Transformation for Resilient Landscapes and Communities Partnership

Taking Transformative Action in the NSW Murray Catchment Region

by Rod Griffith, Paul Ryan, Michael Mitchell, Greg Walkerden and Sandy Robinson

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Acknowledgments

Abbreviations

ANU   Australian National University

CAP   Catchment Management Authority

CAP1   Catchment Management Plan, 2006

CAP2   Catchment Management Plan, under development

CEO   Chief Executive Officer

CfOC   Caring for Our Country

CMA   Catchment Management Authority

COAG   Council of Australian Governments

CSP   Community Strategic Plan

C2C   CAP2 Committee

FNQ   Far North Queensland

GM   General Manager

LGA   Local Government Authority

LWA   Land and Water Australia

MCMA   Murray Catchment Management Authority

MDB   Murray Darling Basin

MERI   Monitoring Evaluation Reporting and Improvement

NAP   National Action Plan for Salinity and Water Quality

NHT   Natural Heritage Trust

NHT2   Natural Heritage Trust (2002/3-2007/8)

NRC   Natural Resources Commission

NRM   Natural Resources Management

NSW   New South Wales

RGA   Rice Growers Association

RIRDC   Rural Industries Research and Development Corporation

SES   Social-Ecological System(s)

WSC   Wakool Shire Council

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Appendix 1: *Outcomes from Murray CMA's engagement with the Transformation for Resilient Landscapes and Communities project, 2009-2012.* A report by Dr Michael Mitchell, Adjunct Research Fellow, Institute for Land, Water and Society, Charles Sturt University.

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Executive Summary

What the report is about

This report covers the Murray region case study, as the first of three case studies in the *Transformation for Resilient Landscapes and Communities* study (Transformation study). The formal case study period covered mid 2009 to mid 2012. The broader Transformation study has been working with partners in New South Wales (NSW) and northern Queensland who are confronted with significant change and therefore interested in exploring the synergies between resilience, collective learning, adaptive governance and transformability, as they apply to natural resource management (NRM). Transformability, for the purposes of this study, is the capacity of actors within a social-ecological system to take intentional transformative action.

The research partners in the Murray region were the Murray Catchment Management Authority (MCMA) and Wakool Shire Council (WSC). The report provides a detailed description of the researchers' interactions with these two organisations over the three year study period. It presents a comprehensive review of the organisations' responses to the researchers' introduction of three foundational concepts (resilience, collective learning, and adaptive governance) as helpful concepts for instigating radical change, to address major problems facing the organisations at the time.

Central to the Transformation study, this report presents developments with a conceptual framework for building and maintaining capacity to take transformative action, which is a product of this study. The Framework has been redesigned to include six transformative management capacities which together create conditions for change, and five key 'stimulants' of transformative action, which push change beyond incremental adjustment to more radical action. The report demonstrates the use of this Transformability Framework as a diagnostic tool, assessing MCMA's progress with capacity building, adaptive governance changes and the stimuli applied for transformative action.

The final chapter outlines implications for the Murray region beyond the study, as its seeks to institutionalise changes of the past three years, while meeting the challenges of a forced transformation of NRM arrangements in NSW, through the replacement of CMAs with Local Land Services. The chapter also considers implications of lessons learnt to the study objectives.

Who is the report targeted at?

This report is relevant to NRM practitioners, commentators and policy makers who are interested in transformational change, a more systemic approach to NRM and creating the flexibility for NRM organisations to innovate. It is aimed at leaders and decision makers across all levels of NRM policy development and implementation in Australia, particularly those working on regional capacity-building.

Background

Most resource-based rural communities in Australia continue to face intractable NRM and sustainability problems. Many regions are currently experiencing ongoing expected and unexpected changes in such key variables as commodity prices and government policies and priorities, as well as ongoing uncertainties associated with climate variability and the future cost of energy. These problems are difficult to deal with for five key reasons: (1) they exhibit high degrees of complexity and uncertainty and low controllability; (2) they are not governed by simple cause and effect relationships; (3) they are difficult to articulate and scope; (4) they are often deeply embedded in the structure and function of modern societies; and (5) they have no final solution, with attempts to manage them simply changing the problem.

Current rational and market-driven approaches to NRM underpin fragmented, incremental investment programs for land, water, soil and biodiversity assets. After two decades of significant investments to address extensive natural resource problems nationally, the trend in condition is still in decline, and new issues have arisen. Action taken to address landscape problems is generally aimed at remediating the biophysical symptoms without adequate regard to the complex cross-scale linkages between people and the biophysical environment and the underlying social and economic drivers. Actions which aim to "restore" the environment fail to recognise the way social systems work and consequently have limited impact over time.

In mid 2009 the Natural Resources Commission (NRC) encouraged our research team to approach MCMA with the aim of including the Murray region in the Transformation study. The MCMA had been through a potentially serious governance crisis in the previous year and a new leadership team of Chair and General Manager had just been appointed. CMAs are statutory authorities of the NSW Government with the responsibility of interfacing with the Minister and agencies responsible for natural resources on the one hand and catchment communities on the other. The NRC is an independent commission established to provide the NSW Government with advice on natural resource management and the performance of CMAs in relation to state wide targets and standards.

The MCMA had also performed poorly in a number of key areas in a regular audit of CMAs by the NRC in late 2008. This Audit covered how the NSW Standard for Quality NRM was being used to promote adaptive management, and to implement their Catchment Action Plan. The new leadership team and Board were keen to address the deficiencies raised in the Audit and were committed to performance improvement. The NRC were aware that our team included recognised expertise in the fields of resilience, sustainability, adaptive governance and social or collective learning approaches to change and were keen for the MCMA to have access to the thinking and skills associated with those concepts.

Aims/Objectives

The research presented in this progress report aims to explore how rural communities and sectors can build and maintain the capacity to take intentional transformative action. It also aims to build this capacity with the case study partners as the research progresses.

Towards these aims, the research objectives of the study are to explore the contribution of resilience thinking, collective learning, adaptive governance and transformability stimulants in different community, resource risk and climatic settings, as well as at different scales, with partners which are actively seeking to undertake an intentional transition in response to significant social and environmental resource-related challenges. A further objective is to build the capacity of the case study partners and their communities to undertake intentional transitions beyond the research study. Capacity-building of the partners is intended through skills transfer from the research team and provision of resources derived from the research results. In addition, the intent is also to undertake capacity-building of the wider NRM community through exploration of alternative methods of extending and transferring the learning from the study to other resource-dependent communities not involved in the case studies.

Methods used

The overall approach to the case study (and to the wider Transformation study) was intended to be trans-disciplinary and based on participatory action research methodologies. Trans-disciplinary involves breaking down professional boundaries and promoting the fusion of different perspectives into whole new types of knowledge.

Participatory action research encourages practitioners to take a research approach and to actively participate in the research and process design. Working with self-nominated 'champions' to develop transformative leadership, was an important strategy from the outset for information transfer, building

capacity for taking transformative action and managing the researcher/practitioner relationship. However, in this study neither the trans-disciplinary nor the participatory intention could be claimed as having reached full potential.

The approach to putting resilience thinking, adaptive governance and collective learning into practice (with respect to transformative action) was influenced heavily in the early stages of the study by literature reviews. The reviews supported four phases of transformation: (1) a phase of preparation and trust building; (2) a window of opportunity; (3) navigating through the turbulence of transformation; and (4) consolidating adaptive governance. Two other key influences on transformation were also identified: leadership (with multiple dimensions) and shadow networks.

A framework for assessing transformability, or the capacity for taking intentional transformative action, has been under development in parallel with the Murray case study. The Framework can also be applied as either a stand-alone capacity building tool or as a key step in a wider planning process should transformation be identified as an option for intractable issues raised in the planning process. It has been designed to include six transformative management capacities which together create conditions for change. At the centre of the Framework is adaptive governance as the enabler of the capacities. There are seven principles of adaptive governance of which transformability is of most interest to this study, in particular key influences on transformability which we are calling key 'stimulants' of transformative action. The five stimulants are: critical reflection; knowledge repackaging; innovation networking; transformative leadership; and, tipping point incentives. These stimulants can also be used as indicators of whether the capacity for intentional transformative action is being built or maintained. For this report we have used these indicators and the six management capacities in the Framework as a lens through which to view the Murray story.

The researchers have used a pro forma to make notes on key events including meetings, workshops and discussions with champions. Provision was made for factual description and reflection in relation to study aims and objectives. For key meetings and workshops, notes were provided to participants for correction and as a record of the event. The evaluation also includes eleven semi-structured interviews undertaken in May and June 2012 and a re-analysis of earlier interviews from 2009 and 2010. MCMA documents including papers prepared for the CMA Board and the Catchment Action Plan Community Committee have also been drawn on for this evaluation.

Results/Key findings

Of the three foundational concepts brought to the study by the researchers, resilience attracted the most interest from MCMA. This interest stemmed from the prominence given by the NRC to resilience and how it might be applied in NRM. It was also due to NRC audit findings of MCMA in 2008, which highlighted a number of deficiencies in the social dimensions of the CMA's business, its adaptive management and maintenance of an evidence-based approach to NRM. Resilience thinking offered opportunities to address these deficiencies and the Board and staff were keen to explore these opportunities.

Despite a continuing prominence of resilience thinking in MCMA planning and operations, all three concepts separately and together have been influential in the journey of change so far in the Murray region. These concepts have made significant contributions to:

- The design and implementation of a successful governance change strategy which has resulted in a transformation to adaptive governance, radically affecting the outlook and behaviour of individuals, the overall culture of the organisation and the nature and effectiveness of community and government agency relationships with the CMA

- The approach to the development of a revised catchment action plan (CAP2) which operationalises resilience thinking and collective learning and has resulted in a paradigm shift in the way NRM is practised.

These two inter-connected initiatives, informed by resilience, adaptive governance and collective learning, have underpinned effective community engagement making communities feel valued and motivated to work with MCMA.

The outcome appears to be an overall change in capacity which has been sufficient to lead to a transformation of regional NRM governance. The major changes observed over the three years have been compared to a set of conditions which serve as criteria to indicate whether any change could be interpreted as transformational change.

Transformation criteria	Significant change led by Murray CMA
Introduction of new key elements and the loss of others	Novel and unique governance structures such as community CAP Committee (C2C) have been introduced leading to new relationships. Introduction of new thinking and associated methods of NRM practice which were not present prior to the study Community networks have been legitimised, expanded and linked together.
Recognisable, more or less stable change in form and function of the entity or system being transformed	Governance and management structures have changed, including the policy base, organisational structure, Board structures and new community based structures consistent with adaptive governance principles. The governance principle of devolution leading to localism is also evident. Functionally there has been a profound change in attitudes, individual and collective behaviour, organisational culture and reported relationships between Board and staff and organisation and community. Is it stable – probably not! Expecting ongoing transformation as new externally driven policies take effect.
An identity shift or break with the past	A very different culture exists within the CMA which is articulated, championed and followed by the majority of staff and Board. There is a sense of pride, achievement and belonging, and new relationships are being forged upwards, downwards and sideways Evidence of a paradigm shift in the way NRM is conceptualised and practiced comes from the CAP development process In the community the new paradigm allows social-ecological identity to be uncovered and discussed which may extend the organisational and governance transformations to place-based transformations

These results support a legitimate claim of transformation of the MCMA as an organisation, including its culture and its leadership role as a change agency and bridging organisation in the region. Claims of a wider NRM governance transformation are still partial but also have merit and changes to the regional planning approach could also qualify as transformational compared to the starting conditions in mid 2009. There is acknowledgement that the study as participatory action research and all three foundational concepts have played a significant role in shaping and at times acting as a catalyst in the change process which had delivered the observed transformations.

In the past twelve months the research team has developed a Transformability Framework (illustrated) for assessing transformability, or the capacity for taking intentional transformative action, in parallel with the Murray case study. The Framework can also be applied as either a stand-alone capacity building tool, or as a key step in a wider planning process should transformation be identified as an option.

Context: Access to financial, human, social, natural and built capital stocks as resources for transformative self-organisation

Capacity for scoping preferred futures

Capacity for strategic assessment of how SESs work

Transformation

Capacity for reading feedback signals

Adaptive governance
↓
Transformability
→ 5 Key stimulants

Capacity for sidestepping the present

Capacity for nurturing innovation

Capacity for radical design

Outcomes: Triple loop learning, radical self-organisation
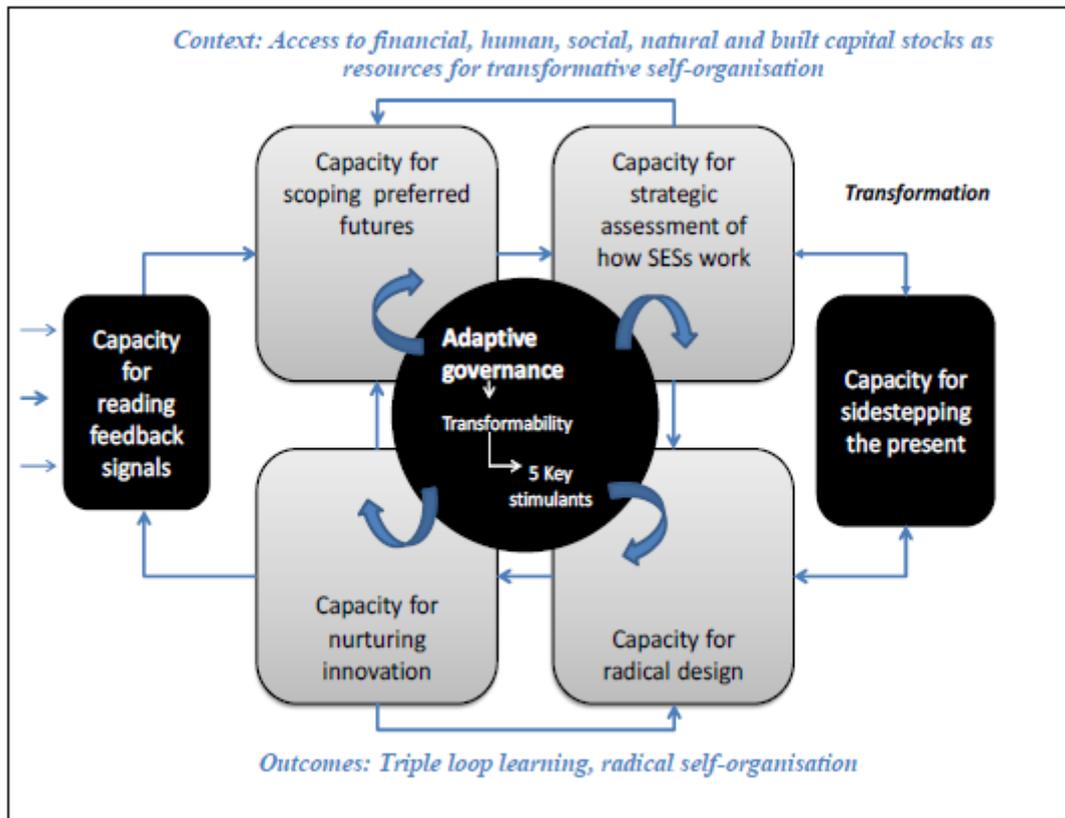
The Framework also provides opportunity for inputs from social-ecological systems dynamics assessments and recognises the importance of access to capital stocks available within social-ecological systems, as resources for renewal. At the centre of the Framework, key influences on transformation have been expanded through literature review and reframed as five key stimulants of transformative action. The five key stimulants of particular interest to this study are:

- Critical reflection - challenge to assumptions, norms and contexts for triple loop learning

- Knowledge repackaging – reframing and re-contextualising that open up new perspectives

- Innovation networking – networking that explores alternative futures

- Transformative leadership – empowerment and navigation for radical innovation

- Tipping point incentives –incentives applied near thresholds to either prevent or assist change

In this report, the Transformability Framework has been used as a diagnostic tool for the first time. The evaluation process has identified that MCMA has built its own practice approach to change which includes capacity building and which integrates resilience thinking, collective learning and adaptive governance. This approach is still under development in relation to NRM practice around the social-ecological system as a governance and management unit. From our snapshot of an incomplete process, all of the capacities and stimulants in the theoretical Transformability Framework have equivalents in practice. In many aspects language is the big difference. Overlaying the Transformability Framework on the Murray process also confirms there are no big gaps in its practical process. Ideally, the Framework should have been introduced to MCMA as a self-assessment or guided assessment process, unfortunately circumstances did not allow progression to this next step. However, from a research perspective, the desk top analysis of Murray case study data in this report has been extremely valuable for revising the Framework as a participatory diagnostic process, to be trialled in the Cape York case study in February 2013.

