

# COASTAL CATCHMENT MANAGEMENT: THE FUTURE OF CATCHMENT ACTION PLANS IN NEW SOUTH WALES

## Executive summary

Coastal NSW is a dynamic landscape of competing biophysical and social pressures, which requires robust regional planning, management and accountability arrangements to deliver the best outcomes over the next 20 years. The challenges along our coasts are increasing and require an integrated response from community, industry and government.

Catchment Action Plans are regional strategic plans developed by Catchment Management Authorities (CMAs) that provide the opportunity for all parties to collaborate and develop an evidence-based investment strategy. The first round of community-based catchment action plans were not whole-of-government plans, nor were they sufficiently strategic to plan for the large drivers of change on our coasts such as climate change.

The NSW Government's 10-year plan *NSW 2021* sets an objective to have new catchment action plans in place across the whole state by March 2013 (NSW Government, 2011). Catchment action plan upgrades are now starting along the coast, following a pilot process testing new approaches to regional planning in two inland regions, the Central West and Namoi.

These catchment action plan upgrades are focused on:

- developing and implementing the plan in collaboration with communities and governments
- applying systems thinking and resilience concepts to strategic natural resource planning
- spatially representing regional priorities and values.

Resilience concepts have not been applied in a strategic regional planning process on the coast before. A resilience-based approach encourages planners to view landscapes as dynamic systems with interacting social and ecological components. When conducting a resilience assessment, planners aim to identify a small number of important variables that control the way a complex landscape system functions, and the thresholds within which the system can continue to function in a desired way.

Coastal CMAs and their communities, local government and state government partners are faced with the challenge of strategically prioritising and aligning their efforts to ensure the future health and resilience of the NSW coast. The catchment action plan upgrades give stakeholders an opportunity to better understand their landscapes and work towards addressing the complex issues facing their region. We encourage coastal stakeholders to get involved in upgrading and implementing their region's catchment action plan.

## Introduction

Natural resource management is about actively managing the way in which people and natural landscapes interact. It has been described as a 'wicked' public policy problem because of the complexity in balancing the many – often competing – environmental,

social and economic benefits we derive from our natural landscapes (Australian Public Service Commission 2007; Balint *et. al.* 2011).

Coastal areas present a unique and complex set of challenges for natural resource managers. Coasts are highly biodiverse areas where terrestrial, riverine, estuarine and oceanic ecosystems interact to support environmental values. These areas generate economic wealth through industries such as mining, agriculture, fisheries and tourism, while also supporting desirable lifestyle amenities such as recreation. As a result, coastal regions are under pressure from growing populations and land-use change.

In addition, the external driver of climate change will have real impacts on coastal communities and natural resources. For example, in the Northern Rivers catchment, CSIRO estimates that a warming of 1.0 degrees Celsius and no change in rainfall (a moderate scenario for 2030) would make the climate of Coffs Harbour similar to the current climate of Lismore (CSIRO 2007). Similarly, Yamba is projected to have the number of days above 35 degrees move from 1 up to 7 per year by the year 2070 (*ibid.*)

Governments at all levels are trying to find ways to better manage the tightly linked social and ecological processes that shape our regions and their possible futures. Strategic planning, particularly at the regional scale, has been identified as providing the best opportunity to integrate natural resource management and land-use planning, and to develop solutions to coastal issues (Lazarow *et al.* 2006).

Currently, Catchment Management Authorities (CMAs) are adopting new approaches to regional strategic planning, including the use of resilience concepts, government and community collaboration and spatial products in the planning process. The Natural Resources Commission (NRC) believes that the new approaches adopted in upgraded catchment action plans could provide new solutions to the difficult issues faced by coastal communities and their natural resource managers.

## **Recent developments in regional strategic planning**

NSW's regional model for natural resource management is designed to encourage greater involvement of communities in managing their landscapes, promote adaptive management and provide greater confidence to government investors and communities. CMAs and regional catchment action plans are two important components of this model.

CMAs are regional bodies that work with their communities to encourage land stewardship and voluntary adoption of sound natural resource management practices. CMAs are also responsible for engaging with their communities and government to develop catchment action plans.

Catchment action plans set out their region's strategic priorities for investment and action aimed at improving the health and resilience of the landscape. The plans identify what the community and government value about their landscapes, and explain what needs to be done to ensure long-term, sustainable management of a region's natural resources.

The first catchment action plans were developed in 2004-05, at a time when CMAs and the regional model for natural resource management in NSW were in a relatively early stage of development. The NRC recommended that these plans be approved by Government, on the condition that the CMAs made progress towards improving the quality of their plans and underpinning business systems over time.

