STRATEGIC PLANNING ON THE COAST: THE BENEFITS OF APPLYING SYSTEMS AND RESILIENCE APPROACHES

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Executive summary

Competing demands on NSW's coastal landscapes and resources place pressure on their economic, social and biophysical values. Collaborative planning processes help people understand the issues affecting their landscape so they can be part of the solution.

Recent catchment action plan upgrades, led by NSW Catchment Management Authorities (CMAs), help to address some key challenges identified for coastal governance in Australia, including the need for:

- a regional strategic approach
- better integration in environmental management of socioeconomic elements
- improved cooperation and coordinated action across jurisdictions
- definition of roles and responsibilities for each different level of government
- stakeholder involvement and community engagement, education and awareness
- improved capacity building and resources
- improved monitoring and reporting (HORSCCCWEA, 2009).

The upgraded plans showed the benefit of strategic planning at the regional and local scale in promoting co-operative action and partnerships. The use of systems and resilience approaches was a key factor in their success.

Systems thinking prompted planners to consider the linked social, cultural, economic and ecological components of landscapes. Resilience analysis then helped planners to understand and manage change within their landscape systems, be it in response to unexpected shocks or longer-term variables like climate change.

Applying systems and resilience approaches encourages planners to identify the key internal or external factors that really control their landscapes. Planners and communities are able to focus on the cause of problems, rather than symptoms, leading to stronger communities and better on-ground outcomes.

Resilience planning is not just about staying in the same state, it can also be about transformation – anticipating change and knowing when your community or landscape should shift to an alternative state.

By driving continual improvement in strategic planning we will be better able to tackle the complex issues and barriers faced in coastal landscape management. This paper sets out insights and key lessons from the catchment action plan upgrade processes that can be used to improve local strategic planning processes on the coast.

Coastal challenges

Coastal regions are under pressure from the combined drivers of population growth, economic growth and climate change (State of the Environment 2011).

Coastal population and economic growth, and the land use change that accompanies them, place pressure on the natural resources that originally made settlement in these regions so desirable. Threatening processes in coastal regions include water abstraction and pollution, seawater intrusion, habitat or vegetation loss, modification or fragmentation, invasive species, fishing, urban, industrial or agricultural expansion and extractive industries (State of the Environment 2011).

Communities on the coast have always been subject to natural hazards such as storms, shoreline erosion and flooding, the impacts and costs of which are again exacerbated by increased coastal development and infrastructure. However, sea level rise, inundation and more frequent or severe storms driven by climate change are likely to increase the potential for damage to property, infrastructure and ecosystems (NCCARF, 2012).

Managing natural resource values in the context of these landscape drivers requires communities and planners to make strategic decisions around complex trade-offs between competing resource demands and uses. It is also important that planning is integrated, cutting across policy, program and inter-jurisdictional boundaries and silos. However, multi-tiered coastal governance arrangements present challenges for integrated strategic planning (Gurran, Squires and Blakely, 2006). These challenges are explored further in the following section.

Planning challenges

The value of coastal landscapes means there are a large number of stakeholders with an interest in coastal management and access to resources (State of the Environment 2011). This leads to layers of cross-jurisdictional planning and management arrangements at local, regional, state, national and, in some areas, international scales (Gurran, Squires and Blakely, 2006). Roles, responsibilities and objectives are not always agreed or aligned between these different levels of government, and resourcing is an issue across all scales (State of the Environment 2011).

Coastal policy and legislation is usually determined at the state scale, though local governments have a significant role as ‘front-line’ decision makers around local land use planning and urban growth management, as well as carrying out environmental services (Gurran, Squires and Blakely, 2006; HORSCCCWEA, 2009).

However, given the large scale at which population growth, land-use change and climate change drivers act, various reports have identified a need to improve communication and co-ordination between national, state and local scales (HORSCCCWEA, 2009; NCCARF, 2012).

The Australian Government initially addressed some of these governance and coordination issues from the national scale through its *National Cooperative Approach to Integrated Coastal Zone Management* (NRMMC, 2006). This framework identified issues for national collaboration, but did not provide specific guidance around co-operative strategic planning, or clarify responsibilities and accountability during implementation (Gurran, Squires and Blakely, 2006; HORSCCCWEA, 2009).

This was followed by a national report in 2009 from the Representatives Standing Committee on Climate Change, Water, Environment and the Arts, which identified 12 challenges for coastal governance in Australia (HORSCCCWEA, 2009).