Implications for the Murray case study region

This report demonstrates that significant changes have taken place in the Murray catchment (NRM) region over the term of the study. Innovations led by MCMA in the areas of governance and NRM planning, backed by sound risk management practice have changed the culture of the organisation and as a result its standing with regional communities and peer organisations.

It is too soon to tell whether transformative action at the organisational level of an institutional scale initiated by the CMA, and their extension to regional scale institutions, will result in bigger changes towards sustainability such as transformations in landuse or land management practices, or in a transition of any of the landscape scale social-ecological systems, or the whole regional system. As yet, the rural communities have not demonstrated they are willing to intentionally transform whole social-ecological systems or parts of those systems, other than governance.

With regard to next steps, the leadership group may derive some new insights from having the case study reflected back through this report. In particular, there may be new insights from the report's analysis of MCMA's change process using the Transformability Framework. Also of potential benefit are the perspectives of catchment planning committee members presented in this report, and their role in mediating and changing engagement approaches and processes for gathering information from communities.

The new paradigm of NRM now being practised and expanded by MCMA is under threat from transformation of NRM arrangements in NSW driven from above, at the state scale. The NSW government is establishing new regional authorities across the state called Local Land Services with new regional boundaries, which in the Murray region will absorb MCMA. In the longer term the Murray region will also experience changes in water allocations and irrigation systems.

However, over the past three years, experience has been that MCMA always has a forward agenda under thoughtful consideration, which would suggest that another phase of intentional adaptation is already underway. MCMA will need to deal with this next big challenge while still facing the very significant challenges involved in institutionalising the new paradigm and radical innovations it has fostered over the past three years. The shift to adaptive governance, underpinned by the management systems, developed by MCMA should provide a sound basis for adapting to the imposed transformations. It will require a fresh look as new connections are developed and design and implementation of a new business model to accommodate the diversity of functions covered by Local Land Services.

Implications for on-going research

The Murray case study is part of a longer term participatory action research study. The study aims and objectives have been advanced significantly as a result of engagement with partner organisations and communities in the Murray region. In particular, there has been significant progress with conceptual integration and there are now two reasonably well integrated frameworks for building and activating transformability. One is theoretical, developed by the research team, and the other a practical framework developed by MCMA. The latter demonstrates that the foundational concepts of resilience, adaptive governance and collective learning can play a strong role in informing intentional transformational change processes at the scale of a regional NRM organisation and if the trends continue, to regional NRM governance systems. Similarly these concepts have informed a shift in the way NRM is conceptualised by MCMA and communities. Next steps in the study will include a comparison of theoretical and practical approaches for similarities and differences, attempt further synthesis, then further trials of the Framework in Far North Queensland (FNQ).

There has been some degree of confirmation about the importance of the five key stimulants of transformative action which have been chosen for testing in this study. Much has been learned about the practical application of those stimulants. Critical reflection linked to triple loop learning,

innovation networks, knowledge reframing and repackaging, and tipping point incentives have all been applied by MCMA in novel ways which provide new insights for future applications with other case study partners. However, it is the transformative leadership which has been foundational to the successful change process in the Murray region. These leaders have made a significant contribution to the study and to future practice models of NRM. However, there is some caution at this stage as there is still a lack of radical innovation in relation to addressing intractable NRM problems. The research team intend to explore the use of the Transformability Framework to drive new thinking in this area.

The case study has also made a significant contribution to our thinking about a package of support resources for rural communities and NRM organisations. This has been a vexing issue for researchers working in this study. MCMA had changing needs for tools and heuristics as competencies with the concepts grew and pilots proved successful. This has already led researchers to dispense with the original idea of a 'toolkit'. A new approach is now under development on how the study could engage with, and support, partners and a community of practice.

It is too early to start hypothesising about a new practice model of NRM. However we can see the embryo of such a model in the Murray approach. It is reasonable to say that MCMA's integrated package of adaptive governance, adaptive management and social-ecological systems, underpinning its planning process, is a cutting edge example of an emerging paradigm of NRM. Some very important characteristics are apparent in this emerging model and the intention is to take this further as the study continues in FNQ.

1.   Introduction

1.1   What this study is about

Many communities in Australia and elsewhere are faced with declining landscape function, resource condition, terms of trade and population, as well as changing access to resources. Climate change is an added factor which is expected to exacerbate some of those trends. Traditional approaches and the current institutional arrangements for natural resource management (NRM) as a predominantly technical and biophysical project are not adequately equipped to deal with these persistent and largely intractable challenges which have roots deeply embedded in the social system.

The *Transformation for Resilient Landscapes and Communities* study sets out to explore the option of transformational change for those communities in rural Australia which depend on the natural resource base for their livelihoods. It seeks to better understand the attributes and influences which provide communities with the extra capacity to instigate deep systemic change when incremental adjustment is not working and circumstances demand transformative action. This also includes capacity for breaking out of situations known as 'lock-in traps' where deeply entrenched problems become resistant to change.

Three core concepts; resilience, adaptive governance and collective learning are drawn on in the study, to assist regional NRM bodies and the communities they support, to explore intentional transformative action for entrenched problems through a social-ecological systems approach. The study also aims to provide guidance on frameworks and tools to support an approach to NRM which expands the narrative to take on a social dimension and better responds to human-nature interactions.

1.2   Theory into practice

Through a case study in the Murray region of New South Wales, the research team has participated in a three year journey of intentional change in one catchment management authority (CMA) and the NRM region that it supports.

For a number of reasons it is not easy to assess the influence of the working partnership between researchers and the CMA. Firstly, this study is based on participatory action research. While our interventions as researchers are documented it is recognised that many changes to thinking and practice in NRM have origins external to this particular study. Notwithstanding these issues, we are confident this is a success story. Many lessons have been learnt from initiatives that worked as planned, and from those that did not work as expected or failed in a practical sense. The relationship between researchers and practitioners has been at different times tense, challenging and productive, one often leading to the other, sometimes according to the script and at other times in a more chaotic fashion.

On at least four occasions the study partnership could have ceased altogether, when the challenges associated with this type of methodology, together with new thinking, became particularly difficult for our partners. Early efforts in the study focussed on an attempt by the CMA and a small Shire Council which was in crisis, to jointly engage their shared communities in the western part of the region, in transformative strategic planning informed by resilience thinking, adaptive governance and collective learning. The collaboration was less productive than expected and after some initial interest in the idea of transformation, the communities and their Council returned to business as usual. Key lessons were learnt by both researchers and the CMA from this failed experiment.

As the study progressed, the practical focus of the CMA shifted away from a local scale defined by formal administrative boundaries and relationships with local government, to multi-scalar issues such

as identity in social-ecological systems, challenging the role of regional NRM bodies and even to paradigms of NRM. There is clear evidence of cases of personal change along the way. There is also clear evidence of a transformation of NRM governance at the regional and sub-regional scale as a result of intentional transformative action by CMA leadership. The CMA has repositioned and restructured itself and its relationships with its communities, to facilitate adoption of a very different mode of reviewing its primary strategic document – the Catchment Action Plan (CAP). It has also developed new ways of engaging with catchment communities based on a social-ecological systems perspective. These potentially transformative shifts, including the adoption of a new business model, are described and discussed in the report.

1.3   Background to case study selection

In mid 2009 the Natural Resources Commission (NRC) encouraged our research team to approach Murray Catchment Management Authority (MCMA) with the aim of including the Murray region as a fourth case study in a larger study, *Transformation for Resilient Landscapes and Communities* (Transformation study). The MCMA had been through a potentially serious governance crisis in the previous year and a new leadership team of Chair and General Manager had just been appointed. CMAs are statutory authorities of the NSW Government with the responsibility of interfacing with the Minister and agencies responsible for natural resources on the one hand and catchment communities on the other. The NRC is an independent commission established to provide the NSW Government with advice on natural resource management and the performance of CMAs in relation to state wide targets and standards.

The MCMA had also performed poorly in a number of key areas in a regular audit of CMAs by the NRC in late 2008. This Audit covered how the NSW Standard for Quality NRM was being used to promote adaptive management, and to implement their Catchment Action Plan (CAP). That Audit also introduced two additional issues: (1) interpretation of the notion of resilient and ecologically sustainable landscapes; and (2) governance. The new leadership team and Board were keen to address the deficiencies raised in the Audit and were committed to performance improvement. The NRC were aware that our team included recognised expertise in the fields of resilience, sustainability, adaptive governance and social or collective learning approaches to change and were keen for the MCMA to have access to the thinking and skills associated with those concepts.

At that time, the Transformation study was transitioning from a scoping phase to full study status with Land and Water Australia (LWA). The scoping phase focussed on applying resilience thinking, adaptive governance and collective learning theories to the underdeveloped collaboration space between regional natural resource management (NRM) organisations and local governments. The aim was to explore the potential for intentional transformation for sustainability. Three case studies had been scoped and partner organisations had committed to a three year study with the case studies to run in parallel (Griffith et al 2009a).

Initial discussions with MCMA and NRC were based on including a fourth case study to the existing study, therefore the regional NRM body-local government theme was at the forefront of thinking. As it turned out the very day of an introductory meeting with MCMA, the Australian Government announced it would no longer continue resourcing LWA and we were now without resources to continue the wider study. In full knowledge of this situation MCMA committed to a stand-alone case study on a year by year basis subject to review. Subsequently, through additional financial support from the NRC and Charles Sturt University's Institute of Land Water and Society (ILWS) (provided by the National Centre for Groundwater Research) there were sufficient resources to maintain the range of expertise assembled for the original study.

Towards the end of the first year of the initial case study in the Murray region, Rural Industries Research and Development Corporation (RIRDC) provided additional funding to support the Murray case study and to expand the Transformation study to other regions. As a result we were able to

accept an invitation in 2010 to partner with the newly formed Cape York NRM Ltd organisation, to assist with its intention to transform NRM governance on Cape York. A year later a third case study was established involving a multi-regional arrangement between the four regional NRM bodies of Far North Queensland and Regional Development Australia (RDA) which covers these regions.

1.4   Purpose of this report

This report has several purposes. First, the research team recognise that as the three year funding period for the Murray region case study has concluded, it is appropriate to produce a stand-alone case study report, separate to the on-going work of the other two case studies. Therefore, the focus of this report is an account of a three year journey of intentional change with MCMA and the NRM region that it supports. As the journey is still continuing for both the CMA and the region, this report presents the first three years of an unfolding narrative.

This report has also been developed as a potential resource for all the case study partners. While on the one hand it provides MCMA and its NRM region with an assessment of its actions and progress against the objectives of the study, the report also provides important lessons learnt for the other two case studies. These lessons are considered to be made more useful when embedded in the context of the overall change narrative for the Murray region.

For this reason, the report is also considered useful for other regions which are expected to identify with many aspects of the context of the narrative and thereby providing a better opportunity to weigh up the relevance of the ideas, framework and tools presented in this report, to their situation.

This is the fourth report from the study and follows on from the progress report to RIRDC in August 2011 (Griffith et al, 2011). Lessons learnt from the case study are documented in relation to the overall study objectives. Lessons from the experimental collaboration with Wakool Shire Council have been captured in in Griffith et al (2011) and Mitchell et al (2012 resubmitted) and are not central to this report. An evaluation of the Wakool pilot is documented in Appendix 1.

2. Objectives

Over the three year period of the NSW Murray Catchment case study, changing circumstances has led to some changes to the study's objectives from those specified at the outset. Because of its earlier history (Griffith et al, 2009), there were additional specific research questions which reflected the focus of a then much bigger study with Land and Water Australia (LWA). These questions were:

- Can NRM organisations partner with local governments to manage intentional transitions to sustainable resource use in their linked social-ecological system?

- What are the implications of this research for NRM governance in Australia?

Due to the closure of LWA, the bigger study did not proceed. As a consequence, the NSW Murray Catchment case study began as a stand-alone study based on the original objectives. Since then additional case studies have been established in circumstances quite different to those envisaged originally, leading to changes in the objectives. The overall aims of the study have also been adjusted to take into account key learning from reflections, and to provide more clarity.

The aims now are to:

- Explore how resilience thinking, adaptive governance and collective learning, separately and together, can build capacity to take intentional transformative action for sustainability
- Actually assist regional NRM bodies and regional communities to build that capacity at different scales to improve regional and multi-regional NRM outcomes
- Use the findings and lessons learnt during the study to inform support material for an emerging paradigm of NRM and community of practice.

The study has several key objectives which are focused on delivering long term benefits to the participating communities. These objectives are to:

1. Explore the contribution that resilience thinking, collective learning and adaptive governance can make to rural resource dependent communities facing significant resource, social and environmental challenges;

2. Draw on and enhance synergies between these concepts to develop a transformative 'learning by doing' framework for rural, resource dependent communities to undertake an intentional transition in anticipation of emerging risk;

3. Apply and test the framework in different community, resource risk and climatic settings and at different scales in order to develop a set of tools appropriate for the participants' situation rather than a 'one size fits all' model;

4. Build the necessary trust, agency, collaboration and adaptive governance arrangements, with partners and communities, to enable them to undertake an intentional transition;

5. Develop strong inter-connections between each of the case studies so that learning gained in one setting can be extended and transferred;

6. Explore alternate methods of extending and transferring the learning from the study to other resource dependent communities not involved in the case studies.

3. Research approach

The NSW Murray Catchment case study of the *Transformation for Resilient Landscapes and Communities* study formally commenced in July 2009 based on a business case and study brief developed in May 2009. Funding partners included Murray Catchment Management Authority (CMA), the New South Wales Resources Commission (NRC) and the National Centre for Groundwater Research & Training. At that time, it had become a stand-alone study, instead of one of four case studies (due to the closure of Land and Water Australia [LWA]), though efforts were still being made by the research team to re-establish a multi-case study project.

3.1 Starting assumptions

Methodologically, the research team was still in a mindset of testing a number of key propositions or assumptions which were the basis of a previous study proposal and scoping study under LWA. These included:

- That many NRM problems were 'wicked' (persistent or intractable) problems and hence were deeply embedded in the social system requiring a learning approach

- This type of problem manifests over multiple scales – tackling the problem at one scale is not likely to work

- Current NRM governance and funding arrangements were ill suited to tackling this type of problem

- Most NRM organisations were approaching natural resource management with technical and primarily biophysical strategies and solutions

- Going beyond 'business as usual' and probably **transformational change**, will be required to tackle many NRM issues – therefore rural communities and their support organisations will from time to time require a capacity to instigate and navigate their way through profound change i.e. transformability

- **Resilience thinking**, **adaptive governance** and **collective learning** concepts separately and particularly together would be useful in tackling these issues and enabling transformation

- The under-developed collaboration space between regional NRM bodies and local government was a productive area for governance improvement, for addressing intractable issues and for developing transformative action.

3.2 Core concepts

Transformational change-- is a type of deep or profound change. In the NRM context it is a process which implies:

- Introduction of new key elements and the loss of others

- Recognisable change in form and function of the thing being transformed

- An identity shift or a break with the past

In this study we are focussed on transformational change in linked, co-evolving social-ecological systems. The profound change is either to whole social-ecological systems (in the sense of a transition from current forms of governance, ways of making a living or landscape function), or in parts or components of the system (where the transformation results in more sustainable human/nature relationships and development trajectories and in more resilient landscapes and communities). Transformation as an outcome in social-ecological systems is something that can probably only be recognised in hindsight by applying the above criteria as a test.

Transformative action-- is the intentional and purposeful action taken by people within the system to instigate and navigate their way through transformational change processes. This includes:

- A type where the intentional action resides within a group of activists for change who are concerned over development trajectories and the functioning of the system

- A type where the community as a whole decides on an intentional and consensual course of action

- A type where a new practice with capacity to transform parts of daily life and management of resources is devised by an innovator or group of innovators and diffuses into communities

Contrasted with these from the inside-out processes, are two other types of transformation imposed from the outside-in. These are:

- Transformation driven by new technology which becomes available then diffuses into practice and leads to a transition. New communication technologies, the steam engine, the computer and potentially genetic modification come into this category of change. Such changes are often introduced with little or no resistance by the dominant regime.

- Transformation which is forced on communities by policy change or changes to external ecological conditions or both at the same time. Structural adjustment policies in manufacturing and sugar industries in Australia, climate change, water policy in the Murray–Darling Basin and forest policy are examples. These initiatives are most often resisted by communities affected by the change.

Transformability-- is the capacity of communities to take intentional transformative action if and when the circumstances require it. Transformability is sometimes known as transformative capacity.