Since 2004-05, continuity and experience has allowed NSW's regional model to mature considerably and CMAs' knowledge and strategic capabilities to grow. At the same time, six years of experience, audits and progress reporting has allowed the NRC, CMAs and agencies to identify priorities for improvement which provide the context for upgrading catchment action plans (NRC 2006, 2008, 2010)

NRC progress reports and audits have consistently demonstrated that to achieve integrated catchment management and effective use of limited investment we need:

- a more co-ordinated approach to natural resource planning and management by aligning CMA, government and community efforts at a policy level and on the ground
- access to useful, integrated science and knowledge that can inform decision making, including better spatial analysis and representation
- whole-of-government adaptive management, so CMAs and agencies can share experiences and knowledge to build on what is working.

Importantly, in NSW there has been a clear shift towards greater collaboration between agencies and CMAs, and commitment to a whole-of-government approach to regional resource planning and management. How we think about landscapes is also changing, with growing recognition that landscapes are made of dynamic social and economic systems and that management strategies should focus on building social, economic and environmental resilience in the face of future uncertainty and climate change. There are also significant upcoming changes in the external policy environment at state and national levels. Regional strategic planning has a role to play in informing and helping to implement these plans and policies.

### ***Piloting upgraded catchment action plans***

To explore the priorities and opportunities for improving NSW's natural resource management, the NRC, agencies and the Central West and Namoi CMAs piloted a process for upgrading and assessing catchment action plans.

The pilot process allowed CMAs, agencies and NRC to test the feasibility of new approaches to collaborative planning and landscape analysis. In particular, the pilot provided a structured, collaborative learning environment to test the feasibility of and explore approaches for:

- whole-of-government and community catchment planning
- using systems thinking and resilience concepts for analysing and managing landscapes
- spatially representing priorities and values to align with statutory planning.

The pilot process has highlighted the CMAs' valuable strategic planning capabilities and knowledge, and their current growth and future potential as leaders in regional natural resource management. The pilots led to a better understanding of what can be achieved by upgrading catchment action plans, and what aspects of strategic catchment planning might need more time and support. The pilot also allowed the NRC to test, calibrate and refine its framework for assessing upgraded catchment action plans (NRC 2011).

The pilot process concluded in May 2011. The resulting Central West and Namoi pilot catchment action plans have now been finalised and submitted to the NRC for assessment and to Government for approval and implementation (CW CMA 2011, Namoi CMA 2011). The NRC's initial findings after reviewing the first upgraded plans indicate that:

- the pilot CMAs have demonstrated their depth of regional knowledge and strategic planning capabilities
- a strong strategic planning process sets the foundation for effective and better targeted investment in the region
- whole of government and community planning is achievable and worth pursuing
- resilience concepts add value to regional planning
- linking biophysical and social elements of landscapes is difficult but important
- a good information base supports informed decision making
- spatial tools are useful for analysing and communicating information
- the upgraded plans can align government plans and policies at a regional scale

The NRC aims to provide formal advice to government on the Central West and Namoi plans in November 2011. The NRC's full reports will be available at <http://nrc.nsw.gov.au/Workwedo/Catchmentactionplanreviews.aspx>.

## **Addressing coastal issues through upgraded catchment action plans**

Coastal regions currently face multiple issues including climate change and variability, sea level rise, population growth, land-use change and development, habitat and biodiversity loss. Given current trends, these issues are likely to become even more critical over time.

Our progress in addressing coastal issues is limited by a lack of integration in our approach to understanding and managing our landscapes (Middle 2004). Integration is made difficult by complex, siloed institutional arrangements, where multiple plans, policies, partners and investors are acting across different scales and priorities.

Given the complex issues and barriers faced in coastal natural resource management, we need to rethink our current approaches if we are to maintain healthy landscapes. Upgrading catchment action plans provides an opportunity to overcome these barriers and find better solutions for managing coastal natural resources more effectively.

Firstly, catchment action plan upgrades provide a forum for stakeholders to think strategically about their region's current and desired trajectories, and their goals and priorities for their region. Secondly, the systems thinking and resilience concepts being applied in catchment action plan upgrades provide a new lens through which to view catchments; one that acknowledges social and ecological interactions and embraces change and uncertainty to find better solutions to complex problems. Thirdly, the upgraded plans seek to align government plans and policies with community values, leading to shared strategic priorities that will help co-ordinate CMA, government and community action on the ground.

