalise adaptive learning and ensure each successive round of NRM reform builds on the lessons of the past. Unfortunately, the collective history shows some



repetition of past mistakes and processes, where we re-learn the same insights about managing complex natural and social systems.

The next steps for developing more enduring institutions at the state and national scales should be to establish a more permanent role for the whole-of-government co-ordination that the Senior Officer Group is providing, and a longer term strategic agreement at the Council of Australian Governments (COAG) and NRM Ministerial Council levels.

Recommendation 5:

That the NSW Government institutionalise system-wide learning and improvement processes.

The next steps are for:

- the NSW Government to formalise the whole-of-government co-ordination function provided by the Senior Officer Group
- the NSW Government to work with other jurisdictions to develop COAG- and Ministerial Council-level agreements on NRM policy, investment and performance-based adaptive management
- the Senior Officer Group to create formal processes to continually improve NSW Government NRM efforts, including independent evaluation of policy and program delivery
- the NRC to use State of the Catchment reports to evaluate CAP implementation across government and communities
- the NRC to maintain and improve use of the Standard and CAP audit processes, and revise the state-wide targets (**Recommendation 3**).

5.2.4 Match funding to landscape need

Landscape scale change comes about by cumulative impacts over a long period of time, underwritten by solid community engagement and capacity building. Reliable, co-ordinated long-term funding that recognises the public good generated through private land management is essential.

There has been significant federal, state and local government investment into our coasts, rivers, soils and communities between 2004 and 2010. However, the total amount of NRM-related investment in NSW is unclear due to the multitude of investment streams at different scales. A desktop review of NSW Government Budget Papers for 2009–10 indicates

NRM-related investment through NSW Government agencies in programs targeting better management of natural resource and landscape health is in the vicinity of \$1 billion per year.⁵⁶ Local governments also make a significant contribution towards NRM-related activities, estimated at around \$1.7 billion per year across NSW.⁵⁷

Nationally, a similar desktop review of budget papers indicates Australian Government agencies receive around \$3 billion funding each year for NRM-related activities Australia-wide.⁵⁸

In contrast, a significant yet relatively small proportion of estimated government NRM-related investment in NSW is being co-ordinated through the quality-assured and audited CAPs. For example, in 2009–10, CMA investment was around \$130 million.⁵⁹

There are opportunities to better co-ordinate NRM-related funding through CAPs. **Figure 5.3** shows the wide range of NRM-related funding delivered by different levels of government and the potential for greater strategic alignment of investment priorities through regionally planned CAPs that reflect community priorities. This would minimise duplication and maximise return on governments' investment. While the CAP can have an increased role in aligning investment, it is legitimate for investors at different scales to have varying priorities, some of which may be outside of the CAP's priorities.

There are some good examples where CMAs are working within the current arrangements to seek greater return on investment by aligning funding streams at the regional scale. The Lachlan CMA is one of eight NRM regions across NSW and Queensland acting as a delivery agent for Caring for our Country's Environmental Stewardship Program. The CMA does not determine which landholders receive funding under this scheme. However, by working with landholders during the approvals process, the CMA identifies which properties are receiving funding under this program. The CMA then identifies areas where its CAP priorities allow for CMA investment to complement and enhance investments made under the Australian Government program.

There is also value in being able to interrogate investment data, both in amount and spatially, so that investment can be assessed against federal, state or regional priorities, or linked to on-ground outcomes. Linking investment to outcomes can help identify how much should be spent and where to make a difference. In the past, investment data has often not been captured or reported in a way that allows for effective and efficient spatial analysis. However, DECCW have developed a Land Management Database, which is a user-driven framework that allows for the spatial recording and description of NRM-related investment at the local, regional or state scales. Twelve out of 13 CMAs are using this database and other state agencies are exploring its use.