In other reports in this series of study reports we have outlined our understanding of transformational change and key stimulants of such change which are the focus of this study (Griffith et al 2010, Griffith et al 2011; Griffith et al 2012b; Mitchell et al 2012 resubmitted).

Resilience -- is a property of a linked social-ecological system to learn and self-organise in response to shocks while retaining its identity. It has it conceptual origins in complex system theory and is closely linked to adaptive management. Resilience thinking refers to the discourse that has developed around the concept. A key part of this discourse is that transformations are necessary to maintain identity and resilience at the scale above hence our study title *Transformation for Resilient Landscapes and Communities*.

Explanations of the resilience discourse and associated assessment methods can be found at http://www.resalliance.org/ and in *Ecology and Society* a journal dedicated to the understanding of social-ecological relationships and resilience http://www.ecologyandsociety.org/. In other reports in this series of study reports we have outlined how resilience thinking is applied to this study (Griffith et al 2010, Griffith et al 2011; Griffith et al 2012b; Mitchell et al 2012 resubmitted).

Adaptive governance-- is learning based governance for change - a form of multi-layered power sharing, engagement and decision making which in the resilience discourse enables adaptive

management and hence resilience. It has its origins in new or environmental governance also associated with the sustainability discourse and contrasts with modes of governing that seeks to 'command and control' change.

Good accounts of adaptive governance are provided by Folke et al (2005), Lebel et al (2006), and Bellamy (2007).

Collective learning-- is a form of social learning in which groups of learners come together to work their way through issues of shared concern. The outcome of these collective learning processes may be retention of business as usual, incremental adaptation or transformation. This study is most concerned with how to use the concept and associated frameworks in relation to intentional transformational outcomes.

Accounts of collective learning are provided by Brown (2008) and Brown et al (2010). An explanation of social learning can be found in Keen et al (2007) while Pahl-Wostl (2009) looks at social learning in relation to water policy in Europe. Previous reports from the *Transformation for Resilient Landscapes and Communities* study provide explanations of collective learning and attempts to use its framework in conjunction with adaptive governance and resilience frameworks.

3.3   Case study location and partner organisations

The NSW Murray Catchment region as it was for the study period covered an area of 35,170 square kilometres north of the Murray River from its origin in the Australian Alps to near the junction of the Murray and Murrumbidgee Rivers.

It is part of the Murray-Darling Basin (MDB), Australia's largest and best known river system which extends across four States and the Australian Capital Territory. The landscape, land use and settlement pattern varies as the Murray River progresses west and rainfall declines. The largest settlement is Albury with a population of approximately 51,000 people. Rural land use is predominantly grazing, cropping, irrigation, forestry and horticulture. Major NRM issues over the past 20 years have been the health of the Murray River, condition of its riparian environments, salinity and water allocation policies. These issues and the way in which governments have responded have created tensions both within and beyond the regional scale.

Consistent with the study propositions outlined above, the MCMA approached WSC to join the study as a partner. The practical aim was to jointly engage the communities of Wakool Shire as an initial part of a planned review of the MCMA's Catchment Action Plan (CAP). Wakool Shire was the most western Local Government Area (LGA) in the NSW Murray Catchment region (Figure 3.1).
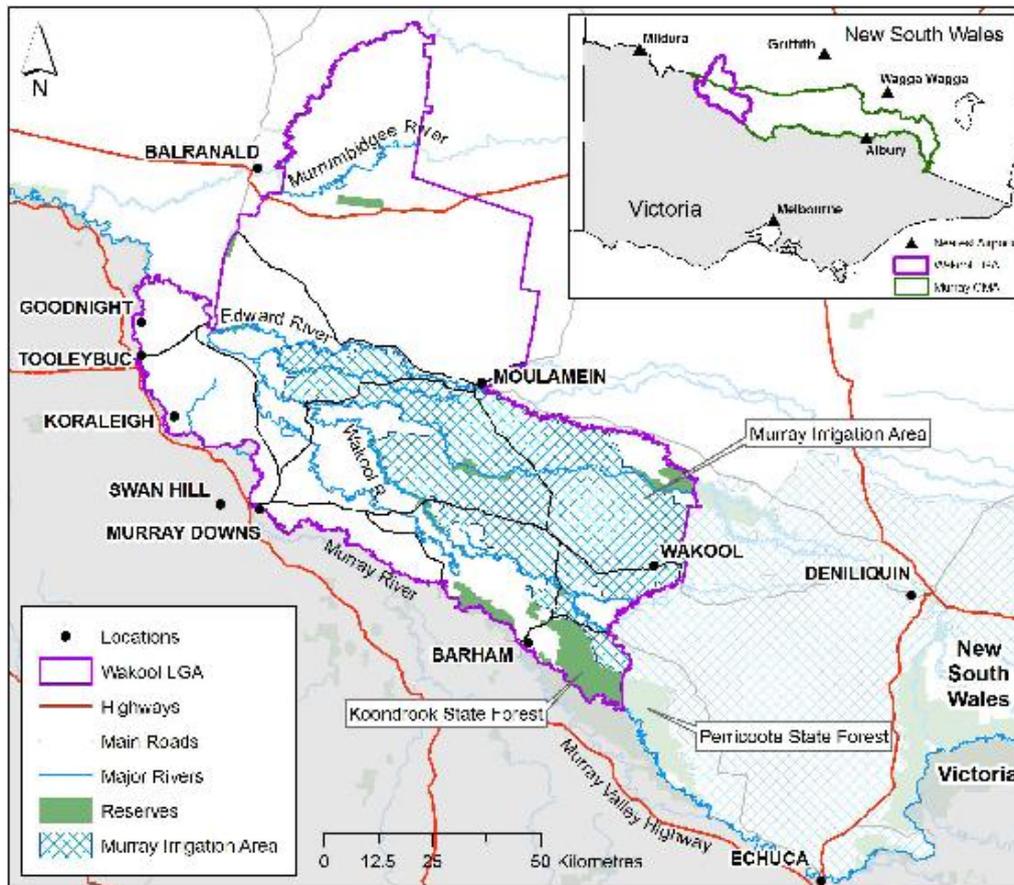
Figure 3.1: NSW Murray Catchment and Wakool Shire regions

Wakool Shire was chosen for several reasons. The WSC had recently emerged from its own governance crisis and a new progressive General Manager had been appointed a year earlier. The region was experiencing a long severe drought which had started in 2002. Federal Government exceptional circumstances provisions were in place, livestock production and cropping were at record lows, particularly rice production, and the regional economy had contracted. Populations in the small towns of Wakool Shire were declining with impacts on community life.

The Murray River and its associated ecosystems were also showing signs of stress, and public sentiment in large urban populations in Australia was shifting in relation to the long standing tension between irrigated agriculture and the health of the Murray River. This was being expressed in changes to River Red Gum forest policy and in proposed changes to irrigation water allocations as part of the MDB Plan. The Wakool Shire was significantly affected by all of these conditions and it appeared as though transformational change would be forced on the communities within the Shire. The Red Gum forest logging industry had been compelled to significantly reduce its operations and negotiate compensation arrangements, as a result of the conversion of state forest title to national park title. At the same time, a group of 40 irrigators in the Shire were in negotiations with the Federal Government to sell their water allocations as part of the Government's water buy-back scheme and retire their irrigation district after 74 years.

Applying the adaptive cycle (a heuristic used in resilience thinking –Walker and Salt, 2006) the social-ecological systems of the Wakool Shire were brittle and potentially entering a back loop where innovation and reorganisation of social capital are required. The need for capacity to either deal with the imposed transformation or instigate and steer their way through a community driven transition seemed obvious.

8

At one point in the discussion of suitable partnership options, MCMA raised the option of working with Murray Irrigation Ltd as an alternative to working with local government. In hindsight and given the outcome of the Wakool partnership, the option was not given enough thought. However, at the time the researchers put forward two arguments against the partnership. The first was that the leadership team of Murray Irrigation included the old leadership team of the MCMA. Secondly, and drawing on theories of transition management and paradigm shifts, there was a possibility that Murray Irrigation may have a vested interest in blocking rather than enabling change, as the operator and manager of regional irrigation infrastructure. As it has turned out, over time the two organisations have become collaborators and partners in an apparently productive relationship.

3.4 Methodology

The overall approach to the case study (and to the wider Transformation study) was intended to be trans-disciplinary and based on participatory action research methodologies.

The trans-disciplinary approach we perhaps ambitiously had in mind is the open type described in Brown et al (2010). Most people are familiar with the approaches of multi-disciplinary research which involves different disciplines or professions providing different but self-contained perspectives on the same problem, or inter-disciplinary research which involves taking this further by attempting to integrate these different perspectives. Trans-disciplinary research goes beyond these two approaches and involves breaking down professional boundaries and promoting the fusion of these different perspectives into whole new types of knowledge (Lawrence, 2010).

Participatory action research encourages practitioners to take a research approach and to actively participate in the research and process design. Working with self-nominated 'champions' to develop transformative leadership, was an important strategy from the outset for information transfer, building capacity for taking transformative action and managing the researcher/practitioner relationship.

In this case study neither the trans-disciplinary nor the participatory intention could be claimed as having reached full potential. The reflections on why this might have happened are covered later in the report. Nevertheless, they remain an ideal for the study and performance around both aspirations improved as this case study progressed, particularly so in the last year.

3.4.1 Case study design

Coming down a step or two from our trans-disciplinary intentions, the practical expression of how resilience thinking, adaptive governance and collective learning, could be applied to support transformative action and potentially transformational change at the sub-regional scale, was influenced heavily in the early stages of the study by literature reviews (in the area of resilience thinking and transition management - Griffith et al, 2011). A paper by Olsson et al (2006) which examines shifts in governance, and phases of transformation and some key influences which drive transformative action, was particularly influential in shaping the case study design. Based on a case study in Sweden, they propose four phases of transformation:

- A phase of preparation and trust building

- A window of opportunity

- Navigating through the turbulence of transformation

- Consolidating adaptive governance

Two other key influences on transformation were also identified: leadership (with multiple dimensions) and shadow networks.

According to Olsson et al (2006) a period of trust building and thought leadership is essential to prepare for taking collective transformative action. When windows of opportunity arise this social capital and particularly any development of alternative and novel solutions become important resources for taking transformative action. Through an adaptation of these authors' work, the initial intention of how to introduce resilience thinking, adaptive governance and collective learning theories is illustrated in Figure 3.2.
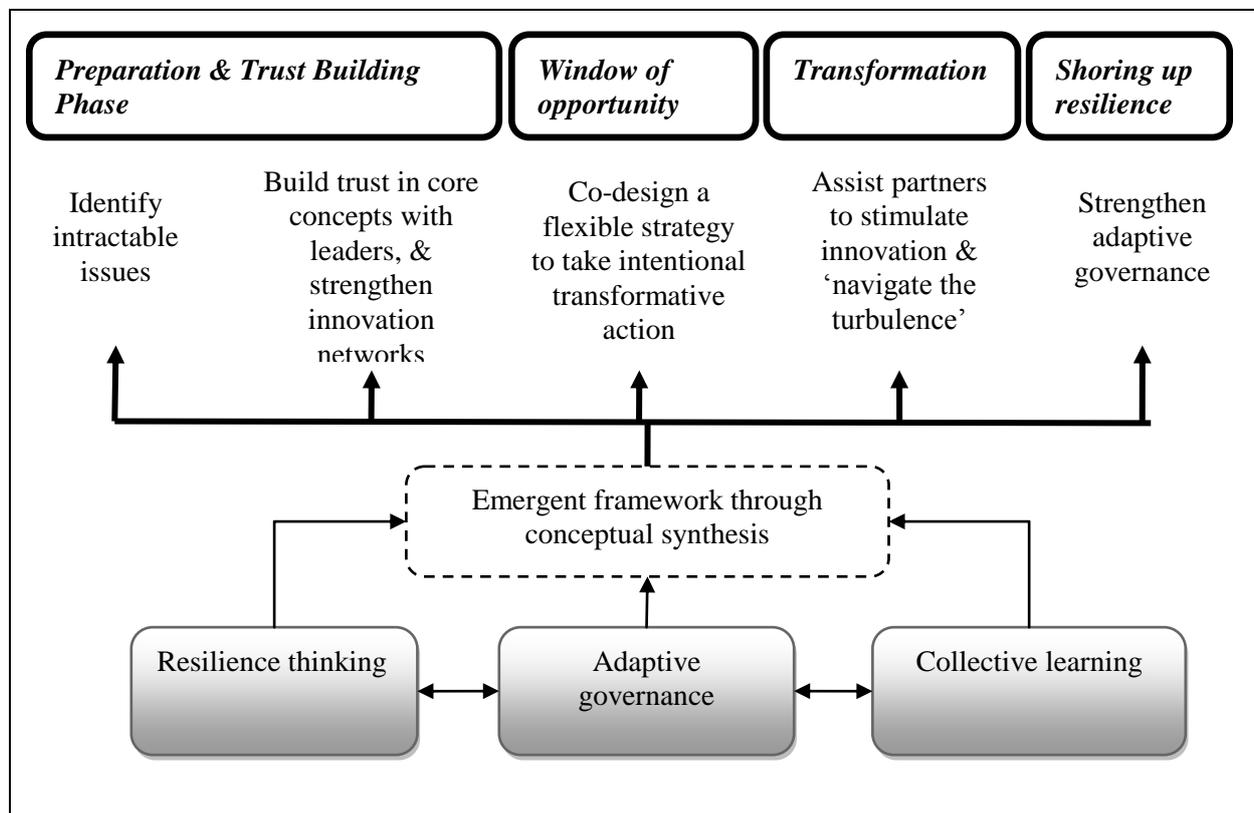
Figure 3.2: Intended process for supporting intentional transformative action in the NSW Murray Catchment case study (Adapted from Olsson et al, 2006)

Implementation of this broad design was different for the local (shire) and regional (catchment) aspects to this case study. Learning from the early application at the local scale, was used to improve the application at the regional scale. In both cases implementation was based around a number of key steps.

1. An initial period of trust building where:

   – A new or under developed collaboration space is opened to work in;

   – The nature of the challenges facing the community are stressed;

   – The tools are demonstrated to the partners; and

   – New ideas that could help are aired and tested

2. Establishment of a governance baseline using a set of principles for good NRM governance. The baseline allows the changes in governance over time to be assessed.

3. Tailoring of the conceptual framework with the partners to suit their particular resource, social and economic conditions.

4. Establishment of a resilience knowledge network to work through resilience issues and identify key leverage points for transformative change. This involves the application of a modified Resilience Alliance assessment process using a combination of workshops and follow up sessions.

5. Build or building on (if one exists) an MER framework to ensure the outputs of the resilience and governance assessments become inputs which inform the transition process outputs.

6. Collective learning workshops to develop strategic directions and generate innovative projects for transformative action.

7. The innovative projects which result from the workshops are then collaboratively resourced and mentored through their development in 'safe arenas'.

8. The study then continues as an iterative process of monitoring, evaluation, review and collective learning in response to progress with innovations.

3.4.2 Windows of opportunity and vehicles for change

A number of external and internal conditions created a window of opportunity for the Murray region in 2009. The region was experiencing prolonged drought, there were significant changes to resource access policy and there had been a governance failure in our partner organisations. In particular, the NRC's 2008 Audit Report for MCMA pointed to a number of areas of underperformance. All of these in combination conveyed an inter-related social, economic and ecological crisis. However, together with incentives provided by the NRC (funding and other support for the research team to expand its existing study to include the Murray region), a window of opportunity was created for learning and self-organisation, which the MCMA recognised and acted upon.

Two potential vehicles for change were identified as providing the opportunity to take advantage of this window of opportunity, these were:

- an upcoming review across NSW CMAs of their catchment action plans (CAPs)

- new legislation for local government on developing Community Strategic Plans (CSPs)

Two applications of the study design, one at the local scale and the other at the regional scale, are based on these vehicles for change and are documented in the case study. The initial intention of the study was to focus on the planned review of the MCMA's CAP as a vehicle for local and regional change. CMAs are required by legislation to review CAPs every five years. MCMA saw an opportunity to draw on the core concepts in the study to improve engagement and better explore the links between social and ecological dimensions of NRM.

MCMA was also interested in exploring whether joint engagement of communities at a local scale with local government, would enhance the CAP process and outcomes, using Wakool Shire as a pilot. Coincidentally, during the preparation and trust building phase, the NSW government introduced a new community focused integrated planning and reporting framework for local government. Legislation and guidelines were released which seemed compatible with all of the study objectives and aims of the partners. While WSC leaders were slow to see this significant shift as a window of opportunity for change, the GM of MCMA envisaged a potential situation where the Murray region CAP could be informed by local shire community strategic plans across the catchment, undertaken with collaborative engagement.