In a 'wicked' space like coastal natural resource management, planners will always be faced with imperfect knowledge and different, often competing, stakeholder values. Planners struggle to find an optimal solution to the issues faced, when often an optimal

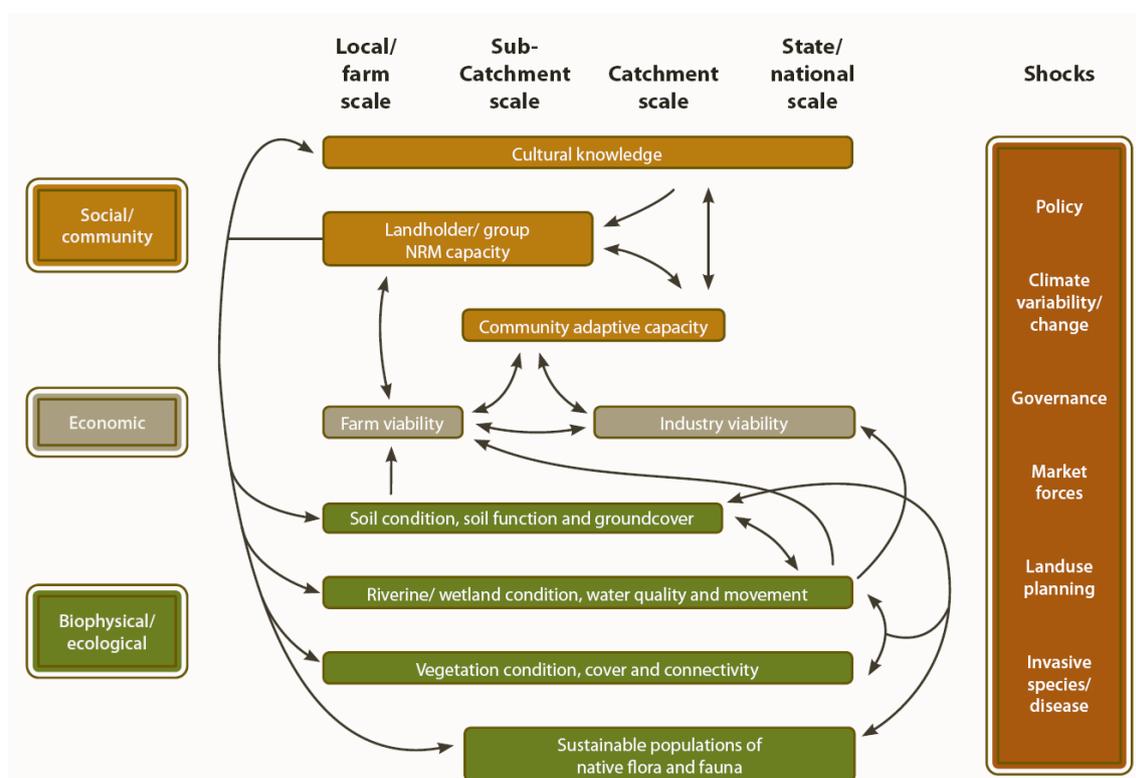
solution may not exist at all. Instead, planners should be bringing together the best available knowledge about a region and the regions stakeholders to develop and implement a satisfactory management solution (Balint *et al.* 2011). As knowledge improves and stakeholder values evolve, planners and stakeholders can then review and adaptively manage their strategies to achieve continual improvement. Upgrading catchment action plans provides a good platform for determining shared regional goals and priorities, and for improving regional natural resource management over time.

### **A new approach to managing landscapes**

Systems thinking and resilience concepts have emerged as new frames for analysing and managing a region’s natural resources (see Bennett 2003; Chapin, Folke & Kofinas 2009; Walker *et al.* 2009; Walker & Salt 2006). The Central West and Namoi catchment action plans are two of the first examples in Australia of regional natural resource management planners applying resilience concepts in regional strategic planning (Goulburn-Broken CMA in Victoria is another example; see Walker *et al.* 2009).

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.