How regional strategic planning can help

At the regional scale, coastal CMAs have been working together and with their partners to implement new collaborative and systems-based planning approaches through their regional catchment action plan upgrades.

The Natural Resources Commission (NRC) has recently completed its assessment of all upgraded catchment actions plans and has provided advice to the Minister for Primary Industries on whether to approve each catchment action plan based on the quality of the plan. This advice is part of the NRC's wider program of independent performance evaluation and reporting to promote excellence and drive continual improvement in natural resource stewardship.

Of the 12 key challenges identified for coastal governance in Australia (HORSCCCWEA, 2009), these new regional plans help to address the following:

- need for a regional strategic approach
- better integration in environmental management of socioeconomic elements
- improved cooperation and coordinated action across jurisdictions
- definition of roles and responsibilities for each different level of government
- stakeholder involvement and community engagement, education and awareness
- improved capacity building and resources
- improved monitoring and reporting.

The rest of this paper uses the above challenges as a framework for capturing the lessons and good practice gained through the catchment action plan upgrades for the benefit of other coastal planning processes.

A regional, strategic approach to natural resource management

Catchment action plans are strategic plans for improving the health, productivity and resilience of regional landscapes and communities. The plans identify what the community, industry and government value about their landscapes, and explain what needs to be done to drive long-term, sustainable management of a region's natural resources.

In its *NSW 2021* goals the NSW Government committed to increasing devolved decision-making at the regional scale through upgrading the catchment action plans to better facilitate community and government collaboration (NSW Government, 2011). Between 2011 and 2013 the CMAs updated their 2004-2005 catchment action plans.

Systems thinking and resilience concepts have emerged as a powerful means of analysing and managing a region's natural, social and economic resources and possible futures (see Bennett 2003; Chapin, Folke & Kofinas 2009; Walker *et al.* 2009; Walker & Salt 2006).

Multi-scale systems approaches define landscapes as dynamic, interconnected systems where people and communities are integral to landscape function. Their focus is to ensure social, cultural, economic and environmental processes are properly integrated in planning and investment decisions. Planners should look at systems and linkages at scales above and below the planning scale.

Resilience is a measure of a system's capacity to cope with shocks and undergo change while retaining essentially the same structure and function. In NSW catchment action planning, resilience is used as an overarching conceptual framework into which local knowledge and ideas from other disciplines can be incorporated.

Resilience analysis is about understanding and managing change. Resilience analysis helps identify the relatively small number of factors that are really controlling a system, both from within the system or at other scales. It focuses on causes of problems rather than symptoms and the management actions that will be most critical to supporting increased social and economic demands on natural systems, now and into the future.

Although systems thinking has been used in different contexts for many years, NSW's upgraded catchment action plans are among the first examples in Australia applying resilience concepts in regional strategic planning (Goulburn-Broken CMA in Victoria is another example; see Walker *et al.* 2009). Further, the upgraded catchment action plans are the first attempts globally to put resilience theory into regional planning practice at such a broad scale.

To the surprise of many who were sceptical or thought it too complex, the new approach was successfully adopted by nearly all CMAs, who found it made sense on the ground and fostered innovation in natural resource management. Independent technical review of the use of systems and resilience approaches in the upgraded plans has been mostly positive, while noting room for improvement in what has been a ground-breaking exercise (Griffiths, 2013a).

A resilience approach emphasises the importance of measuring, and then understanding and managing change both within and across geographic, temporal and institutional scales. Natural landscapes, together with social and economic drivers, are highly variable. Strategic planning therefore needs to be dynamic and responsive.

> 'There is widespread acceptance that the world is changing fast and is increasingly unpredictable. … Natural resource management will not be 'business as usual' in the coming decades, because it cannot be, because the world will be different. What will determine the effectiveness of natural resource management in these changing circumstances will probably be the numbers and social influence of people who shift the way they think about natural resource management to a new and better paradigm…' (Abel, 2013)

Adaptation strategies within the upgraded plans are supported by a better understanding of regional and sub-regional issues and the range of appropriate management actions. In some upgraded plans, for example Northern Rivers and Border Rivers-Gwydir plans, this understanding extends to looking beyond regional borders to considering cross-border issues. More broadly applied, this approach builds collective adaptability and enables, agile strategic responses to multi-jurisdictional problems.

If good monitoring and evaluation systems are established, this will provide a foundation for understanding the implications of change from community and scientific perspectives and if necessary, for re-prioritising investment programs from a range of suitable alternative actions.