The study's practical focus for joint community engagement therefore shifted from the Council collaborating with MCMA on the development of the new CAP, to MCMA assisting Council and the Wakool communities with the development of their CSP.

The MCMA – WSC collaboration was something of a failed experiment notwithstanding that very valuable lessons were learnt by MCMA, the research team and to perhaps a lesser extent by WSC and its communities. Expectations that there would be interest in place-based or industry transformation did not materialise and for a number of reasons the window of opportunity for change closed and the research partnership was placed under considerable strain. The processes and outcomes of this local scale pilot are documented in previous reports and papers (Griffith et al, 2011; Mitchell et al 2012 resubmitted) and are not revisited in detail in this report.

In March 2011 a decision was taken to refocus on the CAP upgrade as the primary change vehicle. New contractual arrangements between MCMA and the researchers were put in place to ensure skills transfer and a set of practice notes were delivered.

3.4.3 Reflective transfer versus skills training

Based on Figure 3.2, the early strategy was to begin trust building with partner organisations (the formal leadership) and then as confidence built within partner organisations, extend to community leaders (the informal leadership) through the partners' networks. It was envisaged that the research team may have to supply the initial thought leadership and over time transfer that role to self-nominated multiple champions in the CMA, Council and community as trust and knowledge of concepts were built.

The strategy also included workshops using key concepts and tools, an adaptive governance baseline assessment process and network mapping and design sessions. Of particular significance for later outcomes in the Murray region was an ad hoc dialogue which commenced between the research team leader and the GM of MCMA. This sharing of experiences extending beyond the formal study events consisted initially of forwarding key papers to the GM but shifted to a process of question and answer on key topics which indicated a process of deep or critical reflection going on in the background. At intervals draft articles or copies of emails would be received by the research team that indicated that this reflection and consolidation of thinking was actually being operationalised and a change process was underway.

Later as the study emphasis shifted to the regional scale, and the benefits of changes by the MCMA Board to governance and management had become more apparent to CMA staff, the relationship with researchers morphed to resemble the one established earlier in the study with the GM and Chair of the Board. That is, researchers became more of a trusted or critical friend to staff by way of providing advice, demonstrating tools, reviewing processes and providing opportunities for critical reflection. Interaction with a wider range of staff ensued and those staff acted more as the leadership team had earlier on, accepting tools and advice but re-designing and re-contextualising to suit the conditions under which CAP2 was being developed. Unlike expectations and the pattern adopted in the Wakool CSP, researchers transferred experiences and made suggestions based on contemporary knowledge but did not take an active role in engagement of community or implementation.

3.4.4 Evaluation methods

The change journey for the MCMA and its communities is still a work in progress and the CAP review is yet to be completed. However our formal 3 year study with MCMA ended on 30th June 2012 marking the end of the first case study in the larger Transformation study. This evaluation of the change process and its outcomes, including the Wakool experience, has been undertaken as a way of wrapping up the first case study.

From the outset the researchers used a pro forma to make notes on key events including meetings, workshops and discussions with champions. Provision was made for factual description and reflection in relation to study aims and objectives. For key meetings and workshops, notes were provided to participants for correction and as a record of the event. The evaluation also includes eleven semi-structured interviews undertaken in May and June 2012 and a re-analysis of earlier interviews from 2009 and 2010. MCMA documents including papers prepared for the CMA Board and the CAP2 Community Committee have also been drawn on for this evaluation.

A framework for assessing transformability (Figure 3.3), or the capacity for taking intentional transformative action, has been under development in parallel with the Murray case study. A separate report covering the development of this framework (Griffith et al, 2012) as a work in progress is available. The Framework can also be applied as either a stand-alone capacity building tool or as a key step in a wider planning process should transformation be identified as an option for any intractable issues raised in the planning process.
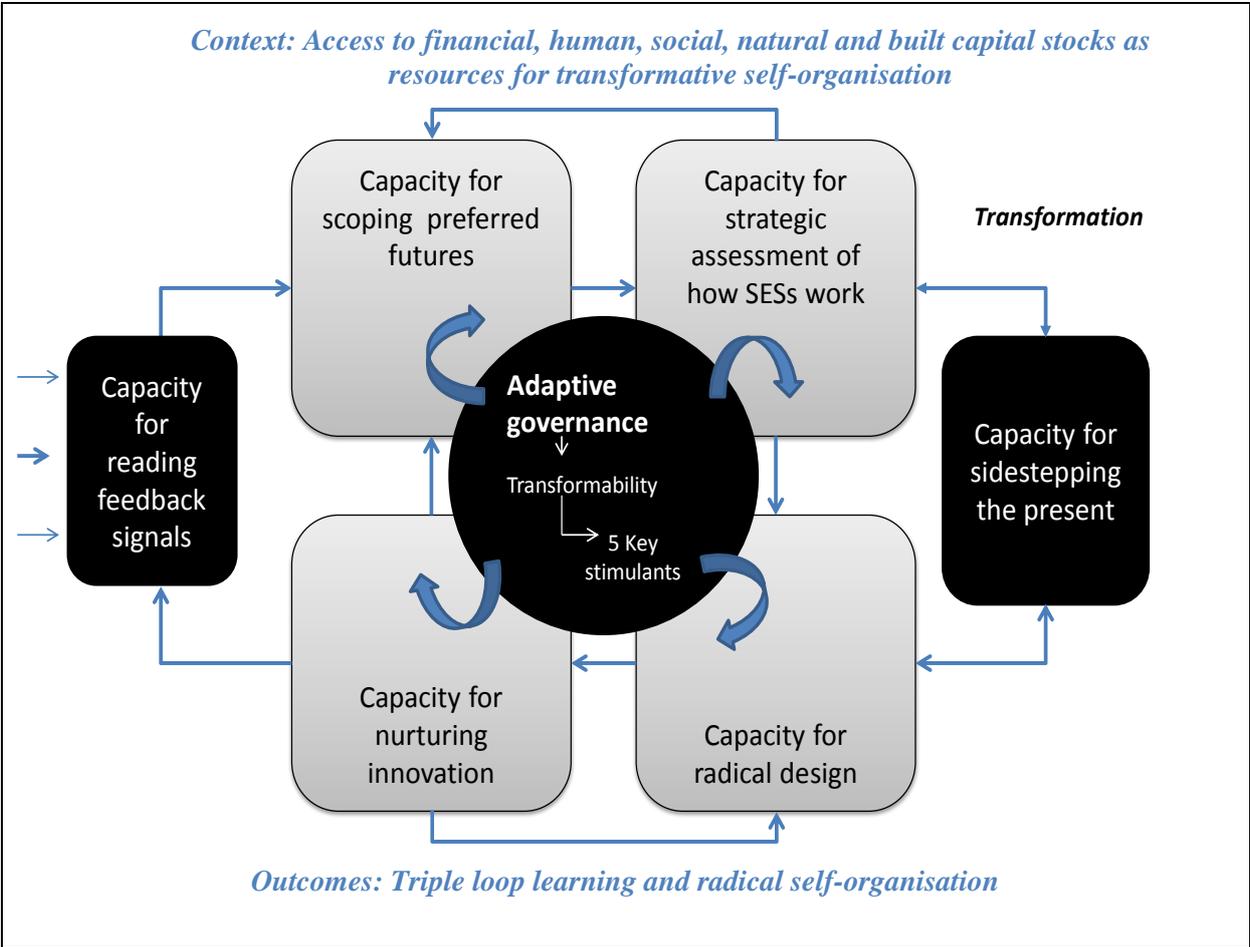
Figure 3.3: Transformability Framework - A framework for assessing capacity for intentional transformative action

This framework draws on Brown's (2008) collective learning framework as well as an adaptive governance assessment framework (Griffith et al, 2009b) modified for this study. It also provides opportunity for inputs from social-ecological systems dynamics assessments and the importance of access to capital stocks available within social-ecological systems as resources for renewal. At the

centre of the Framework, key influences on transformation identified by Olsson et al (2006) have been expanded through literature review and reframed as five key stimulants of transformative action.

The five key stimulants of particular interest to this study are:

- Critical reflection - challenge to assumptions, norms and contexts for triple loop learning

- Knowledge repackaging – reframing and re-contextualising that open up new perspectives

- Innovation networking – networking that explores alternative futures

- Transformative leadership – empowerment and navigation for radical innovation

- Tipping point incentives –incentives applied near thresholds to either prevent or assist change

These stimulants derived from literature review (Griffith et al, 2012) can also be used as indicators of whether transformability, or the capacity for intentional transformative action, is being built or maintained. For this report we have used these indicators (in section 8.3) and the capacities covered by the Framework (section 8.2) as a lens through which to view the Murray story.

4. Institutional landscape for NRM

The political, institutional and policy context in which the Murray Catchment Management Authority (MCMA) operates is complex and dynamic. To understand the extent of governance innovation outlined in the next section of this report (section 5), it is necessary to present a broad picture of the NRM arrangements operating at the commencement of this study. This picture contributes to the governance baseline from which change over the last three years can be gauged.

Governance of natural resource management (NRM) in Australia is polycentric and multi-level (Bellamy, 2007). It constantly reshapes itself and evolves as a result of periodic political intervention, and ongoing interaction between centres of decision making within and between levels in the system. Australia's constitutional responsibility for natural resources is vested with the States which have evolved their own particular institutional arrangements for dealing with that responsibility.

In Queensland and Western Australia the linkages between NRM bodies and government agencies are not statutory. In both the Northern Territory and Australian Capital Territory there is one regional body within a government agency which covers all of the territory. Tasmania has overarching legislation though exerts little formal control over the three NRM regions. There are strong legislative frameworks in place in the states of New South Wales (NSW), Victoria and South Australia which ensure direction over establishment and functioning of regional bodies. All three of these states have devolved some regulatory functions to their regional NRM bodies though these regulatory roles are different in each state.

There are also a plethora of informal relationships, influences and institutions which structure both the wider NRM context and regional NRM governance systems. Regional NRM bodies are by necessity closely tied to local communities at a number of institutional levels from farm and locality scale to regional scale. However, relationships with Landcare groups and local governments, for example, are inconsistent throughout NSW and Australia and variable in benefit, with historical factors and attitude to power-sharing playing a big role. Local government involvement in NRM seems to be case specific with some councils, particularly in urban and coastal areas, taking a strong role while others remain focussed on more traditional responsibilities.

4.1 NSW CMA Arrangements

The MCMA is situated in the state of NSW where regional bodies have morphed through several guises since the late 1980s as government policies and community interest, support and political pressures have changed. The Catchment Management Authority era from 2004 to 2012 retained the catchment as the key defining basis for a region, but functionally was built on a narrative provided by the Wentworth Group of Concerned Scientists (2003) around native vegetation management.

CMAs operate as authorities of the state under the *Catchment Management Act 2003,* through a skills based board under ministerial direction. The staff and general manager are employees of the state. The primary functions of a CMA are to engage regional communities and to improve the condition of the resource base including soils, water and biodiversity. The key regulatory role for CMAs is related to the *Native Vegetation Act 2003* though this is restricted to an assessment rather than compliance function. Despite the label of 'catchment management authorities' the State has not devolved environmental water management functions to these regional bodies.

The NSW Government provides core administrative funding to the CMAs. It also channels some of its NRM program funding through the CMA becomes as a service delivery agent. CMAs are also able to access other funds for NRM, notably those provided under Federal Government initiatives such as the *Caring for Our Country* program. A more detailed account of the history of NRM in NSW

(Griffith, 2009) discusses structural and functional issues inherent in the NRM system operating at that time.

The CMAs in NSW have a statutory link to the Natural Resources Commission (NRC) which is an independent body established in 2004 to advise the NSW government on the functioning of the NRM system. The NRC is a relatively unique organisation in Australia. Its independent positioning has enabled it to become an engine room for blue sky strategies related to NRM. It has developed the *Standard for Quality Natural Resource Management* (the Standard) which aims to promote quality in the NRM sector in NSW to encourage adaptive management to achieve improvements in resource condition.

As explained by the NRC (2005), the Standard is a set of seven inter-related components that define the characteristics of quality NRM practice. These characteristics are expressed as *Required Outcomes* that effective NRM managers are expected to meet. These *Required Outcomes* provide consistent reference points to help organisations and individuals evaluate and improve their decision making and management approaches, at all scales (from national to property scale) and through all phases of the adaptive management cycle (plan–implement–audit–respond). The Standard is a management standard rather than a technical Standard. This means that it sets criteria for quality practice, but does not define strict steps to be followed or specifications that must be adhered to.

In 2005, the NSW Government adopted the NRC's recommendations for an NRM goal and 13 state-wide targets. These targets provide focus, coordination and a means for tracking progress in natural resource management. They encompass biodiversity, water, land and community themes. The aim is that regional targets and regional strategic planning documents developed by the CMAs (Catchment Action Plans or CAPs) will guide a collective effort towards the state wide targets and goal.

Importantly, the goal embodies the notion of 'resilient and ecologically sustainable landscapes functioning effectively at all scales'. Initially this was pursued through the ideal of a strategic, knowledge driven and spatially explicit assets approach to NRM, which was also in favour in other jurisdictions. After questioning what was meant by the term 'resilient landscapes', considerable attention was paid to how resilience thinking could be applied in NRM and the implications of such a new frame. During this process, the NRC developed some draft guidelines and established two pilot processes for CAP upgrades in the Namoi and Central West regions. The basic principles of taking a landscape systems approach and ensuring whole of government/whole of community buy-in were subsequently enshrined in a set of assessment criteria for CAP upgrades (NRC, 2012b).

A key function of the NRC is to determine whether CAPs are likely to deliver on state wide NRM targets and whether CMAs are implementing and complying with the Standard (NRC, 2005). Auditing of CAPs is the primary mechanism for promoting adaptive management and continual improvement of performance, and in ascertaining compliance with the Standard. Through this mechanism, the NRC is both auditor and advocate for change.

4.2 Role of the Australian Government

Since the late 1980s the Australian Government has taken an increasingly prominent role in NRM. As an investor and institutional force in NRM, it has shifted from a relatively modest program of small grants and hence relationships with localised bodies, to a multi-billion dollar program in 1996 when the *Natural Heritage Trust* (NHT) was established from the sale of Telstra. In the early 2000s through NHT2 and the *National Action Plan for Salinity and Water Quality* (NAP), there was a further shift by recognising, a key NRM planning and delivery role for regional bodies, and a more strategic approach to investment. This involved bilateral agreements over joint investment with the States which strengthened the relationship between regional NRM bodies and the states.

A further shift occurred in 2007 with a change in government. The new *Caring for Our Country* (CFoC) program moved away from bilateralism to direct investment with a range of providers. In addition to regional NRM bodies, new agents such as non-government organisations and commercial providers entered the governance system. The program priorities are developed nationally and contracts are established with providers to deliver on outcomes against these priorities. This has left regional bodies with new challenges including: significantly less funding; regional plans and priorities that are not given any prominence; and, more complex relationships to build and nurture.

Following the release of the first CFoC business plan in 2008 total program funding from the NSW and Australian governments for MCMA declined by 70% from a 2007 base of approximately $40m. Many regional bodies including MCMA had to reassess their staffing structure and functional role as a result.

More recently the Commonwealth Government has sought to reinvigorate the planning capacity of regional NRM bodies to coordinate activities under climate change and carbon farming initiatives. The impact of this shift on the governance system is yet to emerge.

4.3   Continuing Change to NRM arrangements in NSW

The institutional arrangements for NSW CMAs are continuing to change. New NRM policy has just been announced by the NSW Government which has the potential to deeply change MCMA. With a relatively new conservative government after a long term Labour Government regime, there is a narrative shift away from what is perceived as a 'green' NRM agenda focussed on native vegetation protection, to a production focussed agenda. This policy shift has three major aspects:

- reducing the number of CMAs from 13 to 11, including merging Lower Murray Darling CMA with Murray CMA

- amalgamating CMAs, Livestock Health and Pest Authorities and agriculture advisory services from NSW Department of Primary Industries into new regional bodies called Local Land Service (which take effect in early 2014). The aim of the new organisation is to provide customer-focused, Government-funded, agriculture and natural resource management services, advice and information. The delivery areas will be: agricultural advice; plant and animal pest control and biosecurity; natural resource management; emergency and disaster assessment and response (DPI, 2012).