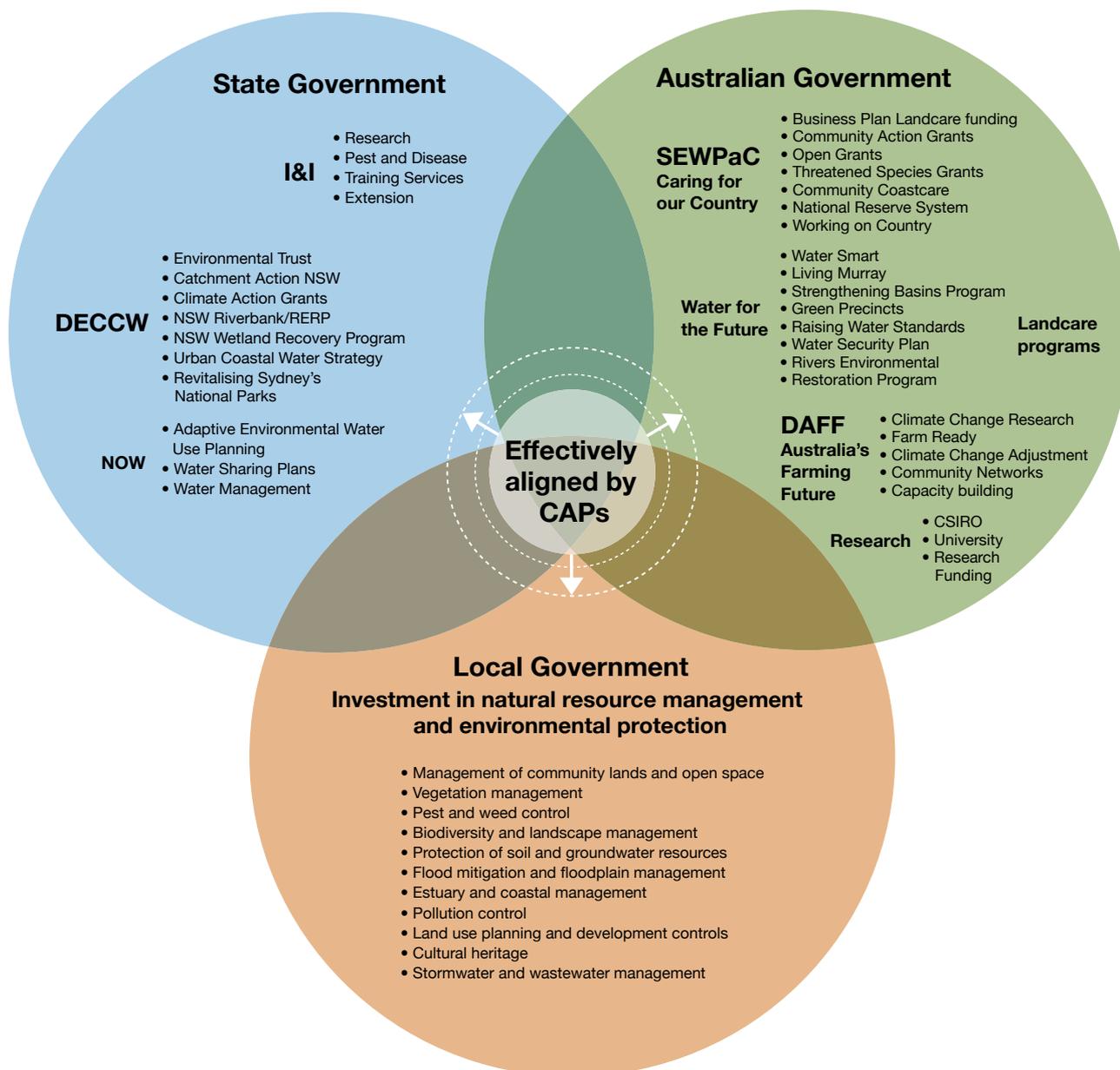
56 Source: NSW Government Budget Papers 2009–10, reporting for DECC, Environmental Trust, DPI, NSW Rural Assistance Authority, DWE and NRC. Estimates include all operational, program and grant funding for each agency, less any funding streams that could be readily identified as not contributing to the state-wide targets and NRM.