Under the upgraded plans, CMAs have the flexibility to respond appropriately and in a timely manner to changes in the landscape. For example, to respond to natural disasters, government policies, significant new knowledge, or changes to delivery partner priorities or funding. There are also periodic review processes for the catchment action plans, as well as for the shorter-term implementation plan and annual investment plans that sit beneath a region's longer-term strategic plan.

Better integration in environmental management of socioeconomic elements

The purposeful inclusion of economic and social drivers in a systems context has improved understanding of how and why different landscapes are managed, and about the trade-offs that are inevitable in resource use. A technical reviewer noted:

> 'Upgraded catchment action plans are not business as usual . . . Upgrades have created catchment action plans that are more balanced than previously' (Dangerfield, M, 2013).

The upgraded catchment action plans aim to sustainably manage modified landscapes for improved economic, social, cultural and ecological wellbeing rather than to restore biophysical condition to some pre-determined benchmark. This forward looking perspective prioritises management actions that support social and economic demands on natural systems.

For example, on the coast the Southern Rivers Catchment Action Plan 2013-2023 has three overarching goals that reflect a balance between improving social well-being and profitable industries, governance and the natural resource base that sustains the community and the environment (see **Figure 1**).

Of particular note is the explicit focus on industry and community capacity. While Southern Rivers CMA previously had effective industry and community based programs, this is the first time the social and economic importance of regional industries has been reflected in their strategic planning.

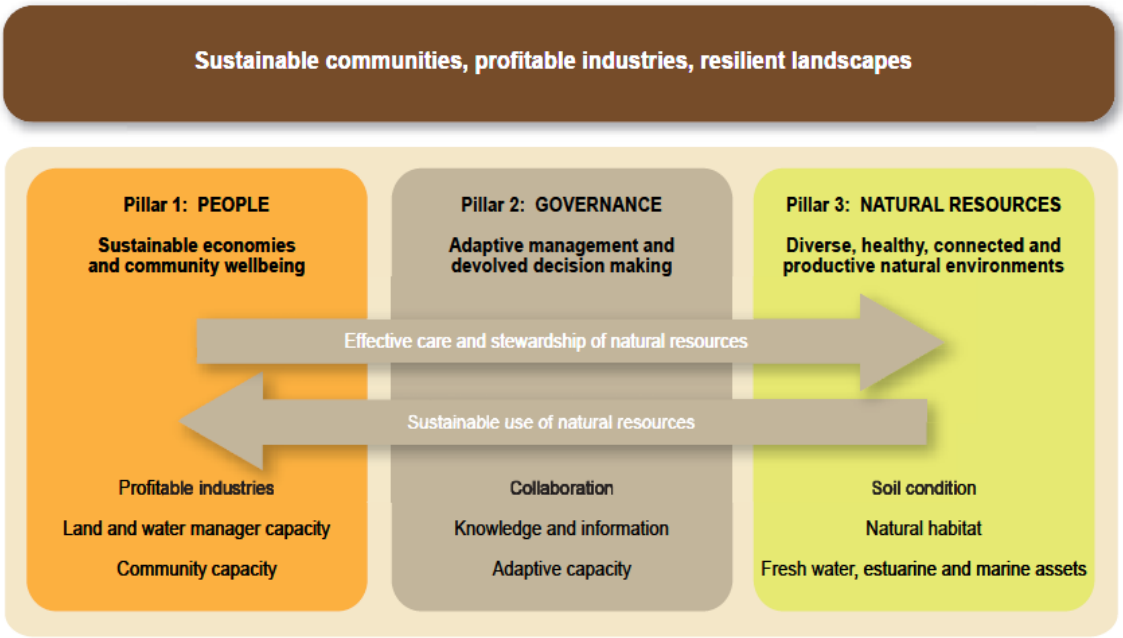

Figure 1: Southern Rivers Catchment Action Plan framework (Southern Rivers CMA, 2013).

Most plans illustrate these economic, social, cultural and ecological interactions with a conceptual model similar to the diagram in **Figure 2**.

These conceptual diagrams are underpinned by evidence and knowledge drawn from both the scientific and local communities. This analysis of evidence against conceptual models of landscape functions helps identify:

- the interventions that are known to work, and why
- priority areas for investment
- where there are key knowledge gaps or assumptions that need to be addressed.