- proposed governance arrangements (Figure 4.1) will involve:

  – regionally-based, semi-autonomous, statutory organisations, which are governed by locally elected and skills-based Board members

  – an independent Reference Panel as an interim measure, to work with community and stakeholder groups to identify how the organisation will best deliver its services

  – one central Local Land Services Board of Chairs made up of representatives from each regional organisation and accountable to the Minister for Primary Industries

  – regional operational management plans that prioritise service delivery on a regional basis, reflecting regional priorities.

  – independent auditing to ensure accountability and delivery against priorities.

  – funding from direct budget contributions from the NSW Government, ratepayer funds and a continuation of natural resource grant funding via the State Government and Australian (DPI, 2012)
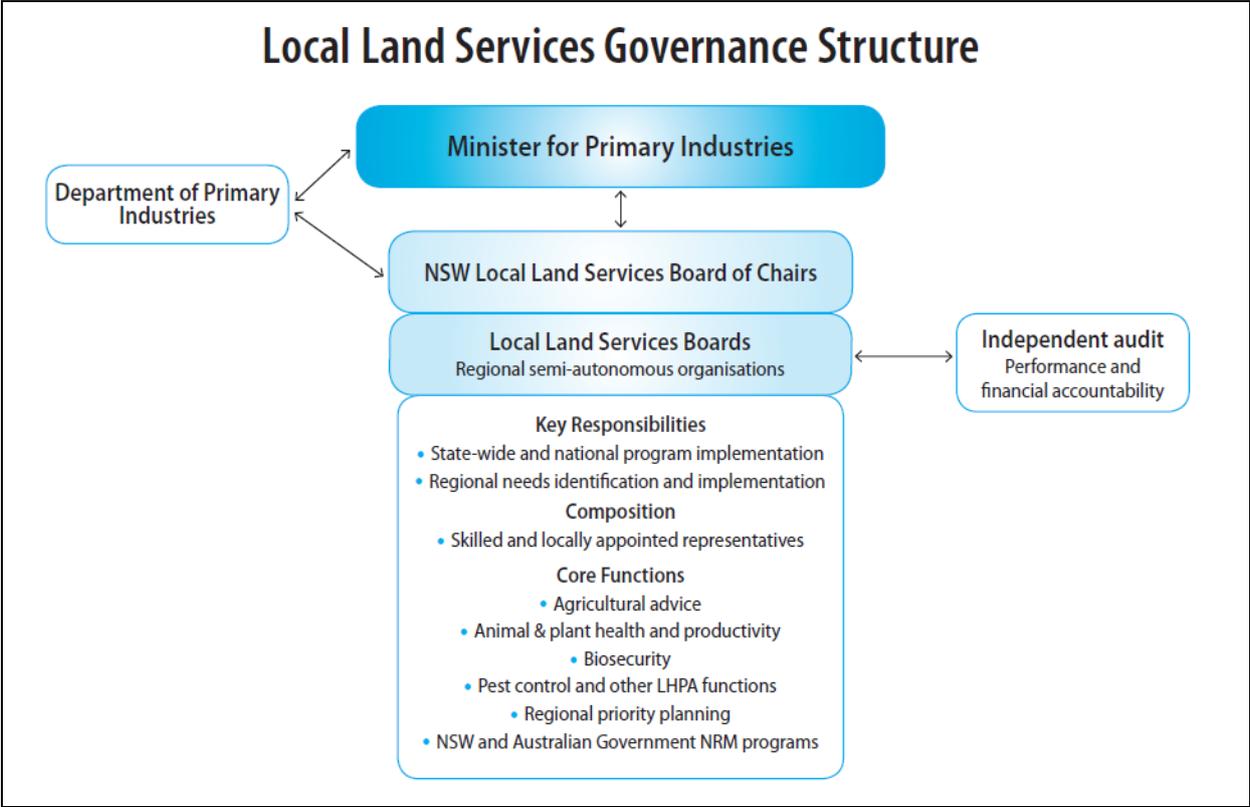
Figure 4.1: Governance arrangements for the new Local Land Services organisations in NSW, which are due to commence operation in January 2014. (Source: DPI, 2012)

5.   Governance innovation in the Murray Region

Governance can play a strong role in either enabling or inhibiting change, and in influencing the distribution of risks and benefits of any change. It includes how power and authority are distributed and shared, how decisions are made, and how people are involved in decision making. Governance is often the first factor identified by communities undertaking resilience assessments as a key social dynamic of social-ecological systems. Also resilience case studies have shown that if governance transforms, particularly to adaptive governance, other transformations may follow (Olsson et al, 2006).

A strong message from the previous section (section 4) is that the MCMA, as an example of a regional NRM body, sits in a complex wider system of governance, a system which is adjusting incrementally from day to day and which periodically undergoes more radical reform. The forces driving change are not all working in the same direction and sometimes seem paradoxical, resulting in hybrid governance outcomes and a non-linear development trajectory. In this dynamic environment and emerging from a governance failure, MCMA's challenge was to establish and maintain a functional and highly legitimate system of regional governance, in which it has only partial discretion, declining funds and has limitations placed on its flexibility and choice of instruments.

This section of the report presents the significant changes in governance arrangements at MCMA over the three year period of the study

5.1   A trigger point for change

Evaluation interviews conducted recently, and those from earlier in the study, consistently point to an audit conducted by the Natural Resource Commission (NRC) in 2008 as a key event in the history of the Murray CMA and a trigger point for change. The NRC regularly conducts audits of CMAs (section 4.1). All CMAs were audited in the second half of 2008 and through 2009.

The audit focused on four lines of inquiry:

- Is the CMA effectively prioritising its investments to promote resilient landscapes that support the values of its communities?

- Are the CMA's vegetation projects contributing to improved landscape function?

- Is the CMA actively engaging its communities?

- Is the CMA effectively using adaptive management?

In the 2008 MCMA Audit Report the NRC explained that:

> "For each line of inquiry, we assessed not only whether the CMA is doing the activity, but whether it is doing it effectively – that is, by applying the most relevant elements of the Standard and achieving the required outcomes of the Standard." (NRC, 2008)

The 2008 NRC Audit was an important trigger for change for two reasons. The first is that the question about promoting resilient landscapes took the MCMA by surprise, as it did other CMAs. Its inclusion would have major flow-on effects for NRM generally in NSW and specifically among the

leadership team at MCMA. The question not only raised the profile of resilience thinking but created the embryo of a new paradigm for NRM which through implementation in the Murray has been further developed.

The second reason the audit was important is that MCMA audit results were not favourable. The NRC pointed out deficiencies in shared vision, project risks and monitoring, community participation and engagement, adaptive management, documentation as well as in some minor areas. The list of suggested areas for improvement was relatively long compared to the better performing CMAs at that time.

> "….The 2008 Audit was fairly damning for us in a whole lot of ways but that created a springboard for us to work on those issues, and it was around that time that the new GM and Chair came on board…..."(MCMA staff member, June 2012)

5.1   Adaptive governance assessment

Adaptive governance is one of the foundational concepts brought to the MCMA by the research team. It is the conceptual glue which enables resilience thinking and collective learning to work in synergy.

A governance assessment was undertaken in 2009 with leaders within the MCMA and WSC to establish a governance baseline against seven principles of adaptive governance (Table 5.1). The first three principles (legitimacy, procedural fairness, accountability) provide the sound foundation for innovation without risk. The other four principles (interconnectedness, reflexivity, adaptability, transformability) provide foundation and flexibility for learning, self-organisation and innovation, in driving or responding to change. In addition to a baseline, the assessment process was also intended to act as a capacity building tool by providing: an introduction to adaptive governance as a relatively new term; a stimulus for learning about adaptive forms of governance; and, as a prompt and guide for ongoing governance improvement.

The assessment tool was structured to provide a rapid but not necessarily quantitative appraisal based on the non-prescriptive *NSW Standard for Quality NRM* (section 4.1) with which CMA leaders were already familiar. Each respondent was asked to allocate a score from 1 to 5 (5 being full achievement) to statements of desired outcomes for up to 4 indicators representing each of the seven governance principles. They were then asked to provide evidence to back up their score. There was an option to use a score of 6 if respondents felt the situation had gone beyond the desired outcome and there was innovation, however some interviewees chose to use a minus for emphasis.

The assessment tool used for the baseline had a number of limitations. Interviewees spent more time questioning the interviewers than providing scores and evidence for the assessment. In particular, respondents commented that the language and concepts in the assessment were predominantly new and unfamiliar. This led to many clarifications of meaning and discussions on particular principles and some interviewees taking their assessment away to complete later. The study intention was to repeat an appraisal process every 12 months to see if a shift in individual scores from the baseline score had taken place.

Although the interview scores are not comparable between leaders, or across scales, and responses were mostly from an organisational perspective, a picture of NRM governance in the Murray catchment emerged and is summarised in Table 5.1.

The assessment results confirmed the picture presented by the NRC's Audit Report in 2008. They also highlighted that MCMA one year on from the audit had begun a journey of change.

Table 5.1: A qualitative baseline assessment of governance November 2009, against seven principles of adaptive governance, (modified from Griffith et al 2009)

Governance principle	Assessment results
	(Interviewees: MCMA: the Chair, General Manager, two senior managers. WSC: the Mayor, General Manager, Community Development Officer.
Legitimacy – the conferred or earned authority and necessary diligence and integrity to make decisions on behalf of others	Conferred legitimacy - high for both WSC and MCMA. Through their legislative connections to Government and their status as holders and distributors of State and Commonwealth funding. Earned legitimacy, based on public trust - not been high for some time for both organisations. Trust declined further for both as the result of: (i) relatively major misjudgements related to infrastructure provision (WSC) and program administration (MCMA) and (ii) decision making and program delivery held within the organisations at the expense of community decision making bodies and groups. New leadership teams recently appointed. They had addressed project and financial management issues and were keen to address trust issues. The MCMA Board had restructured around portfolios and was determined to improve its audit performance, was on a pathway to a more strategic approach while the WSC remained ad hoc and reactive despite efforts of the new GM.
Procedural fairness - an ethical basis for the way decisions are made and how communities and stakeholders are involved and treated	Both organisations rated their transparency and ethics in the mid to high range but admitted relationships with communities and engagement in decision making were poor and required a lot of attention. MCMA thought their decision making processes and attention to achieving fair outcomes was in the range 3-4. However, one respondent's reference to 'healthy conflict' revealed the nature of some relationships.
Accountability - the answerability to those on whose behalf decisions are made	Both organisations rated this around the 4 mark with the CMA citing upward, sideways and downward examples Both groups indicated mandated formal reporting processes served little purpose for learning at their scale and there was little evidence that it was used for learning at other scales. The MCMA had tried to modify formal reporting to government funders to make it more useful for regional decision making but had not been able to convince funding bodies to change their systems.
Inter-connectedness – the linkages, networking and knowledge exchange that enables cross-scale and within scale coordination of effort to occur and both ecological and social feedback loops to operate	The indicators of connectivity, including linkages, co-management, networks, feedback loops, institutional overlap and collaboration within and across scales, were not given any scores greater than 3 with some being rated 0. Comments suggested that WSC were somewhat insular while MCMA the comment 'we are getting better' was made by a number of respondents. MCMA had improvement in 'looking out' rather than 'in' and much more aware of scale than previously.
Reflexivity – the awareness, deep reflection and recursive responsiveness to changing conditions that enables learning, new knowledge and feedback signals to be incorporated into planning and action	Pre 2007 under old leadership – not much deep thinking or reflection – new Board is trying. MER on biophysical, not social – no evaluation Experimenting is research - we haven't got time. Experimental approach is lacking – engaged David Lindenmeyer from ANU to help test assumptions in biodiversity Not good at the social but now recognise linkages and we are trying with Target 12 where others haven't bothered Starting to see things less linearly

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Adaptability	Scores were generally low for most indicators but performance is improving
– the necessary social capital, system knowledge and flexibility to manage resilience	Comments suggest MCMA was previously quite rigid under previous management. Still set up in silos but now sees overlaps. Trying for multiple outcomes but constrained by funder's narrow requirements and inflexibility. Have set up an integrating committee.
	Efficiency rather than resilience still the dominant organising principle. Investors want efficiency and it is set in contracts limiting adoption of a wider system perspective.
	Not good at fostering or mobilising social capital or feedback. Systems for being adaptive not well developed. Low trust.
Transformability	Just starting to regroup and explore change
	Knowledge of and connection to innovation networks are poor
- the potential to navigate a shift to a whole new system of natural resource use and management when the existing system becomes untenable	The organisation tends to use its own knowledge and not link different types of knowledge
	Still overcoming past leadership but new leadership holds much promise for innovation after basic management systems and policies are in place
	The focus has been on bedding down regional delivery model rather than next generation – taking tiny steps
	"We know we will need to change"

5.2   An early attempt at 'localism' as a governing principle (Wakool pilot)

During the baseline assessment of governance and in particular discussions on legitimacy with the General Manager (GM) MCMA, the concept of 'subsidiarity' was raised. This refers to devolution of authority and responsibility to the lowest level of decision making capable of doing the job efficiently. As the study progressed the idea was fleshed out and put into action by CMA leadership. It became one of the central governing principles driving change in the Murray region and the new culture emerging in the CMA.

The first attempt at localism involved exploring the potential of a more strategic relationship with local government. The Transformation study provided the incentive and opportunity for a pilot trial to jointly engage the communities of Wakool Shire as an initial part of a planned review of the MCMA's Catchment Action Plan (CAP). As the pilot got underway there was a shift in emphasis from the WSC assisting the MCMA with its CAP, to the MCMA supporting the Council to develop its Community Strategic Plan (CSP). This was on the basis that with 14 local government shires in the catchment needing to prepare a CSP, MCMA foresaw it could combine with the respective Councils' community engagement processes to explore priorities for NRM and requirements for change.

The pilot with Wakool Shire was not successful in generating community processes and information which would assist MCMA with its CAP process. A description of this pilot has been provided in previous reports in this series (Griffith et al 2010; 2011 and Mitchell et al 2012 resubmitted) and therefore is not repeated in this report. There is however an evaluation of the pilot based on exit interviews which are in Appendix 1 of this report.

Despite the outcomes of the Wakool pilot, interviews have revealed (in hindsight) that both Board and staff of MCMA gained from the experience. Lessons generated by the pilot were applied to the leadership's growing focus on localism and its place in NRM. Some of the gains expressed by those in the CMA that participated in the Wakool pilot include:

- a better understandings of both the mechanics, roles and responsibilities of local government and the social-ecological dynamics of that part of the catchment

- raised awareness of social networks, social tipping points and their importance in influencing change

- strong reinforcement on the importance of organisational culture and spreading the understanding of new ideas, and leadership to avoid situations where a champion leaves and is no longer able to lead change

- an appreciation of the role 'identity' plays in willingness to change and in motivation to engage and participate in NRM

- clear messages on the value of relationship building, knowledge sharing and trust building to prepare communities for engagement and change.

These lessons from the successes and failures of early experiments with the Wakool community have been taken forward by the CMA to improve design and implementation of later pilots.

5.3   Rethinking the 'business as usual' model using localism

By mid-way through the study a number of key factors had (in combination) led MCMA to firstly challenge its roles, responsibilities and business model and then to rethink its position in the governance system of the region. These factors include:

– The 2008 NRC Audit Report

– Significant reduction in funding

– Exposure to new and challenging ways to think about NRM and intractable NRM issues

A meeting was held in March 2011 between MCMA and research leader Rod Griffith to refocus the case study. At the forefront of discussions was the need to shift the emphasis back to processes for the new CAP (CAP2) as a 'vehicle' for change in the Murray region as a whole. As part of a deliberate strategy of seeding and reinforcing of ideas, such as those raised in the adaptive governance assessment, this exercise required revisiting the initial propositions first introduced to the CMA in May 2009 and which formed the business case for MCMA's involvement in the Transformation study.

The areas of the package raised again and reinforced in relation to a way forward for the CAP2 process were:

- That from a CMA perspective NRM is perhaps more about 'managing' people and the co-evolution process than the direct management of the natural resources of the region as a technical project

- This leads to the conclusion that if improvement to resource condition (through achieving targets) is to be successful then the CMA needs to see itself as a change agent, see the CAP as a non-linear change strategy and develop some social change capability

- From adaptive governance theory adopting a role as a bridging organisation rather than operating purely as a doing or delivery organisation has merit

- Organisational culture and governance structures influence function – to perform as a bridging organisation and undertake a radically different type of CAP based on resilience/adaptive management and planning by doing, organisational structure would need to be addressed – if it is not then current structures will drive function for business as usual.