57 Estimation based on ABS 'Environmental Expenditure by Local Government' reporting (2002–03) and ABS 'Local Government Finance Data' (2008–09). Also based on projected NSW LGA expenditure for 2009–10, and operational and program investment reported as a percentage of total LGA investment for the following categories: environmental protection (wastewater management, conservation of biodiversity and habitat, protection of soil and groundwater resources, cultural heritage) and natural resource management (land management and development). Estimate does not include expenditure on solid waste or water supply services. NRM-related investment under the included categories is reported to be approximately 20% of total local government expenditure in NSW.

58 Source: Australian Government Portfolio Budget Statements 2009–10 reporting for DEWHA and DAFF. Figure represents Australia-wide NRM-related investment and includes all operational, program and grant funding for each agency, less any funding streams that could be readily identified as not contributing to NRM.

59 Figure includes all operational, program and grant funding for all CMAs.

Figure 5.3: Opportunities for improving alignment of government investment in NRM



Since 2008–09, overall investment in CMAs has decreased following the Australian Government's decision to move away from the previous joint funding arrangements and invest unilaterally in CMAs through the Caring for our Country program⁶⁰ (see **Figure 5.4**). Caring for our Country provides some annual base-level funding for regional NRM bodies. Additional open grants are available to CMAs and other delivery agents through a competitive bidding process, although the competitive open grants process has resulted in less CMA-delivered funding overall. This has placed collaboration and

project continuity in the CMA regions at risk, and has made the job of aligning priorities across scales and managing concurrent programs more complex.⁶¹

The level of investment in CAPs should be increased to better match the scale of the issues confronting our catchments and communities. From 2004 to 2009, CMA investment of around \$650 million resulted in 5 million hectares of land being protected, repaired, enhanced, treated or rehabilitated. This equates to 6 per cent of the total area of NSW, and indicates

60 Natural Resources Commission (2010), Review of Catchment Action NSW funding allocations to Catchment Management Authorities, October. Between 2005 and 2008, CMA funding from the Australian Government peaked due to project funding through NAP. Following Caring for our Country in 2008, CMA-delivered funding has returned to pre-2005 historical funding levels. In 2009–10 around \$35 million base-level and \$10 million contestable funding was delivered through CMAs, compared with over \$70 million in additional contestable funding was delivered through other agents, including private landholders and non-government organisations.

61 Commonwealth of Australia (2010), *Natural Resource Management and Conservation Challenges*, The Senate Standing Committee on Rural and Regional Affairs and Transport, Department of the Senate, Parliament House, Canberra; Marshall, GR & Stafford Smith, DM (2010), Natural resources governance for the drylands of the Murray-Darling Basin, *The Rangelands Journal*, Vol 32, pp. 267-282; Ryan, S, et al. (2010), op. cit.

an average rate of investment of \$130 per hectare.⁶² In reality, priority landscapes for NRM represent a lot more than 6 per cent of the total area of NSW given the value generated by healthy natural resources, historical degradation, current pressures and likely future shocks.

Individual CMA investment funding profiles have varied year to year, with changes in both Australian and NSW Government investment funding allocations. This variation is compounded by CMAs having little lead-in time to plan their investments for the coming financial year. CMAs would benefit from the NSW Government providing greater certainty of forward year budgets. This would support medium-term on-ground project planning and give CMAs more time to adapt to variations in funding.

However, CMAs still need greater certainty about their long-term future funding, and flexibility to spend it when the biophysical and community conditions mean it will bring the greatest return. CMAs are already negotiating with the central agencies, seeking greater flexibility, including through trust arrangements. CMAs need the flexibility to make stewardship payments over longer timeframes – more than 10 years – in order to facilitate long-term landscape stewardship.