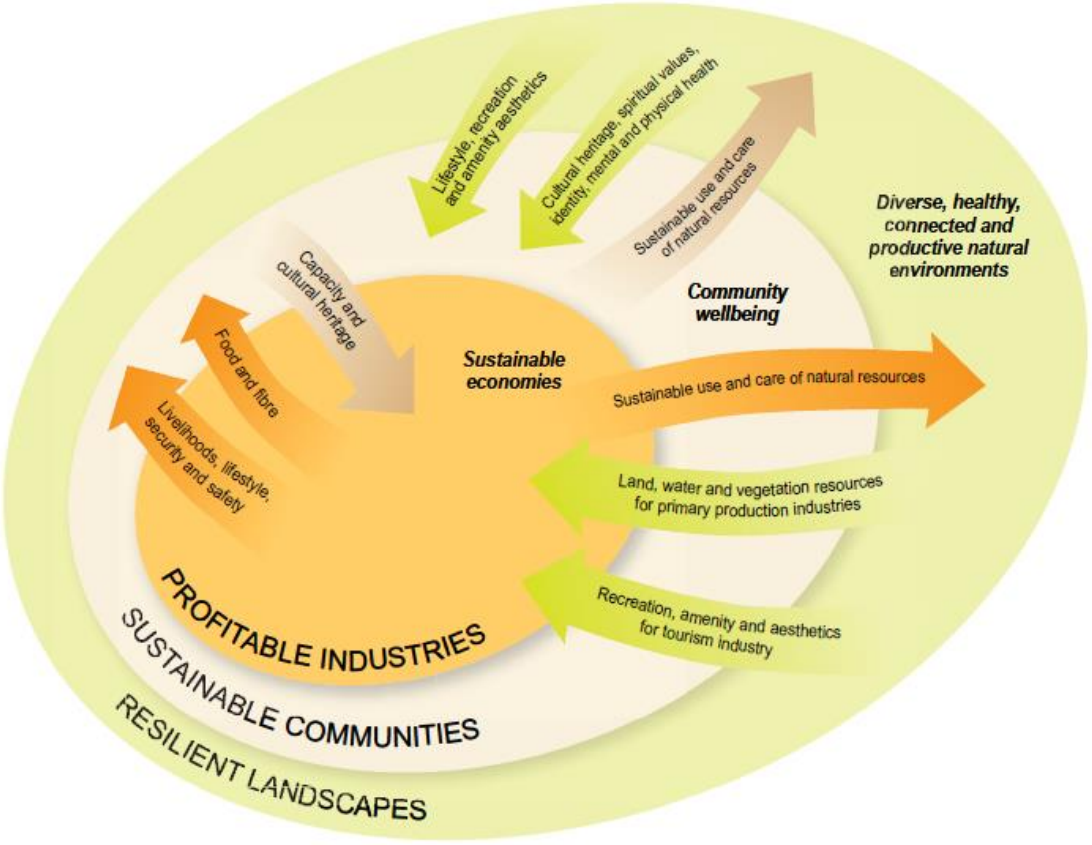

Figure 2: Southern Rivers Catchment Action Plan landscape system model (Southern Rivers CMA, 2013).

CMAs have often chosen to present this analysis in the form of state and transition models, which have proved to be an effective communication tool with communities. An example of a state and transition model for estuaries is provided in **Figure 3**.

Looking above and below the focal scale of management is another key aspect of a systems and resilience approach.

This approach led CMAs to divide their regions into smaller landscapes defined by similar social and ecological characteristics and recognisable by local communities. This *'marked a great improvement over previous catchment action plans'* (Abel, 2013). Issues and actions were then prioritised according to their relevance to sub-regional landscapes. The upgraded plans describe these as socio-ecological landscapes or systems.