- The structure would also need to be sensitive to the integration of knowledge that is required by resilience thinking and collective learning. (Figure 5.1)

Perspectives on landscapes

Collective Learning is here

Holistic (More than the sum of parts)

Holono-centric

Landscape as a messy contested space – ethical, critical and collective systemic processes required to seek out emergent action

Eco-centric

Resilience is mainly here

Landscape as **knowable** systems –change has complex consequences in space & time – models to approximate and simplify reality -- change to improve system function

multiple realities

NRM is mainly here

Ego-centric

Landscape as different things to individuals values emotions, feelings etc – hence keep what I value - different assets for different reasons

Objective – one reality

Techno-centric

Landscape as **knowable** components eg units, water, soils, biodiversity, communities, infrastructure etc- fix it if it is broken

Reductionist (Whole can be understood through parts)

Figure 5.1: A slide provided to the MCMA GM by the research team on the knowledge implications of being a bridging organisation (Adapted from Bawden, 1994)

This meeting appears to be a pivotal event in the story of change. The GM advised by email a few days later that the Board seemed comfortable with such a direction and approach to the CAP and were prepared to take a leadership role as a change agent.

"The Board seems entirely comfortable with:

- seeing and believing itself as a change agent with a broad mandate provided by the CMA Act - and not inconsequential resources ($100m plus over ten years)

- seeing its main role as being a bridging organisation (that acts mainly as a delivery partner with the community)

- the Board itself being the target audience of the CAP

- the main purpose of Murray CAP being a change management plan building resilient landscapes and communities

- identifying needs and opportunities as the initial basis for developing interventions and subsequently targets (not the reverse - i.e. targets first)   (GM MCMA, March 2011)

This position was developed at one of the Board's strategic sessions rather than as a formal Board resolution. It was followed by a year of capacity building and a very steep learning curve for staff, as the leadership group began building a different business model, based on a new relationship with its communities and devolving responsibility to facilitate change.

Under this new business model two additional pilots trialling localism were set up. One pilot established networking and partnership agreements with local Landcare and producer groups in the region (section 5.3.1) while the second pilot devolved responsibility for preparation of CAP2 (section 5.3.2). The results of the capacity building with staff and its transformative effect on the organisational culture of the CMA are discussed below (section 5.4) and taken up again in Section 7 on collective learning.

5.3.1 Re-inclusion of local Landcare and producer groups in decision making

The MCMA GM describes below the rationale for what has become known in the discourse of the CMA as 'localism'. Others interviewed from the CMA also related a similar story.

> "....I guess there was a penny drop for me and the Board outside of this project when the Basin Plan kicked off and there was the beginnings of a large volume of environmental water that was to be managed. And we felt that, as a regional body, we were in the best position to manage that. But the central agencies – at both state and commonwealth level – have asserted – and continue to assert very strongly – that they're best placed to manage that water. And so the Board understood the frustration that comes when capable local actors are denied the opportunity to participate fully in NRM decisions. And the analogy there, was that the Board more fully appreciated that there were other local actors that were similarly frustrated, that were highly capable, they had really good governance arrangements in place, and yet the Authority wasn't devolving resources or decision making or accountability to those groups..........." (GM MCMA, June 2012).

Drawing on the lessons from the Wakool Shire pilot the CMA sought improved ways to bring local government, Landcare and producer groups into the NRM decision making system and acknowledge their legitimacy and capability to make decisions. The approach chosen was one of devolution of funding and responsibility, as described by the CMA Chair in interview:

> " so there's been a whole lot of structural change within the organisation about how we do our daily business how we make decisions, how the governance works, what our accountability frameworks are etc., but in relation to community we also have now moved into this new realm where we are actually devolving some decisions out". (Chair MCMA, June 2012)

The Authority's explicit approach to all their potential partners was to explain that:

> "…the CMA had reviewed its business model, how we engage with the catchment community, and how we were there now to support local actors to build capacity where it was absent, and in effect, we were trying to make ourselves redundant in the longer term". (GM MCMA, June 2012)

The GM defines partnerships as involving "*a transfer of power from the organisation with most power to one with less power*". So in this case, MCMA had financial power, whereas the Landcare and producer groups had good connections with landholders in the community. An important element of the partnership arrangement was to encourage and allow space for the Landcare and producer groups to interact with each other directly. In practice, this was not easy to achieve. Historically, the relationships between MCMA and the Landcare groups in particular had deteriorated, especially after governments changed from providing funds directly to Landcare groups to funding CMAs under the regional delivery model. Therefore the first part of the relationship was to build trust and respect before moving to more formal arrangements.

Establishing trust and formal partnerships came about through negotiations to create four part-time coordinator positions across the catchment, instead of one full time position based in the eastern part of the catchment. Holbrook Landcare Group was seeking government funding to appoint a regional Landcare coordinator, which under the new model MCMA supported instead of competing for the funds. When the bid was successful MCMA matched the funds so that total funding was equivalent to

two full time positions. Through negotiations it was agreed that part time positions with four different organisations across the catchment would contribute to wider capacity building and social capital development, particularly in areas with declining or no active groups.

Holbrook Landcare has created a part time position in its area and one with Corowa Landcare Group. The latter group was on the verge of folding, having declined from some 100 plus members to around 30, but had a good governance structure with a functioning board and strategic plan in place, were well-connected with their community, and had a history of delivering. MCMA introduced Holbrook Landcare to Western Murray Land Improvement Group which had none of this, had a membership base of 15, and was being built from scratch. The focus therefore was on building capacity – human and social capital, and to build the governance up to the standard of the others, particularly as no Landcare group existed in the west of the catchment. MCMA has also contributed to this Group through its governance toolkit, enabling them to acquire basic skills such as how to run meetings, take minutes and record actions. The fourth group is the Ricegrowers' Association of Australia (RGA) which represents the majority of irrigators. RGA has good governance and an Environmental Champions Program which had been winding down because of funding shortfalls and because of stress on members due to the drought and significantly reduced water allocations.

From the outset, it had been made clear that this network of organisations would be responsible to appoint their staff. This arrangement meant that organisations could recruit directly from the community, i.e. people who had existing connections with the community. Had the CMA been responsible for these appointments, they would have been bound by processes for public sector positions, which would have favoured young graduates over existing locals. The CMA's partnership negotiations for these staff appointments have focused on outcomes rather than outputs.

Devolution of funding to partner organisations is a direct result of MCMA no longer having a large budget to do on-ground work itself after a 70% funding cut. The new model achieves on-ground works through working together with partners on the ground. In doing this, MCMA has devolved 7% of its funds through these partnerships, with an aim to increase this to 10%. In addition to funds for the coordinator positions, MCMA provides funding for projects identified by the partners, particularly for capacity building. Overall, the partnerships initiated by MCMA have facilitated several organisations to have access to a part-time coordinator, which otherwise would not have been the case, and which collectively provide a much greater spatial coverage of the catchment than under previous arrangements.

5.3.2 Devolving planning responsibility for CAP2 to a community committee

The Board of MCMA in October 2011 agreed to introduce a new and apparently unique structure into its system of governance. It established a community committee to take responsibility for the upgrade of the Authority's catchment plan (CAP2). This committee is not an advisory committee. Instead it has been delegated the responsibility to take charge of the CAP2 process and the development of the CAP as a document, on behalf of the MCMA Board. To minimise the substantial risks associated with this devolution of power, budget and responsibility, the Board ensured that:

- clear terms of reference were established to which the Committee is accountable

- the process is treated as strategic adaptive management, with a full project plan and inbuilt evaluations and adaptive review

- three of the Committee members are Board members. (Chair MCMA, June 2012)

The CAP2 committee (C2C) has a membership of 14 community members and an independent Chair. It has an external Chair which the Board considered was critical in gaining community support. The

Board itself selected the C2C members based on a set of criteria. They chose people who had a community track record, and in particular:

- are well connected, respected and trusted

- know their business

- have particular strengths

- provide as far as possible a geographic spread.

The C2C has been provided with media and resilience training and a substantial budget. It is also supported by a group of key staff led by a senior manager as project director. These staff members work directly under the instruction of the C2C, and by direction of the GM, understand their priority is supporting the C2C.

Some staff were initially sceptical about such a risky governance structure, as were one or two Board members. The main concerns were that the Committee couldn't handle the job and that it would take too long to educate members before they could perform effectively. However, at the time of writing this report, the C2C appears to be a very effective mechanism and a major success story. As both staff and C2C members related in interview "this is genuine engagement of the community – not a whitewash – it's an honest consultation process". Some managers within the staff were surprised at how well the C2C operated and at the breadth of issues and information generated from the community workshops due to the C2C's involvement.

> "Actually they are very focussed and respectful..... I am impressed with how quickly they came up to speed". (MCMA staff member, June 2012)

> "………. if we had been doing the ringing around, there is no way we would have that range of people turning up, and participating in the way they did. They wouldn't have turned up for starters, let alone participate in the way they did. So having the C2C members doing the ring around and having it in people's home or in a more intimate venue setting in their local area, we were able (a) to get people engaged who hadn't been before and (b) people actively involved in providing information – not only on what they've noticed changing in their local area but also what they want their area to look like in the future. We can see that this is a really powerful process to obtain information that we wouldn't otherwise have got". (MCMA staff member, June 2012)

C2C members were also a bit wary about the arrangements and were critical of early interactions between the staff and the Committee and original proposals on engaging the wider community. However the two C2C members interviewed and the Chair reported a similar story of turn-around in perception as the process unfolded and the C2C and staff worked together:

> "..the engagement plan started off as a public advertising campaign…first design we saw of a workshop was pretty bad…..the survey misfired heaps…..they took all that information from us and came back with a pretty good product….. the MCMA has made a huge attempt to get it right……final product (workshop) is a 7 or 8 out of 10….it really restored my faith ..thought it couldn't be turned around" (C2C member, June 2012)

5.3.3 Localism and Indigenous communities

Through the interviews, several staff and Board members have acknowledged that the localism strategy, illustrated by the pilots described above, are missing an Indigenous aspect. None of the three localism pilots have progressed engagement of Indigenous people in the region. Interviewees foreshadowed the need for more innovation and the development of another governance structure to improve Indigenous engagement.

5.4 A culture shift to support the new business model

The new business model and supporting structures, put in place through the pilots (section 5.3), are based on some new thinking on governance, a new relationship with regional communities and on a foundational principle of devolution. Led by the Board and GM, there is a program of intentional and purposeful change to the organisational structure and culture towards embedding more adaptive forms of governance referred to as 'strategic adaptive management'.

> "It was the views of myself and the Board that we needed to change the culture" (GM MCMA June 2012)

> "We couldn't take a resilience approach to the CAP upgrade with the organisation we had.......
> it had to change ...... we decided to build our own expertise for looking at the social aspects (MCMA staff member, Nov 2011)

MCMA's strategic adaptive management has a number of distinct aspects to it including; changes in: the relationship with regional communities, the effectiveness of the Board, organisational culture and the formal staffing structure.

A change to relationships with regional communities would not have been possible if the entrenched practices and organisational culture had remained unchanged from the time of the NRC audit, and in some aspects even up to the Board's pivotal decision in March 2011. The following example illustrates earlier community relationships. The Board in 2010 had made it clear it wanted greater community involvement in decision making and had decided to identify regional biodiversity assets through community consultation processes. At a biodiversity strategy meeting, the majority of staff attending the meeting expressed dismay at the inefficiency and risks around such a process.

> "We already know what the biodiversity assets are .... why waste all this time, money and effort on public meetings ... just give us the map and we could put all the assets on it in a couple of hours" (MCMA staff member, 2010)

As detailed in section 5.3 there has been a significant shift in MCMA's relationship with the communities in its region, which underpins implementation of the new business model and complements the community Landcare/producer network and the C2C arrangements.

A change in Board effectiveness is evident through:

– the evolution from paper driven Board meetings to thematic policy areas and portfolios championed by Board members

– the "blurring of the lines of the Board and operations" through Board members working with staff on portfolio areas

– a halving of the number of formal Board meetings in favour of strategic discussions with senior staff on alternate months, which allows both staff and the Board to stop and take time to reflect and explore the pros and cons of potential innovations and new directions, essentially to "to elevate thinking".

It is evident from the organisational chart for MCMA that the staff structure now reflects the intention for greater engagement with communities and relationship building, including attention to local government. The emphasis on a much strengthened community section including a social scientist as opposed to emphasis on program delivery in the previous structure is also evident. However themes seem to remain prominent and lines of responsibility do not appear much different. This visual impression is at odds with the descriptions and assessment by staff that there has been substantial and

positive structural and functional change. Perhaps the formal position labels do not adequately describe the actual functioning of the organisation and those positions.

From an organisational culture perspective the change is profound. A shift in organisational structure and culture is evident by comparing MCMA in mid 2012 with the organisation in mid 2009, prior to the study. This comparison (Table 5.2) has been compiled by drawing on interviews with the Chair and GM, some Board members and staff, and two members of the C2C committee, in conjunction with an analysis of key documents produced by the organisation and NRC. The interview transcripts, reinforced by our own reflection notes from meetings of various groups working on CAP2, reveal a remarkably rapid transition which appears to be both deeply systemic and enduring.

Table 5.2: A comparison of MCMA's organisational culture in mid 2012 with 2009, prior to the study.

New Organisation	Old Organisation
Connecting the community in the landscape Bridging organisation Helping people function sustainably in the landscape	Poor connection with community
Had to reframe – less money, less staff More accountable and transparent now with less money Lots of documentation now - clear processes and management system for projects - fully documented Three probity plan documents covering how money is distributed through incentives program Structured for relationships and bridging	Structured for themes and a higher level of funding and staff Just delivering projects Emphasis on money out the door Inadequate financial controls
GM and Chair work well together GM leadership backed by the Board Board portfolios Blurring of boundaries between Board and staff (operations), has empowered the staff, provides opportunity for Board to bring staff along, greater trust Being more creative. Board's role is to disseminate funds to build capacity Confident can take more risks with the management processes that are now in place Strategic meeting every month - supports elevated thinking	Distrust between staff and Board It was "us and them" Board just dealing with papers
CMA maturing due to NRC audit process – "used to hate it now it's the most important thing we do" Ensuring everyone has capacity to come along the way Have lessons learnt processes	Adaptive management was not part of the culture, no transparent repeatable processes to identifying priorities
Now an openness to new things, learning, creativity, willingness to take risks Healthy-work-life-balance A culture of empowerment – devolving responsibility – budgets now responsibilities of coordinators 360 degree reviews People invited to speak up and feel worthwhile Staff recruitment for the culture – selection emphasis on team skills and forming relationships Culture of adaptive management, devolution, risk management, community participation	Individualism and competition amongst the staff Controlling management Recruitment for technical expertise and project management Feel like we are running flat out downhill --want to stop but can't
Systems thinking Having people in it	Purely biophysical focus Linear thinking, themes based
On a journey of continuous improvement	

6.   Catchment planning through a social-ecological systems approach

Core concepts brought to this case study by the researchers include a social-ecological systems (SES) approach and resilience (section 3.2). The proposition was that such thinking would assist the CMA, and the communities which it supports, to better understand and tackle some of the persistent or intractable NRM problems facing the region. Ongoing efforts by the NRC, to operationalise the NSW NRM goal of *resilient and ecologically sustainable landscapes functioning effectively at all scales,* has been important in raising the profile of resilience thinking, as emphasised in section 4.1.

This section of the report outlines the significant changes between the catchment action planning (CAP) approach by MCMA with its first CAP in 2006 and the current CAP upgrade (CAP2). It is evident that the CMA and catchment communities are currently embedded in a planning process which is more participatory, systems based and adaptive. Central to this approach is a focus on identifying and understanding the dynamics of complex social-ecological systems in the region and the adoption of a learning approach which takes staff, the Board and the region's communities on a longer-term journey which may span a number of CAP cycles.

6.1   Drivers for change from previous CAP model

The 2006 CAP is a typical example of a thematic, target driven plan used by most regional NRM bodies in Australia at that time. The plan (MCMA, 2012) presented a set of bland messages, including:

– that natural resources are important to economic and social well-being in the Murray catchment

– the resource base has been degraded and degradation is continuing

– we can improve the resource condition if we have enough funding, greater community engagement and work together

– improvement will require education, and landholders to change land and water management practices

As an NRM Plan it is not a notably poor example. However, nor is it outstanding or innovative in its structure, content or the processes used to develop it. There is some rhetoric of adaptive management but little evidence of how it will be applied, other than applying the Standard, developing better monitoring, evaluation and reporting, and reviewing the Plan mid-term. The logic from actions to asset condition improvement is not well developed or spatially explicit. The CAP was assessed by the NRC in late 2006 and recommended for adoption by the Government subject to a list of matters to be addressed within two and half years. By legislation CAPs must be reviewed every 5 years.