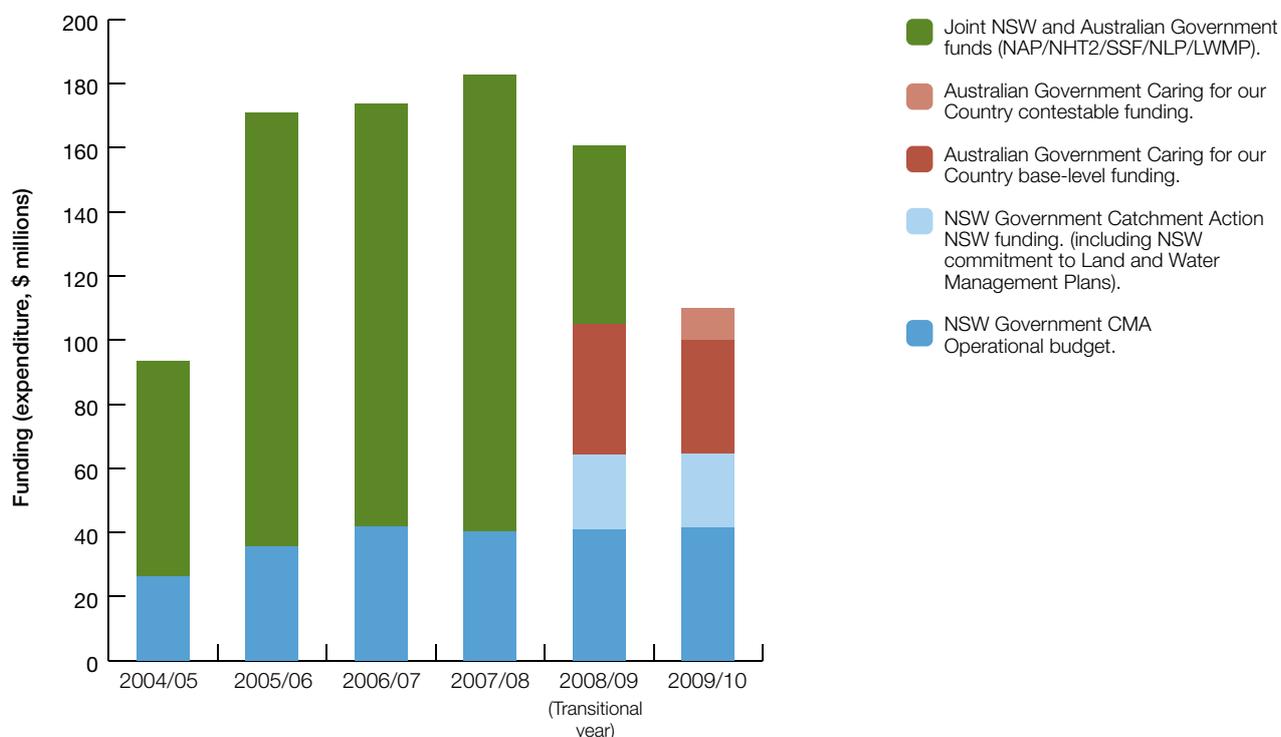
Recommendation 6:

That the NSW Government better co-ordinate and increase funding in the health of NSW biodiversity, water, land and communities.

The next steps are for:

- the NSW Government to advocate to the Australian Government for a recommitment to regional planning and increased investment in CAP implementation as part of the mid-term review of Caring for our Country
- the Senior Officer Group to facilitate alignment between state and local government investment programs and priorities outlined in regional CAPs
- the Senior Officer Group to establish a common system for spatially tracking total Australian, NSW and local government investment
- the NSW Government to increase the amount of investment funding through CAPs
- the Senior Officer Group and the NRC to research innovative markets and economic tools to better capture third-party investment
- the NSW Government to modify budgetary arrangements for CMAs by:

Figure 5.4: Core NRM funding programs delivered through CMAs over the period 2004-10



62 The output and expenditure figures are based on unverified CMA reporting in NSW Catchment Management Authorities (2009), *Celebrating five years of achievements*, p.6.