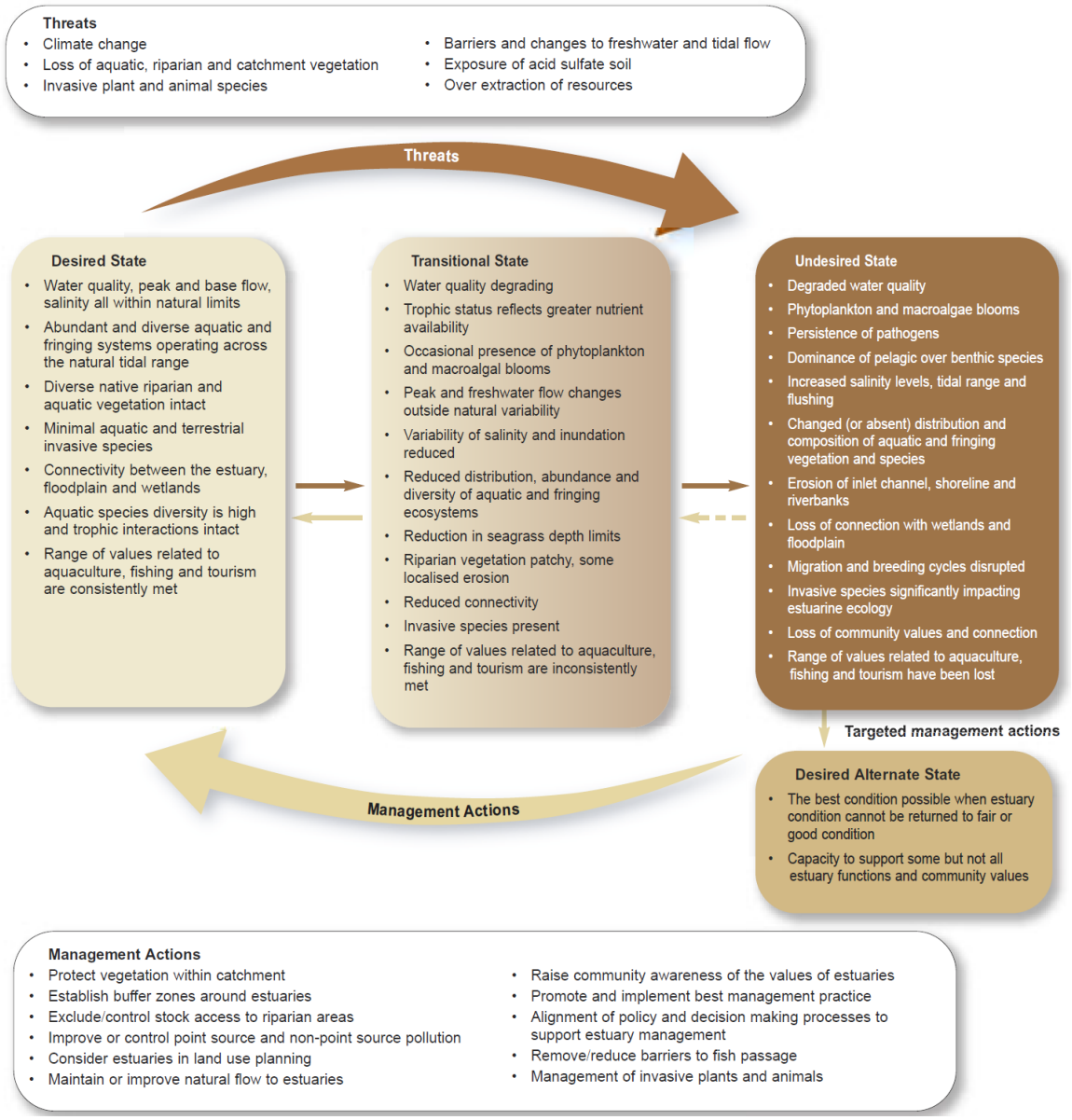

Figure 3: Southern Rivers Catchment Action Plan estuary state and transition model (Southern Rivers CMA, 2013).

Although the coastal CMAs made some progress in this area, subregional analysis was particularly strong in some inland regions; for example, in the Murray. The Murray Catchment Action Plan sub-regional analysis is included as **Figure 4**. Coastal CMAs have room for improvement in terms of greater devolution to sub regional areas and groups within their planning processes.

Overall, sub-regional analysis proved effective for clarifying links between scales and promoting community understanding of how management actions can impact on others, including those some distance away. This built critical knowledge and increased the likelihood that the right issues and appropriate management strategies were identified.

Analysis of these sub-regional landscapes should link with work being done by coastal planners at the local government scale, to help identify local issues for collaborative action supported by best available evidence and information.