The process and content for the CAP2 development are radically different to its predecessor. The key drivers for change in approach include:

- Action through Land and Water Management Plans which was mandated under a COAG agreement and accounted for 60% of program funding in the 2006 plan is no longer relevant having wound up prior to 2010.

- A desire by MCMA to differentiate its planning process from the one used to develop the Murray-Darling Basin (MDB) Plan

- A desire to give effect to localism (section 5.3) influenced by papers and draft models developed by the MCMA GM and Regional Development Australia Murray, on structural adjustment options to support communities as they transition to a post MDB Plan world

- Exposure to resilience thinking, adaptive governance and collective learning and to new approaches to learning-based planning through involvement in the Wakool pilot and interaction with researchers in this study

- Significant reductions in funding since 2006 which have changed the capacity of the MCMA to directly influence change

- The release of a set of assessment criteria in mid 2011 which the NRC intended to use to assess upgraded CAPs for recommendation to the Government.
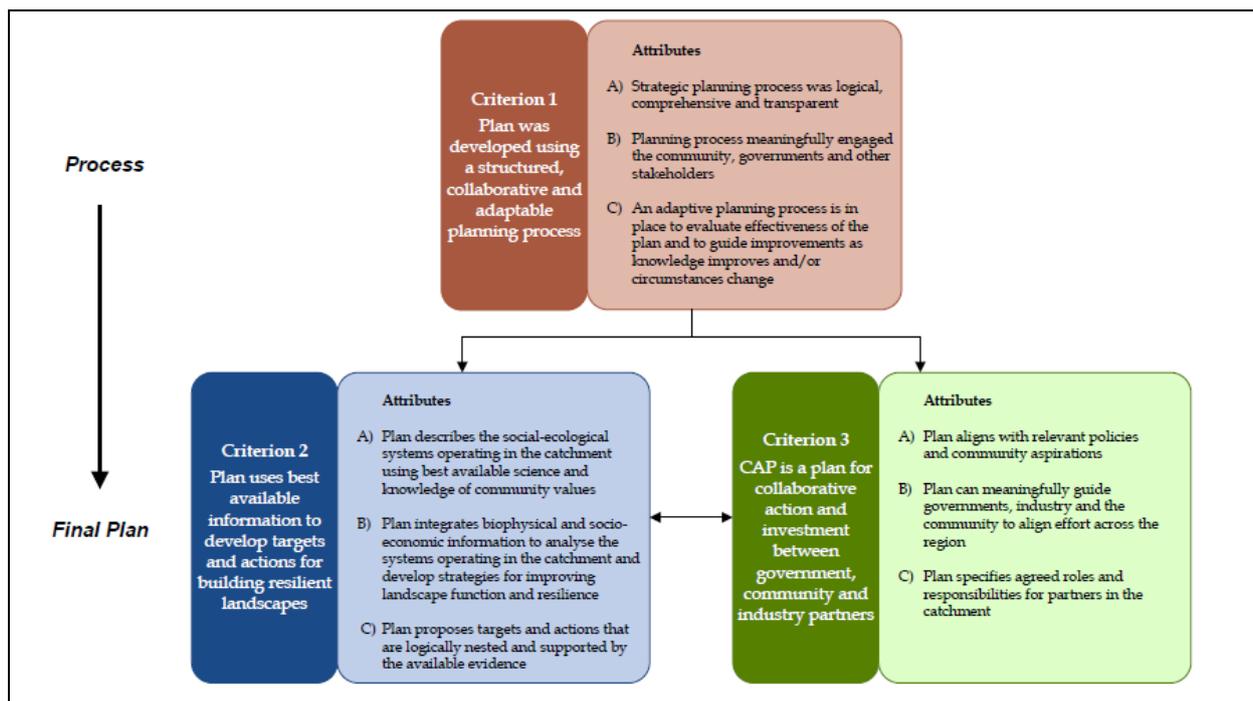
Figure 6.1: Criteria to assess whether the CAP is a quality, strategic natural resource management plan (Source: NRC, 2012b)

As outlined above, the NRC requirements for upgrading CAPs (Figure 6.1) provided a window of opportunity for MCMA to align the core concepts brought by this study and the practical requirements of the CAP upgrade into a focused planning process. Central to both the NRC framework and the study's core concepts was re-conceptualising the relationship between people and their environment as co-evolving social-ecological systems (SES). The SES concept sits at the heart of many innovative

approaches to better manage natural resources around the world (Berkes et al, 2003; Walker et al, 2006).

This re-conceptualising of regional landscapes, as social and biophysical landscape units with a consistent identity that is more internally similar than to adjacent areas, provides a powerful lens for all aspects of natural resource management. Defining SES paves the way for innovative approaches to planning and strategy development, intervention design, adaptation and governance that better reflect the intimate and dynamic nature of the relationship between people and natural resources.

The inclusion of a specific requirement to describe the SES operating within a catchment within the NRC guidelines was the catalyst for the MCMA to approach the research team to explore options for meeting the criteria. The research team supplied both theoretical and practical considerations and suggested tools that could be deployed to meet these criteria of the NRC framework. Importantly the research team also demonstrated how once defined, SESs effectively become the planning unit to further drive other aspects of the planning process including the analysis and engagement.

6.2   Tools and heuristics for a social-ecological systems approach

A central proposition of this study is that intentional transformation has a greater chance of success if supported by the Transformability Framework developed in this study (section 3.4.4). The conceptual framework is based on the concepts resilience thinking, social learning and adaptive governance to guide planning and implementation of transformative action. It includes five key stimulants, providing the ability to assess, benchmark and evaluate progress towards transformative action. In practice, implementing this framework requires key actors to have a range of capacities, tools and supporting processes which can be deployed during the various phases of the transformation process.

In the Murray CMA case study, we developed a 'capacity building package' of heuristics and tools to support the implementation of the Framework. The heuristics and tools are tangible 'mechanisms' for learning by doing, developed from the literature and the researchers experience in previous processes. In some cases they were developed specifically to meet the needs of MCMA staff. The majority of them are drawn from resilience thinking, although deliberate efforts were made to ensure that they were consistent (and in many cases overlapped) with social learning and adaptive governance theory and practices.

The tools and heuristics were intended to provide the opportunity for MCMA to simultaneously build their knowledge of the key concepts and to support the processes they were undertaking during the CAP2 process. As such, they range from simple diagrams to support exploratory discussions around the central concepts through to detailed processes and engagement activities that could be deployed by MCMA staff during the CAP planning process.

In practice the tools and heuristics were introduced to MCMA staff during face to face meetings and workshops, where they were frequently used to support discussions around the key concepts and the development of the CAP planning process. These interactions were often followed up by email exchanges or phone calls to clarify any issues or recap on key points. In a number of cases MCMA staff extracted bits of tools or processes and embedded them in other processes they had developed internally, modifying the tools to suit their context.

6.2.1 Tools and heuristics used with MCMA

A summary of the tools and heuristics (the 'tools') that have, to various extents, been used with MCMA is provided in Table 6.2. These tools have also been developed and tested by research team member Paul Ryan through allied work with other regional organisations. A total of 21 different tools are listed in the table along with a short description of each tool and a brief summary of how they have been used in MCMA and other organisations.

The tools presented in this section have been drawn from a range of sources including the literature with some being developed by the study team where gaps were identified. One example is a rapid project appraisal tool developed for community groups which had put forward innovative projects as part of the Wakool CSP process. The purpose of the tool was to learn about the likely intended and unintended consequences on the SES from the innovative projects.

Most tools have been used to support a planning process that aims to develop resilience or systems based regional plans, though their role in transformative planning has not been fully explored. They support a range of activities within a planning process, from exploratory discussion around the central concepts, to capacity building and skills transfer and engagement activities under taken by the study partners with their stakeholders.

Development and testing of the tools in the Murray case study confirms the value of simple ideas to support adult learning (Newell, 2012).

Table 6.1 Tools and heuristics to support a social-ecological approach to catchment planning

Tool	Short description	How has the tool been used in MCMA or other settings.
1. Clouds diagram (see Figure 6.1)	Stylised diagram of planning process.	The diagram has been used regularly to support discussions with CMA staff and the CAP2 committee. Has been used with 12 other NRM regions to inform discussions around resilience based planning.
2. Interview process	Interview questions and guidance material used to collect information to inform defining social-ecological systems, identifying values and system dynamics, interventions, historical timeline and social network analysis	Because of resource constraints MCMA was unable to undertake interviews however MCMA incorporated some key interview questions into a mail out survey, used some questions to collect information from the CAP2 and informed the development of the process for public meetings run by the MCMA.
3. Small group interview process (short and long session versions)	As above.	Used to inform development of the format for public meetings
4. Social network analysis	Provides information on key individuals and organisations and the relationships between those	Used initially to map CMA staff contact networks with landholders. Also used to limited extent by some other CMA's, particularly for understanding institutional context.
5. SES tools (3L's)	Includes Social-ecological diagrams, example maps, fuzzy boundaries, Brunckhorst approach/publications and the 3L's concept – Landscapes (biophysical), Livelihoods (economic) and Lifestyle (social) categories to describe and elicit information from stakeholders about their system.	Used with CAP2 Committee to supporting process to define social-ecological systems. Also used to inform development of process for public meetings. These tools have been used extensively by some other CMA's to define social-ecological systems, engage stakeholders, organise inputs, strategy development and implementation planning.
6. Historical timeline	Workshop process to collect and organise historical information that is used to explore previous system dynamics, the legacy of those historical and potential future dynamics	Used by MCMA in community consultation meetings to draw out key events and past shocks that have affected the region and SESs...

| Tool	Short description	How has the tool been used in MCMA or other settings.
7. Conceptual models of change	Various diagrammatic and simple models that capture the key dynamics of change of a component of a system. Includes, graphs, descriptions	Use of conceptual models is central to the resilience analysis MCMA undertaken, they have used conceptual models to explore the critical dynamics of key issues raised by the community, to record assumptions, identify evidence gaps etc. The concept and approach is building capacity of key staff around both the resilience analysis process and specific content. Outputs from this process will form the 'engine' for the adaptive management process.
8. State and Transition Models	Subset of 7. above. Used extensively by some regions in NSW, Vic, WA, SA.	As above.
9. Basins of attraction /reef alternate states diagram	Heuristic diagram	Used as part of presentations to staff and the CAP Committee to convey the concepts around alternate states, a foundational concept in resilience thinking.
10. The 3X3 matrix	Diagram for organising and communicating information about scale, thresholds and relationships between them.	Used as part of presentations to staff and the CAP Committee to convey the concepts around scale, integration and the relationship between thresholds.
11. General resilience assessment	Process for assessing general resilience (the capacity to cope with unknown or unanticipated events)	Not used directly to date, however concepts of general resilience (based on the assessment process) have been presented to the CAP2Committee and staff.
12. Certainty/control diagram	Heuristic diagram. Simple 2 axis diagram with control on one axis and certainty on the other.	Used with staff during early planning phase.
13. 'Ice cream' diagram (See Figure 6.1)	Heuristic diagram – conveying system limits future trajectories and options	Used with staff during early planning phase, the diagram was intended as a capacity building tool. It was subsequently adapted by staff and used during the community engagement activities.
14. Adaptive cycle (See Figure 6.1)	Concept and diagram relating to cycles of change, systems and organisational dynamics. Can be used with Historical Timelines	Used during discussion sessions with staff. Will be used during implementation planning once the CAP has been developed. Also has relevance for analysing historical timelines.

Tool	Short description	How has the tool been used in MCMA or other settings.
15. Rapid project appraisal	Series of questions to prompt considerations of the effectiveness and potential systemic consequences of proposed interventions	Will be used during development and testing of strategic actions and projects.
16. Adaptive governance assessment	A set of desired outcomes based on adaptive governance theory and NRM practice which works in much the same way as the NSW Standard to assess and improve governance performance (modified for this study from Griffith et al 2009)	Used early in the trust building and preparation phase to establish a baseline and at regular intervals during the study to assess changes to governance.
17. Paradigms table (See Figure 6.1)	Literature (Chapin et al. and Gunderson)	Used during presentations and discussions with MCMA staff and CAP 2 Committee.
19. Strategy building process – series of steps and supporting material to define strategies for intervention	Process for moving from analysis to development to development of specific interventions.	Used during 'process' discussions with MCMA staff, they subsequently modified and used approach.
20. Evidence and assumptions log and knowledge prioritisation process	Process for capturing and organising evidence and assumptions that allows evidence and assumptions to be easily updated with new information, checked for relevance during evaluation and prioritised for further focused work.	Currently being developed by MCMA based on discussions with staff, the initial work suggest the process of developing an more structured approach to evidence and assumption logging is very beneficial for development of a more adaptive decision making process.
21. Triple loop learning (critical reflection)	Literature (Chapin)	Concept used during discussions and review of current and proposed processes.

1. 'Clouds' Diagram

14. Adaptive Cycle Diagram

13. Ice Cream Diagram

17. Paradigms Table
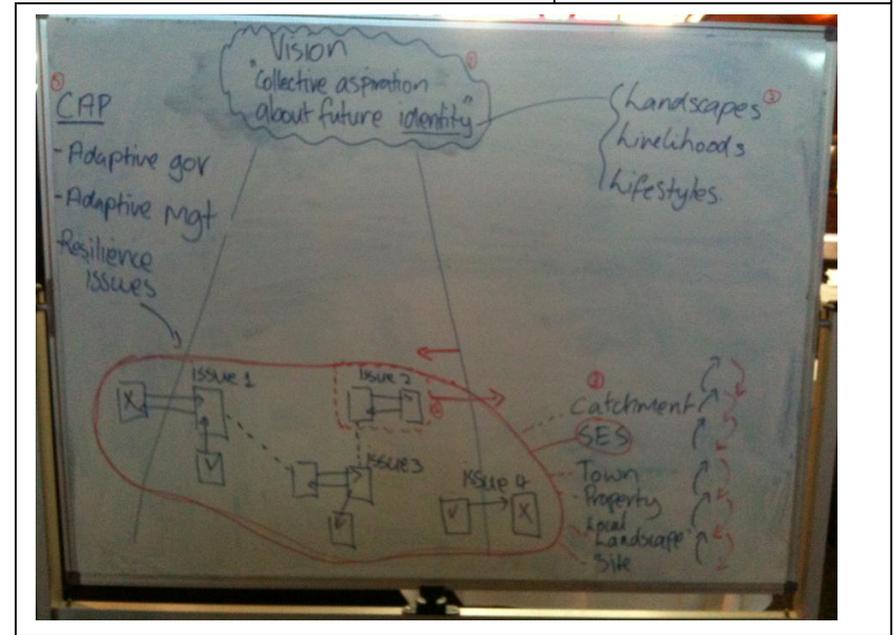
Figure 6.2: Examples of the tools and heuristics which support a social-ecological approach to catchment planning (see Table 6.1)

6.2.2 Social-ecological systems (SES) of the NSW Murray Catchment

A key result for MCMA through the application of these tools is the development of a map of the social-ecological systems (SES) of the NSW Murray Catchment region (Figure 6.2). This has been achieved by the MCMA actively adapting and modifying the tools within the organisation (the importance of which is discussed in Section 7), particularly in consultation with the CAP2 Committee, and then by gathering extensive local information through numerous community consultation meetings across the Murray region.