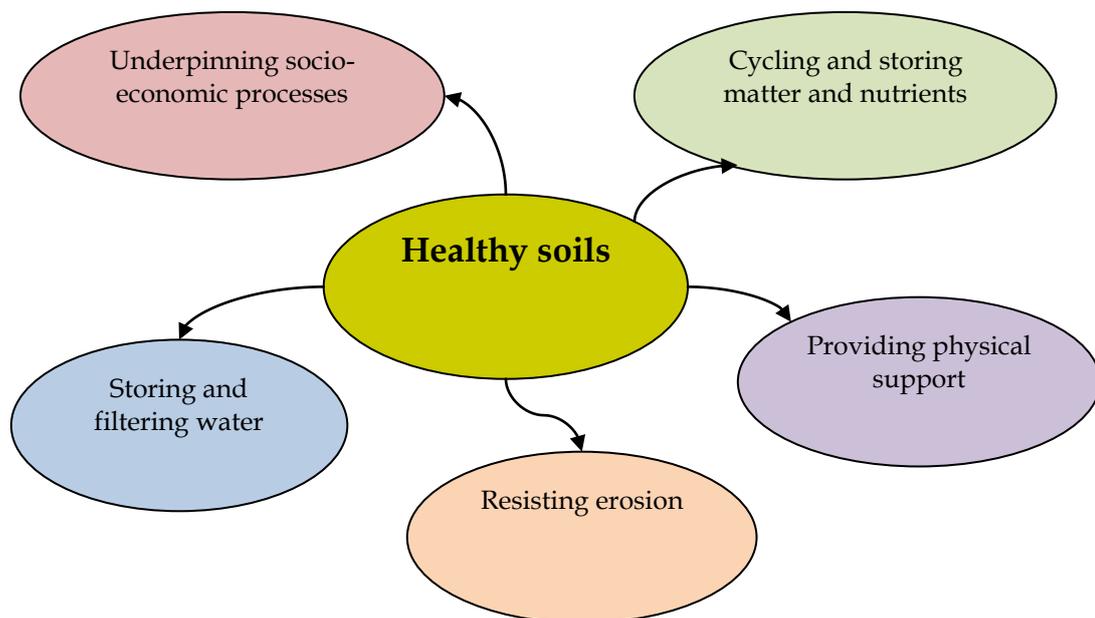
Through the catchment action plan upgrades, CMAs and their partners are seeking a better understanding of their landscapes by looking at them as linked social and ecological systems. Using the Central West Catchment Action Plan as an example, **Figure 1** shows how the CMA conceptualised their region’s social-ecological systems.



**Figure 1: Diagram showing relationships between systems (CW CMA 2011)**

Resilience thinking aims to identify a small number of important variables that control the way a complex 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 either by remaining within thresholds or transforming to a desirable (or least undesirable) alternative stable state. Managing for resilience involves promoting diversity and flexibility in those systems, and building the capacity to adapt and change.

The pilot CMAs used their resilience assessments to simplify their catchment targets and management strategies to focus on what is really important in their region. The importance of groundcover thresholds in the Namoi catchment is a good example. The Namoi CMA's systems analysis indicated that all assets in the Namoi catchment are dependant to some extent on the ecosystems services provided by healthy soils, as shown in **Figure 2**.



**Figure 2: Ecosystem services provided by soil health (adapted by Namoi CMA from DPI Victoria) (Namoi CMA 2011)**

The Namoi CMA developed a conceptual model of soil health and found that organic matter, soil structure and soil type contributed the most to healthy soils, and that groundcover is a key controlling variable and critical threshold in the soil system. As a result, the plan's land management strategy has been simplified to one catchment target focusing on increasing groundcover. The plan's evidence base and resilience analysis indicates maintenance or improvement of groundcover at or above 70 per cent is the key intervention that will be most effective in delivering healthy soils.

In its systems analysis, the Central West CMA used state and transition models to inform how the region's landscape systems should be managed, including information about:

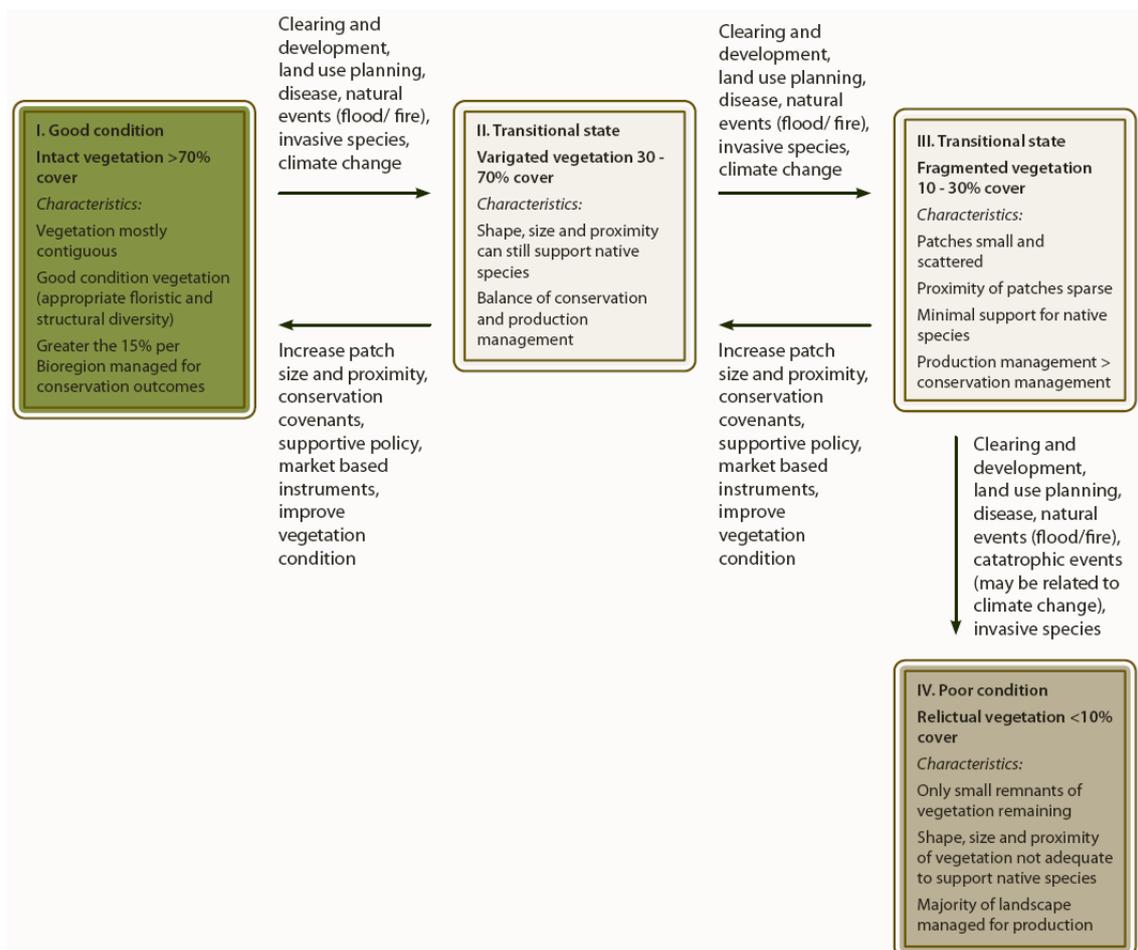
- different alternative 'states' within the system, including desirable or degraded states
- controlling processes and their overarching drivers that move the system between states
- critical thresholds at which the system may change to an alternative state

- actions that can be used to prevent a system crossing a threshold, or move a system from a degraded to healthy state
- the assumptions and evidence supporting the model.

Central West’s model of its native vegetation system, shown in **Figure 3**, provides a good example of how state and transition models work. The state and function of this system is controlled by the shape, size and proximity of native vegetation patches. The system is being driven into transitional and degraded states by vegetation removal and fragmentation. The CMA has used science and regional knowledge to identify the following thresholds for the system:

- vegetation cover shifting below 70% results in an initial drop in biodiversity
- vegetation cover shifting below 30% results in another major drop in biodiversity
- patches should be greater than 10 hectares, and less than 1000 metres from the next patch
- patch shape - low edge to area ratios are beneficial, although exact threshold is unknown.

This information has allowed the CMA to identify improving patch shape, size and connectivity as the most important things that can be done to address native vegetation issues; actions which also align with priorities in the draft NSW Biodiversity Strategy. Stakeholders should target their actions at areas where native vegetation is at risk of crossing into a less desirable state.



**Figure 3: Central West state and transition model for native vegetation (CW CMA 2011)**

Upgrading coastal catchment action plans presents an opportunity to address coastal issues in a new way, although the complex coastal systems will also present regional planners with new challenges. The examples provided above relate to inland agricultural systems and focus primarily on biophysical components. In comparison, the social-ecological systems described in coastal upgraded catchment action plans are expected to be a lot more complex and involve much greater interaction between social and ecological parts of the system.

Previous coastal planning and management approaches have not fully integrated and addressed the political, economic and social factors affecting coastal landscapes (Lazarow et al. 2006). Adopting a systems and resilience approach should help managers to better understand both the biophysical and human context around coastal natural resource issues, and to look at the interactions and trade-offs between alternative management strategies. By focusing on systems, planners are also encouraged to take a 'catchment to coast' approach – to look beyond the narrow coastal strip to identify what catchment processes support a healthy coastal landscape.

Coastal regions are changing as a result of drivers like population growth, land use change and climate change. The catchment action plan upgrades can help us understand and manage for this change. In particular, systems and resilience approaches help communities recognise when social-ecological systems have or will inevitably transcend important thresholds, after which point the structure and function of their social-ecological systems will change. When faced with a system transformation, planners need to choose whether to focus on avoiding the threshold, or guiding the transformation process to ensure that the new system provides the ecosystem services required.

A good example of a major system transformation is urbanisation. Urbanisation is an inevitable consequence of the population growth predicted for the coastal regions. However, it is important that these increasingly urbanised coastal systems continue to support their current social, economic and environmental values, including food and fibre provision, wildlife habitat, water quality regulation, recreation and visual amenity.