- immediately introducing measures to inform CMAs of their forward estimate budgets at least 12 months in advance
- introducing trust arrangement so that CMAs can commit to multi-year payments and buffer variations in government funding sources.

5.2.5 Design sound policy to complement stewardship

There is substantial literature on the challenges of managing common property assets, accounting for externalities and dealing with intergenerational trade-offs in how we use and conserve natural resources.⁶³

In practice, the laws we create to, for example, restrict vegetation clearing or preserve threatened species, impose costs on private landholders and benefit the broader community, now and in the future. The incentives created by poorly designed laws covering, for example, land use, land management or water licensing, can undermine efforts to build community stewardship.

CMAs are proving effective in influencing landholder behaviour and enabling stewardship, but they cannot influence the myriad other factors influencing how a piece of land is managed. Land managers are influenced by market forces, regulation, climate and drought, statutory planning controls and infrastructure planning – CMA encouragement for landscape stewardship is only one factor in this mix.

Therefore, voluntary action by landholders and communities should be complemented by other policy tools that have a bearing on the range of variables influencing how a landscape is managed – for example, regulation, taxation and licensing.

Policy and regulation should also take an integrated view of the landscape, consistent with the principles of total catchment management. This should ensure that policies designed for different landscape components – for example, forestry or water – support, rather than potentially undermine each other. For instance, there is an emerging climate policy on developing carbon-focused forestry. Any carbon plantings need to be located and managed in ways that enhance biodiversity, water balance and soil health. If we do not learn from the adverse impacts of managed investment schemes on agriculture, we may end up with carbon-focused programs that reduce water availability in rivers, create incentives to clear native grasslands, or reduce biodiversity.

In facilitating regional planning and encouraging voluntary action, CMAs have trialled and developed methodologies for community engagement, priority setting, systems thinking and cross-scale planning that should be picked up in other spheres. CMAs have already demonstrated their ability to effectively bring local, on-ground knowledge into the policy arena.

The CMA experience can inform where voluntary action can be most effective, and where other government and non-government levers are needed to achieve the best outcomes. The CAPs can inform a landscape perspective that results in policy design based on integrated landscape management. This includes understanding from which scale (community, local government, CMA, state government or Australian

Government) particular interventions should be driven and how different programs, legislation and plans should be nested for the most efficient and effective outcomes.

This should result in streamlined policy and reduced compliance costs, and policy and regulation that accommodates complexity, uncertainty and cross-scale diversity.

Recommendation 7:

That the NSW Government promote the design of regulatory and other policy tools to complement voluntary landscape stewardship.

The next steps are to:

- facilitate systems for regional-scale knowledge to inform policy design at state, national and international scales
- ensure that policy and regulatory design considers the implications for voluntary stewardship
- research and advocate to the Australian Government that emerging policies on:
 - carbon pricing and sequestration
 - water recovery purchases
 - water infrastructure investment
 - energy security
 - food security and sustainable population

should consider and support voluntary landscape stewardship and integrated landscape management.



Source: Southern Rivers CMA

⁶³ For example: Ostrom, E (1990), *Governing the Commons: The evolution of institutions for Collective Action*, Cambridge University Press; Pearce, D, Markandya, A, Barbier, E, (1989), *Blueprint for a green economy*; Department of Prime Minister and Cabinet (1990), *Ecologically Sustainable Development: a Commonwealth Discussion paper*, Commonwealth of Australia, June.