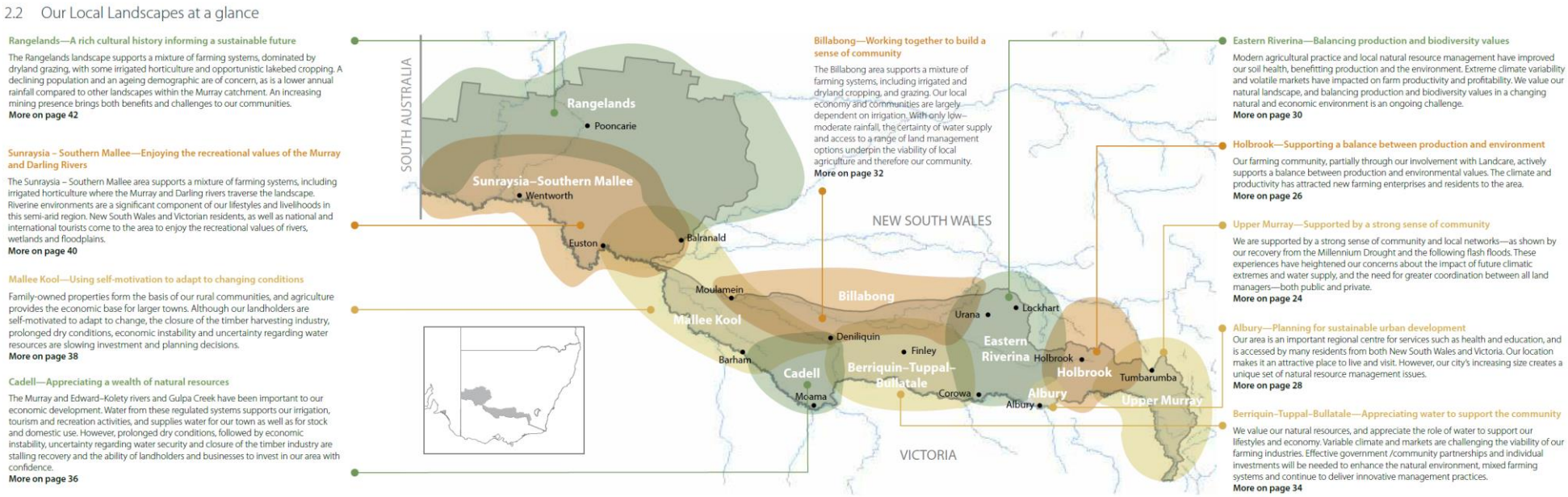

Figure 4: Murray Catchment Action Plan sub-regional analysis (Murray CMA, 2013)

Improved cooperation and coordination of action across jurisdictions

Collaboration across scales is difficult, and requires stakeholders to have a shared goal, dedicated resources and strong leadership. The former Natural Resource Management Senior Officers Group and its secretariat played a pivotal role in championing a whole-of-government approach to the plan upgrades, strengthening partnerships between government agencies and CMAs. Relevant state agencies shared information and knowledge on how their areas of focus (for example, biodiversity or water quality) could be integrated into the upgraded plans. CMAs were encouraged to align catchment priorities with related government policies, co-ordinate action and agree responsibilities for implementation.

For example, during their planning process the Northern Rivers CMA developed strong working relationships with state government agencies through a whole-of-government reference group. The CMA intends this same reference group to continue during the implementation of the catchment action plan, with specific project commitments to be made during the business planning stage. This engagement process could be strengthened by including local government in future planning.

Improved information sharing between agencies also facilitated greater alignment of actions. For example, the NSW Office of Water provided River Condition Index data for each region and was willing to work with CMAs to refine the data so it met regional needs while also ensuring consistency at a State level. Although some CMAs did not use this data during the planning stage, the majority are now working with the Office of Water to better understand priorities for regional river systems.

The benefits of information sharing can be seen through maps showing key issues and priority areas for investment. **Figure 5** shows priority areas for investment in vegetation connectivity in the Hunter-Central Rivers region. All agencies, local governments, community organisations and landholders looking to work on improving vegetation connectivity in the region can refer to this map for guidance as to priority areas for investment and action.

Relationships with regional and local delivery partners have also been reinforced and most catchment action plans outline an implementation planning stage that coincides with the delivery planning cycles of local government.

Stakeholder involvement and community engagement, education and awareness

Emphasis on the importance of people in the landscape provided the impetus for CMAs to improve their collaboration with community, industry and government stakeholders during the planning process. Those involved in the plan upgrades now have a shared understanding of their region's landscape and priorities, and have had the opportunity to build new networks and connections within their communities. This has built social capital that will be helpful to draw on as the plans are implemented.

The systems-based planning approaches led CMAs to canvas a broader range of opinion, and encouraged more people to share their knowledge and identify better ways of working together. In developing their upgraded plans, CMAs held over 160

community meetings across 120 NSW towns. As a result, stakeholder input was more meaningful and planners could give proper weight to local concerns. A technical reviewer noted that:

> 'when planning instruments convey a sense that community input actually gets translated into learning and action, community members become more motivated to achieve objectives and greater levels of cooperation emerge – these manifestations enhance actual plan outcomes' (Natural Resources Commission 2013).