Land use planners and natural resource managers should work together to identify areas where urbanisation will have the least impact on the landscape's overall capacity to provide ecosystem services, and where urban development can be enhanced by the existing functions of the landscape. For example, instead of developing over wetland areas in hanging valleys, planners could look at building around the wetland and using it to help treat wastewater from the new development.

### ***Co-ordinating policy, actions and investment***

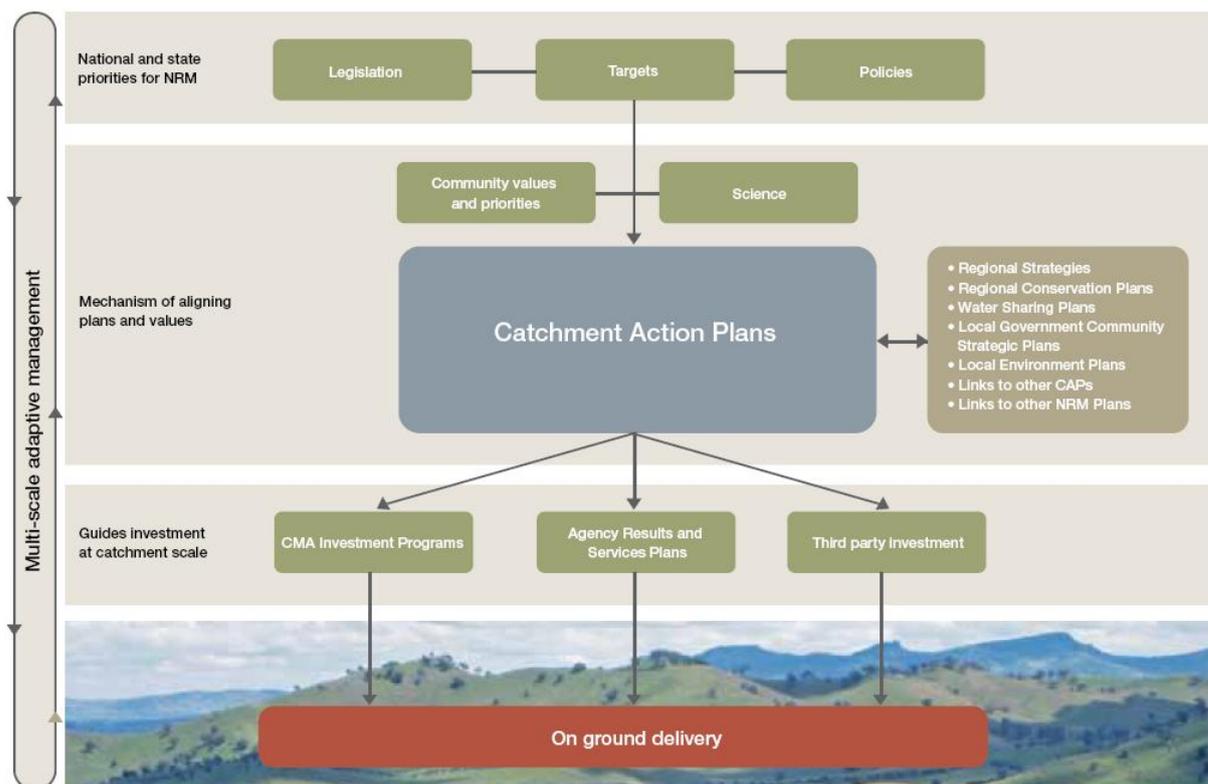
Achieving improvements in NSW landscapes requires the involvement, commitment and effort of multiple parties in natural resource management. These include state, federal and local governments, landholders, community groups, Indigenous groups, non-government organisations, Landcare and Coastcare groups and industry.

The catchment action plans upgrades aim to develop plans for collaborative action and investment by all relevant parties in a catchment region, and should be both 'whole-of-government' and 'whole-of-community'. Previously, catchment action plans focussed more on what the CMAs could achieve. This time, CMAs are involving all stakeholders in the planning process to get broad agreement on what needs to be done.

Catchment action plan upgrades provide coastal communities with a forum for considering alternative futures and management strategies. Coastal stakeholders can use these discussions to arrive at a common understanding about where their region is heading, and their shared goals and strategies for achieving their desired future. Some relevant work on determining alternative landscape futures has already been done along the coast, for instance the University of New England Institute for Rural Futures' work in the Northern Rivers region (Brunckhorst and Morley 2008).

Fostering effective, long-term community involvement in integrated coastal management has often been an issue in government planning processes (Lazarow 2006). CMAs have built strong community networks that can be used to capture community values and regional knowledge about their landscapes to inform coastal strategic planning (NRC 2010).