Attachment 1

1	References for the catchment snapshots	62
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Attachment 1: References for the catchment snapshots

Profile parameter	Explanation
What do we value in this CMA region?	<ul style="list-style-type: none"> • Describes some of the key economic, social and environmental values that governments and communities have identified and seek to realise in the CMA region over time • Information sourced from CAPs and CMAs • NRC confidence in this information is high
What are the key NRM challenges in the CMA region?	<ul style="list-style-type: none"> • Describes some of the key economic, social and environmental challenges and issues facing natural resource managers in the CMA region both now and into the future • Information sourced from CAPs, CMAs and State of the Catchment report cards (2010) • NRC confidence in this information is high
What is the condition of key elements in the landscape?	<ul style="list-style-type: none"> • Provides a high-level commentary on the condition and trend in some of the key biophysical elements found in the landscape, such as native vegetation, rivers and soil • Information sourced from 13 State of the Catchment report cards (2010). Data confidence ranges from low to high across a range of indicators • The State of the Catchment report condition measures ranged across five categories from 'very good' to 'very poor'. A 'very good' measure in condition generally relates to a resource in near pristine or 'reference' condition. A 'very poor' measure indicates a resource that is highly degraded and is unlikely to return to reference condition (2010) • 'Intact native vegetation' is native vegetation in which the structure has not been substantially altered by human activities, or has been altered and has since recovered • NRC confidence in vegetation data is high, with lower confidence in other areas
What significant work has the CMA done?	<ul style="list-style-type: none"> • Describes some of the key strategic and on-ground activities in which the CMA has invested in over the last five years • Information sourced from CMAs • NRC confidence in this information is high
How much is invested in NRM in the region?	<ul style="list-style-type: none"> • Indicates the amount of NRM investment in CMAs over the period 2004–10 (including both operational and project funding). Also provides examples of significant non-CMA delivered investments within the region in recent years, primarily through NSW and Australian Government programs. The list of significant non-CMA delivered investment in the region is not exhaustive • Information on CMA investment sourced from CMAs directly. Information regarding non-CMA delivered investment in the region sourced from NSW and Australian Government sources (e.g. investment program websites, grant reporting schedules) • NRC confidence in CMA investment information is high and confidence in non-CMA delivered investment reporting is moderate

Profile parameter	Explanation
<p>What did the NRC audit tell us about the performance of the CMA?</p>	<ul style="list-style-type: none"> • Provides a high-level measure of CMA performance in effective implementation of the region's CAP and performance across the audit's lines of inquiry • Information sourced from CAP audit reports (available at www.nrc.nsw.gov.au) • Overall performance measures ranged across five categories from 'very high' to 'low'. A 'very high' measure in performance indicates full compliance with the Standard for Quality Natural Resource Management and a very high likelihood the state-wide target are promoted to the fullest possible extent. A 'low' measure indicates little or no compliance with the Standard and very little or no likelihood the state-wide targets are being promoted • NRC confidence in this information is high
<p>What are the some of the key NRM and planning strategies in the region at the moment?</p>	<ul style="list-style-type: none"> • Lists some of the most current and relevant NRM and planning strategies found in the region. The list is not comprehensive and many more local, regional and national policies, plans and strategies are likely to be in place • NRC confidence in this information is high
<p>Map</p>	<ul style="list-style-type: none"> • Shows land tenure (and associated vegetation extent, detailed below), key cities and towns, rivers, population densities and other information such as irrigation areas, wetlands, estuary condition, pest densities, mining and major national parks • 'Intact or derived native vegetation' is (i) native vegetation in which the structure has not been substantially altered by human activities, or has been altered and has since recovered or (ii) vegetation that is predominantly native but has been substantially altered by human activities and is no longer structurally intact • 'Native/non-native mosaic or other vegetation' is (i) vegetation that cannot readily be classified as either native or non-native using current remote sensing methods or (ii) vegetation such as crops, non-native plantations and non-native pastures, or other non-vegetation land-cover types, including urban, industrial and infrastructure • Spatial data sets and information were sourced from the Australian Bureau of Statistics (for population); the NSW Department of Environment, Climate Change and Water (for National Parks, wetlands, estuaries, <i>Beachwatch</i>); NSW Industry and Investment (for mining, state forests); and the Land and Property Management Authority (for tenure and other administration boundaries) • The NRC developed the maps from these data sets and information. As such, the accuracy of the maps relies on the quality assurance systems and processes supporting the data sets and information used

Notes