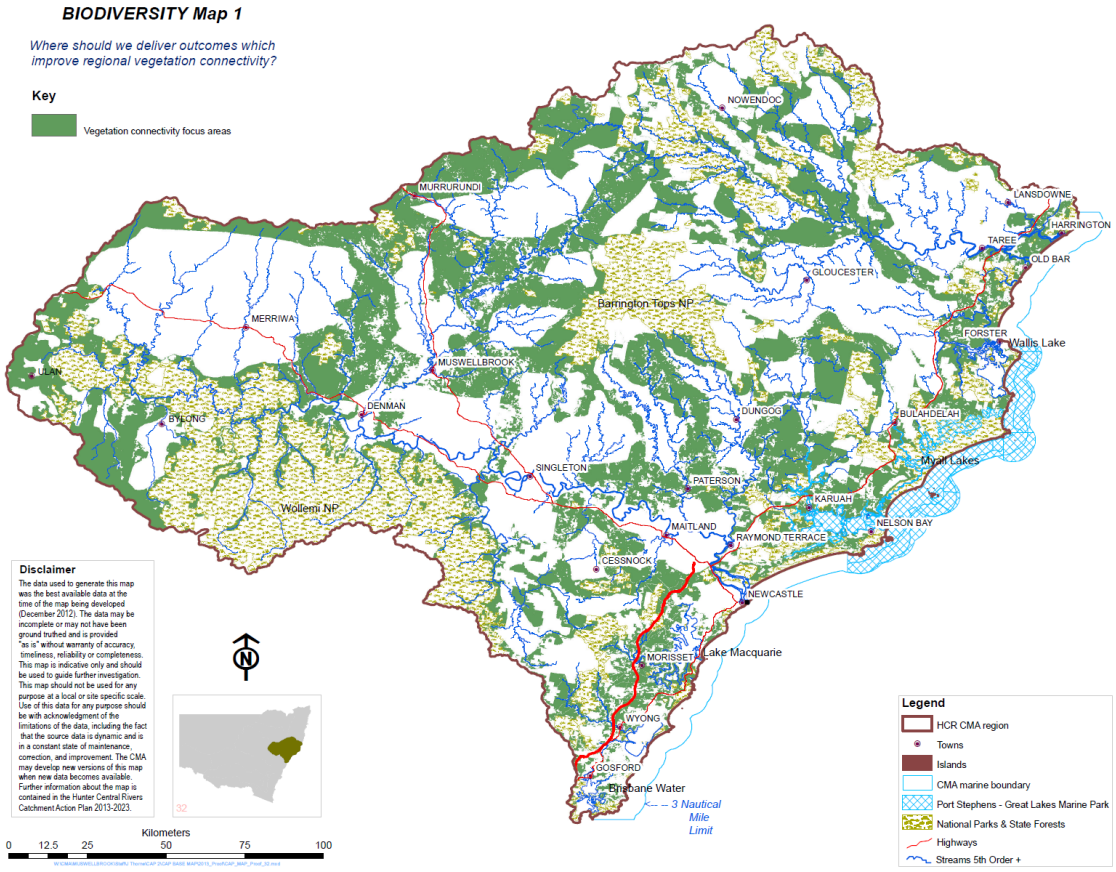

Figure 5: Hunter-Central Rivers Catchment Action Plan map showing priority areas for investment in vegetation connectivity (Hunter-Central Rivers CMA, 2013)

CMAs reported that landholders, who work with systems every day, readily understood a systems approach to planning. A CMA staff member commented:

> 'we are finding this resilience/SES [social-ecological systems] approach really powerful to identify linkages between interventions and drivers – and they (the community) just get it (Griffith, 2013).

The upgrade process established systems thinking as a valuable tool for generating stakeholder participation. Regionally appropriate approaches were used to encourage local input and several CMAs began working with stakeholders that were not effectively engaged in previous planning processes. In particular, the NRC found that incorporating input from local and regional industries into landscape analysis resulted in the generation of better strategies for resilient communities. With industry input, planning is more likely to take into account trade-offs where there are multiple potential uses for the same resources.

For example, the Southern Rivers CMA demonstrated particularly effective engagement with its region's industry stakeholders. These included dairy and beef farmers, small-scale producers, and oyster farmers. The result has been strong industry support for the upgraded plan and willingness to collaborate in its delivery. The Senior Environment and Sustainability Officer at Bega Cheese wrote to the Southern Rivers CMA:

> 'It is pleasing that people, communities and economic viability of industries has been recognised in the plan and that it hasn't focussed singularly on restoring ecological systems. It is also pleasing that the Catchment Action Plan will continue to support profitable industries and partnerships with industry and community.'