Upgraded catchment action plans can also help bring about greater alignment between government policies, including natural resource management, water and land use plans, to represent a more integrated approach to natural resource management in each region. In its *2010 Progress Report*, the NRC described a vision for catchment action plans where they help align and deliver a range of state policies, non-statutory and statutory plans, and NRM-related Australian and NSW Government programs at the regional scale (NRC 2010). This model is illustrated in **Figure 4**.

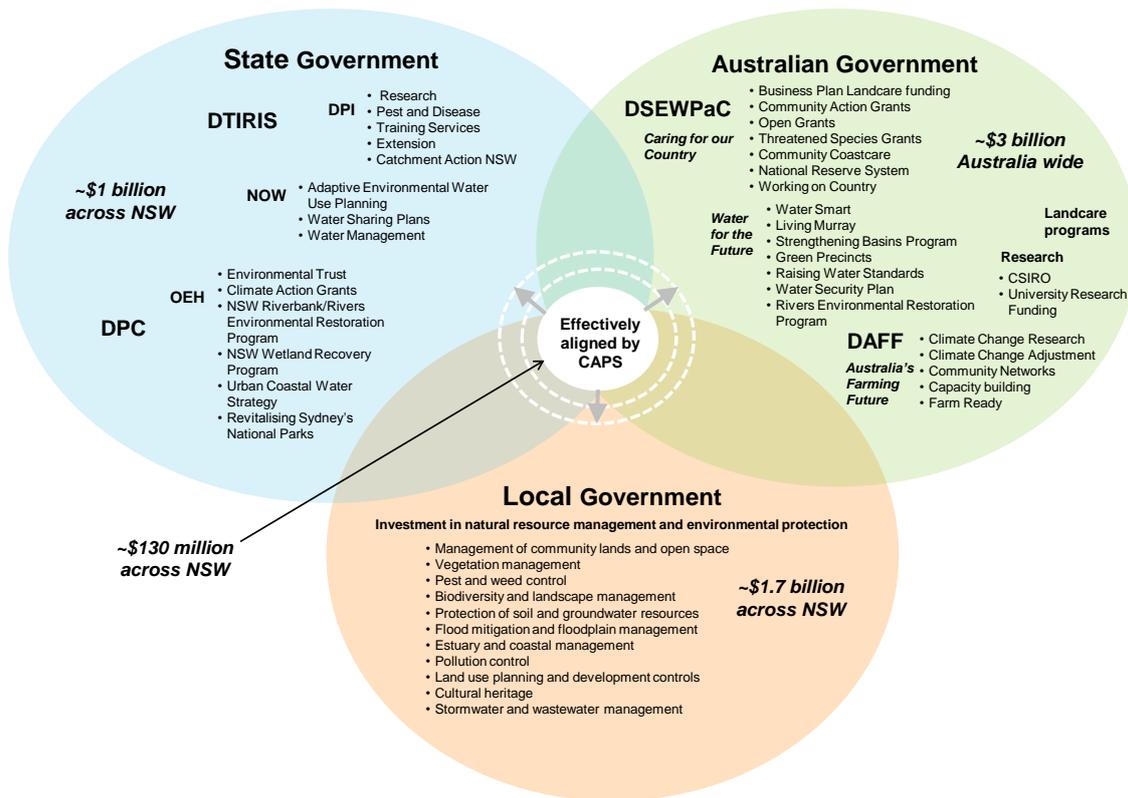


**Figure 4: CAPs as integrated strategies for managing natural resources in a catchment region (NRC 2010)**

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 natural resource management related investment in NSW is unclear due to the multitude of investment streams at different scales. A significant yet relatively small proportion of estimated government natural resource management related investment in NSW is being co-ordinated through the quality-assured and audited catchment

action plans. For example, in 2009–10, CMA investment was around \$130 million (NRC 2010).

There are opportunities to better co-ordinate funding related to natural resource management through catchment action plans. **Figure 5** shows the wide range of funding delivered by different levels of government, and the potential for greater strategic alignment of investment priorities through regionally catchment action plans that reflect community and government priorities. This would minimise duplication and maximise return on governments' investment. While catchment action plans can have an increased role in aligning investment, it is legitimate for investors at different scales to have some varying priorities outside of the catchment action plans' priorities.



**Figure 5: CAPs as integrated strategies for managing natural resources in a catchment region (NRC 2010)**

In summary, supporting collaborative action and investment through upgraded catchment action plans should generate a number of benefits for coastal natural resource management:

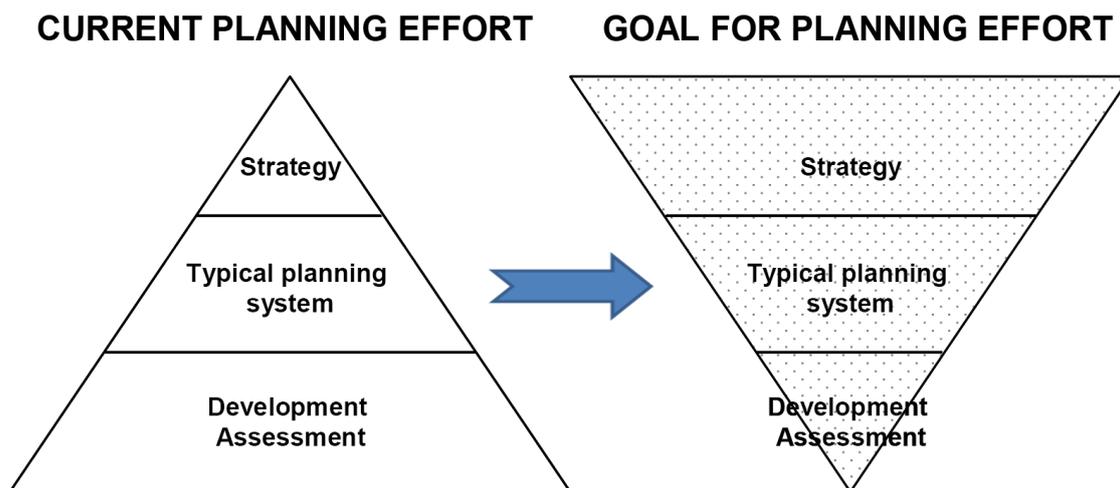
- a collaborative approach should increase the effectiveness of both the CMA and its partners, and minimise costs in working towards common objectives
- agreed, common goals should ensure that regulatory decisions, land use planning and other government policies will be reinforced by the incentive programs delivered by CMAs, while also ensuring that regulatory decisions do not undermine the voluntary work of the community
- agreed and documented roles and responsibilities will streamline effort and extend the effectiveness of all partners, building greater confidence in the CAP
- spatial information tools will help with determining and communicating priorities and facilitating alignment towards common goals, and give the CMA a solid basis for influencing policy and programs developed at state and national scales.

## The role of land use planning

The NRC currently has an independent review role in the application of State Environmental Planning Policy No. 71 – Coastal Protection (SEPP 71). Master planning is one of the mechanisms SEPP 71 uses to regulate residential development in sensitive coastal locations. The Minister for Planning must consult the NRC when considering waiving the need for a master plan or adopting a draft master plan for certain coastal developments. Since 2005 the NRC has reviewed 50 draft master plans, and recommended 14 of them for approval. The NRC has also reviewed 229 requests to waive the need for a master plan, and in 33 cases we have recommended that the master plan not be waived.

The NRC's experience in reviewing these SEPP 71 approvals is that decisions on coastal development approvals would benefit from a more co-ordinated, strategic approach. By making individual decisions at the development scale, NSW runs the risk of cumulative development impacts and misses opportunities to maximise landscape functionality. Strategic planning at the regional scale is where different demands on landscapes should be debated and reconciled, more in line with the scale where important ecological and social systems are operating.

The NRC supports the widely held view that land use planning resources should be rebalanced away from individual development assessments to strategic regional scale planning and plan accreditation. This principle forms the basis for many of the planned amendments to the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth of Australia 2011), is promoted by the Planning Institute of Australia (Planning Institute of Australia 2009), and was included in a review of 'leading practices' in a recent Productivity Commission report, *Performance Benchmarking of Australian Business Regulation: Planning, Zoning and Development Assessments* (see **Figure 6** below prepared by the Planning Institute of Australia).



**Figure 6: Changing the focus of planning efforts (Savery 2010)**

## Getting involved in catchment action planning

The decisions we all make today will open or close the opportunities that may be available to us in the future. We need to make sure that decisions made by local, state and national governments, as well as by individuals, community groups and industry, are all coordinated towards a shared vision of what local communities want their landscapes to be like for the future.

In its NSW 2021 plan, the NSW Government has committed to facilitating community and government collaboration and input to develop upgrading catchment action plans across the state by March 2013. As a result, catchment action plan upgrades are currently being initiated across the five NSW coastal catchment management regions.

To help determine the future of their region, coastal stakeholders need to get involved in the coastal catchment action plan upgrades. Now is your opportunity to share your knowledge about the landscape and how it is changing, and to make sure your preferences and views are captured. The shared goals and priorities in the catchment action plan can help ensure the work you are doing is part of a bigger, collective effort. By participating in their catchment action plan upgrades, stakeholders can help to shape the resilient, functional coastal landscapes that New South Wales will need to sustain its communities as we face the big challenges of the future.

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