Given the broad range of functions and responsibilities of coastal planners, there are potential benefits to coastal planners adopting and building on CMA engagement strategies. For example, Murray CMA led a highly successful bottom-up approach to strategic planning.

Murray CMA devolved funding and responsibility for plan development to a skills-based Community Committee that worked independently but reported to the CMA board. The result was a transparent plan that clearly articulates stakeholder objectives, has extensive community ownership, and provides a strong foundation for successful implementation. 'The design and implementation of this strategy . . . underpinned effective community engagement, making communities feel valued and motivated to work with the MCMA' (RIRDC, 2013). This clearly demonstrates the benefits of cascading devolution to capable, smaller scale committees.

While the upgraded plans made progress in broadening the focus of community engagement to consider a wider range of economic, social and cultural issues, there is scope for broader engagement, capacity building and collaborative planning.

Improved capacity and resources

The NRC's assessments found that the systems-based, collaborative planning process further developed the already strong strategic capacity of most CMA Board members and staff. The NRC also found a strong relationship between high quality plans and 'hands-on' strategic leadership. Active leadership supported by good, adaptive governance arrangements is critical to effective strategic planning and innovation, particularly when the approach is new and challenging. This should be a key focus for internal capacity building within natural resource management organisations.

The NRC also found that a much better plan was produced in regions where the CMAs employed the intellectual and creative capacity of their whole organisation rather than relying on a small number of staff.

In addition, most CMAs have significantly improved their data management and spatial analysis capabilities through the upgrade process, often by collaborating with agencies and other CMAs. **Figure 5** provides an example of the kinds of spatial analysis CMAs are now capable of using in their planning. However, there is much more that can be done in improving regional spatial capacity.

Improved knowledge, monitoring and reporting

The CMA's embarked on a process of collating knowledge from landholders, industry, government agencies, scientists and community groups that was critical in developing

high quality strategic plans. The ability to capitalise on this knowledge base will depend on maintaining good information management, and effective monitoring, evaluation and reporting programs. Some CMAs have already developed systems that allow them to manage large amounts of information, meaning staff can readily access relevant knowledge when needed.

There was at times an over-reliance on qualitative information and conventional wisdom, and insufficient analysis and testing of this against quantitative information and relevant theory. An independent technical reviewer praised the CMAs' analysis efforts while noting:

> 'All they [the CMAs] lack is more science to underpin the thinking and the analytical tools to more reliably set targets (along with the means to measure them)' (Dangerfield, M, 2013).

The CMAs monitoring, evaluation and reporting frameworks should address these knowledge gaps over time. There will be many opportunities for natural resource managers at the local scale to collaborate with CMAs (and Local Land Services) in improving knowledge of key landscape systems over time.

Within these monitoring, evaluation and reporting frameworks, information should be collected not only about the physical landscape, but also about social, economic and cultural factors within the region, including capturing information about interactions with partners and stakeholders to inform future project and consultation activities. This information should be shared and accessible with other natural resource managers.

Areas for further improvement

Although the catchment action plan upgrades deliver a significant improvement in regional landscape planning in NSW, there are still areas for further improvement around:

- prioritisation and target setting
- social, cultural and economic analysis
- innovation and transformation
- upstream community input into design of planning approaches.

However, it is important to highlight the extent of change demanded by, and achieved through, the new systems-based approach. Putting any theory into practice for the first time demands a high degree of adaptability and learning. Although biophysical systems analysis was strong in the upgraded plans, all CMAs found it more difficult to integrate social, cultural and economic elements into their biophysical systems. Improving these analyses and linkages is a complex task and will require further attention as part of ongoing adaptive management of the plans.

Finally, by providing a new lens through which to view the landscape, systems and resilience analysis should promote innovation in landscape management, and should prompt stakeholders to consider actions or potential futures outside of 'business as usual'. This may even mean considering options based on transformation, by anticipating change and knowing when your region should shift to an alternative state.

Next steps

CMAs will soon transition into the Local Land Services delivery model. The upgraded catchment action plans will be adapted to guide natural resource investment for the next two years, until Local Land Services are in a position to review and update their regional plans to cover all Local Land Services functions, including biosecurity, agricultural productivity, emergency and natural resource management.

While the lessons from the catchment action plan upgrades will be useful in guiding Local Land Services in their next planning processes, they may be equally applied to all strategic planning dealing with trade-offs between economic prosperity, social wellbeing and environmental health and biodiversity - including local coastal planning.

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