Interview comments from a community member on the C2C strongly support the shift to a localised SES resilience based approach:

> " ……can pick the CAP document up and relate to it….I can see my region….and these are the programs and policies that apply to my part of the region….." (C2C member, June 2012)
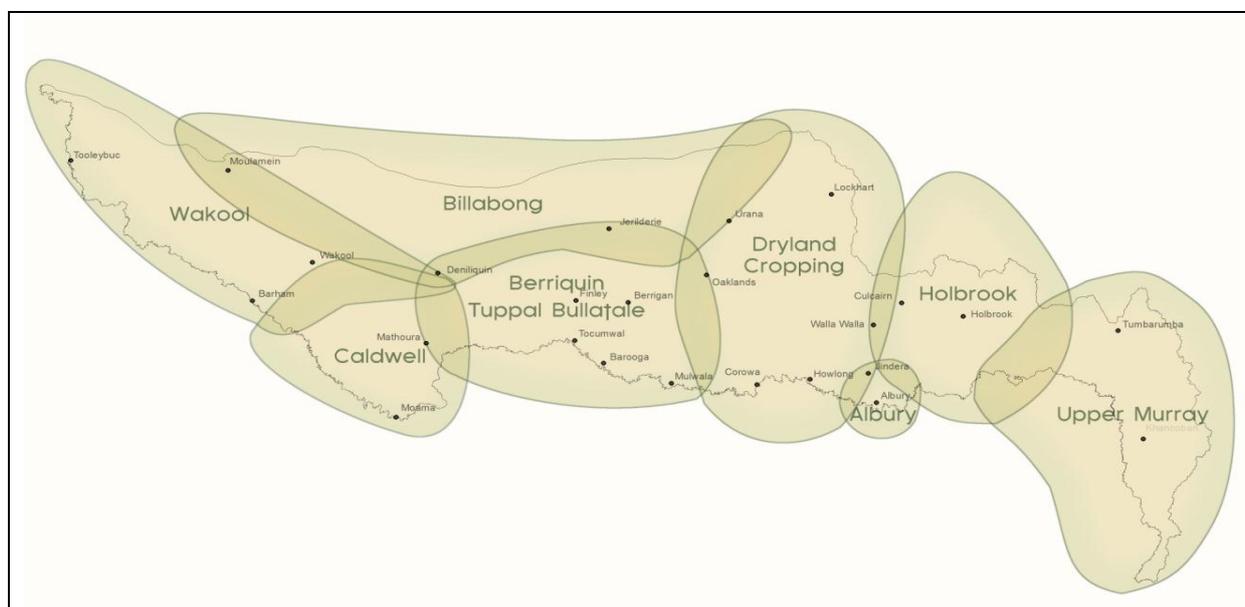
Figure 6.3: A map of social-ecological systems in the NSW Murray Catchment developed through community consultation processes (Source: MCMA)

For each of the SES identified by the community in the NSW Murray Catchment region it is possible to develop conceptual models as illustrated in Figure 6.3 for the Holbrook SES.

In the Murray case 'critical pathways' were then identified for the delivery of values from each SES and key resilience risks for each system were documented. At the time of writing MCMA is in the process of designing strategies for intervention along critical pathways to maintain the delivery of important values from each SES. The intention is to then test each intervention back against the conceptual models and test for secondary or unintended consequences.
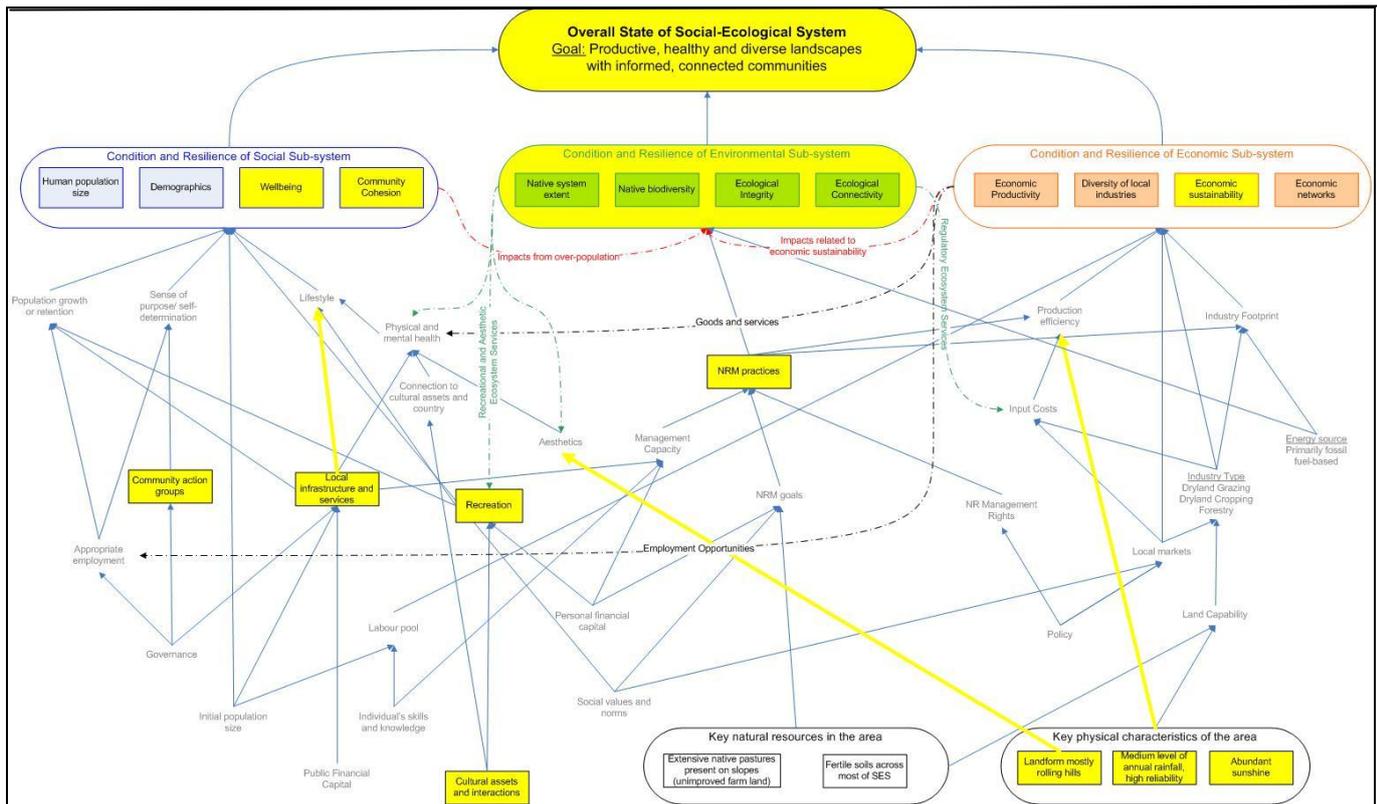
Landscape SES Model: HOLBROOK   Draft 3.3   15/8/2012

Legend
- Text indicates key factors that influence the condition of each system
- Arrows represent key relationships between factors (dotted lines represent key feedback loops)
- Yellow highlights (texts and arrows) indicate priorities from consultation process

Community values and CAP2 strategies for the Holbrook area (yellow highlights in model)
Healthy ecosystems: develop partnership with local groups to continue enhancing the environment within Holbrook SES
NRM practices: continue to assist the local community to identify, explore and implement current recommended NRM practices to support their stewardship ethic
Recreation and aesthetics: explore options for increasing recreational opportunities (including related to community assets and interactions and landscape/landform) within Holbrook SES to maintain the attractiveness of the area to newcomers, improve lifestyles and hence contribute to community wellbeing and cohesion
Infrastructure and services: explore options for assisting the local community to maintain or improve local infrastructure and services, particularly in relation to maintenance of lifestyle
Climate reliability: explore options for increasing the local community's adaptability to climate change/variation

Figure 6.4: A draft social-ecological system (SES) model for the Holbrook region in the NSW Murray Catchment (Source: MCMA)

6.3   Embedding an adaptive approach

The MCMA has a strong culture of adaptive practice. It is already among the leaders in this area. The CMA has been able to strengthen and extend its capacity during the Transformation study and the development of CAP2, culminating in the development of an Adaptation Strategy that will guide the future adaptation of its CAP.

The Adaptation Strategy encompasses traditional Monitoring, Evaluation, Reporting and Improvement (MERI) activities. Rather than geared toward Reporting as is the case in most regions, the Strategy framework developed by MCMA is structured around a triple loop learning approach. This triple loop learning approach was introduced to the MCMA by the researchers over a series of face-to-face

meetings, supported by literature. It integrates a deliberated, structured learning and adaptation approach into the CMA's planning hierarchy (Figure 6.5). The Adaptation Strategy will be supported by organisation, social and information management processes that will drive ongoing learning and adaptation.

ADAPTATION STRATEGY - MULTI-LAYERED EVALUATION, LEARNING AND REFINING
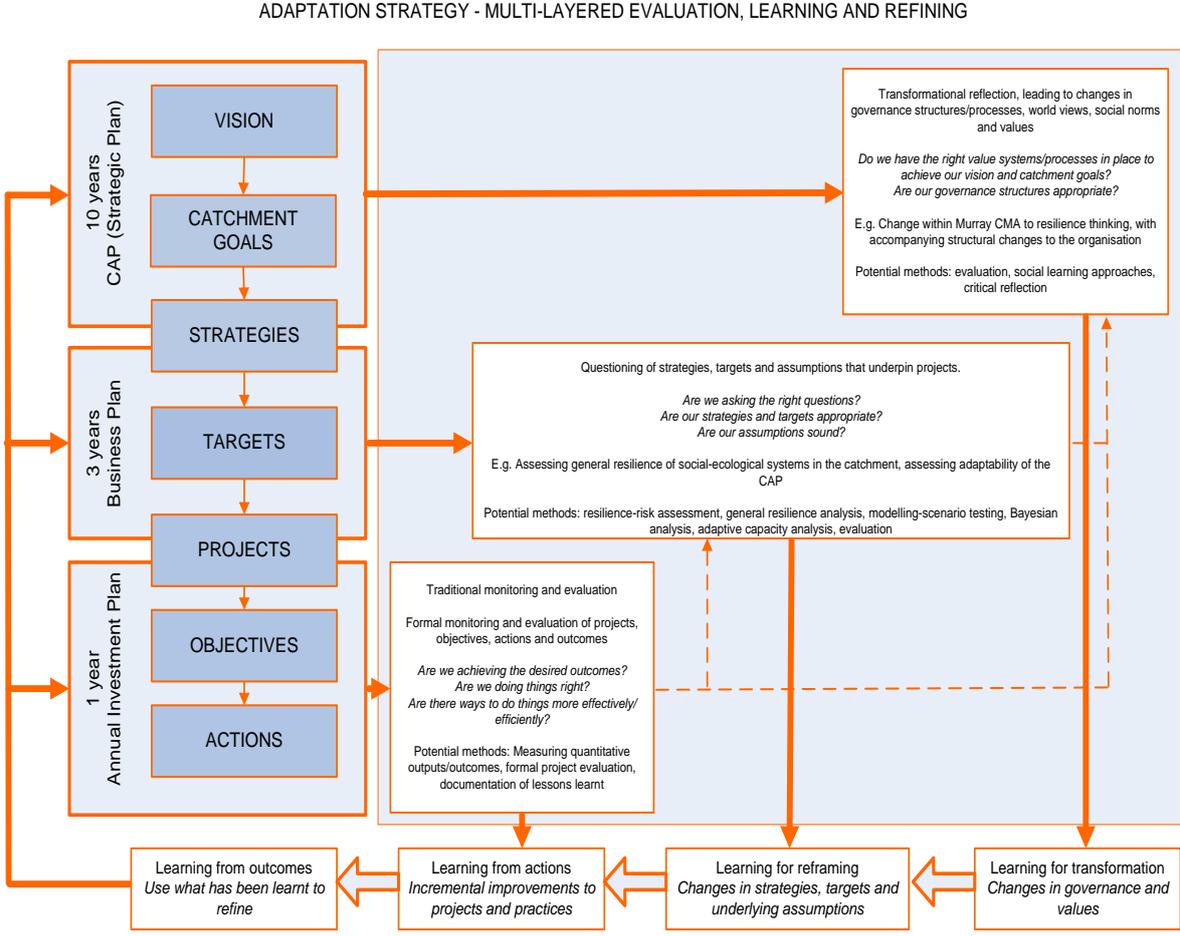
Figure 6.5: MCMA adaptation strategy (Source: MCMA)

In practice, the Adaptation Strategy integrates the key concepts of resilience thinking, collective learning and adaptive governance into a framework for future adaptation and potentially transformative action. In effect, the Strategy framework coupled with the adaptive governance arrangements that have been put in place, foster collective social and technical processes (collective learning) that adjust the conceptual models developed through the resilience assessment (resilience thinking).

There is significant uncertainty about the future implementation of the CAP2 and the Adaptation Strategy. Stage Government reforms and staff reductions mean that both organisational purpose and capacity of regional bodies are shifting. How well the concepts embedded in the MCMA planning process will be carried through to the new arrangements remains unclear.

7. Individual and collective learning

Collective learning is one of the foundational concepts brought to MCMA by the research team. Initially it was envisaged that such learning would take place in the study through guided processes with groups of people (potential learners) coming together to work through an issue of shared concern. In collective learning theory these people would represent different perspectives and be facilitated through a sequential process ending with an action plan for change. The pace, scale, direction and trajectory of change embodied in the action plan would depend on the dynamics of the group as would the perceived gap between what the group thought ideally ought to happen about the issue and what they saw as the actual situation.

The research team demonstrated this type of process at a workshop with MCMA and WSC leaders in December 2009 and again used it to generate actions for the CSP. However, the approach to collective learning in the Murray case study has turned out quite different to the scripted framework taken from collective learning theory and experience.

This section illustrates how collective learning has actually been applied in the Murray case study and outlines the learning that has taken place. The term 'agency' is a concept from the social sciences. In this context it refers to a situation where people feel empowered to make plans and to act to implement them, as opposed to situations where external drivers determine the way people act. An agent is a person who acts to bridge between others or on behalf of others. The term should not be confused with a formal agency such as the CMA or a government agency.

7.1 Four phases of learning and agency building

Over the three year period of this study, four phases of learning and agency building have been observed in the Murray case study. These phases have been deliberately developed and driven by the MCMA leadership team as part of the overall organisational change strategy. Though not identical, similarities can be found with Olsson et al (2006) steps for transformation (section 3.4.1).

The four phases observed in the Murray change process are:

- absorption and tailoring of new thinking and language

- agency building by leadership

- reflective transfer

- diffusion of agency in the region

> "….Firstly I'd like to acknowledge that there have been some profound changes, and to a very large extent they've originated through the contacts with the researchers in this project who have introduced me, my staff and the Board to a range of concepts that were at first unfamiliar and quite frightening. It took a period of time for us to become familiar with the terminology. It took a longer period of time for us to become familiar and comfortable with the meaning behind the terminology, and it took a longer period of time – and we're still working on it – how to apply the theory into practice, and how to communicate the concepts in ways to community stakeholders that will potentially fast-track their learning process as well……" (GM MCMA, 2012).

These phases of learning, the processes and events that shaped the learning and the key agents involved are explained in more detail below and summarised in Figure 7.1.

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Phases of Learning & Agency Building

Nov 2009	Mar 2011	Dec 2011	Apr 2012
Phase 1	**Phase 2**	**Phase 3**	**Phase 4**

Absorption of new thinking	Agency building by leadership	Reflective transfer	Diffusion in the region

Key agents:
researchers and champions particularly the GM

Key agents:
leaders, staff and community reps

Key agents:
researchers, staff and community reps

Key agents:
Community reps and community

Relationships

Trust building and interchange of ideas	Empowering of staff to join new culture and business model	Skilling staff and community reps in social–ecological systems	Networking & engagement

Conceptual Development

Exploring explanatory frameworks and language for fit & resonance	Building new governance structures and a CAP 2 model	Building and testing engagement framework	Exploring social-ecological dynamics and priorities

Innovation Experiments

| 1st localism experiment with Wakool community	More localism pilots empowering community reps		Applying lessons to forced transformation

Figure 7.1: Four phases of learning and agency building orchestrated by MCMA as part of its change strategy

7.1.1 Phase 1: Absorption and tailoring of new thinking & language

In this phase the researchers worked with the CMA leadership as champions, to introduce our foundational concepts and explore different types of change, including transformational change. Key leaders from the CMA worked in the background to ground the concepts in NRM business and then reflected them back to researchers in a practice ready form. It was a 12-18 month process of mutual learning which built trust and confidence.

This phase coincides with the period of most activity in the Wakool pilot. There was a clear contrast between planned learning events such as the resilience workshops and CSP workshop and the self-organising learning going on behind the public processes. Overtly the absorption of new thinking was focussed on resilience, particularly by the GM. This was expected, given the considerable interest that had been generated in resilience thinking in NRM at the time through the NRC's audits and pilot CAPs in the Namoi and Central West CMAs.

Two key events reinforced the extent and depth of learning taking place in MCMA. Both of these increased confidence in the practical relevance of the core concepts to the CMA's change strategy. One event was a presentation given by the GM firstly to the Board and then subsequently to a meeting of research partners in November 2010. The presentation illustrated a potential new relationship between thresholds and targets in four themes of CMA business, boosting confidence within the CMA of the practicality of resilience thinking to its business.

The second event confirmed that a similar level of learning had also taken place about the practical value of adaptive governance and collective learning in the Murray context. Towards the end of 2010 MCMA volunteered for a second NRC audit. The results demonstrated that the CMA had significantly improved in all areas since 2008. The Audit Report noted that the CMA was working on embedding resilience thinking into its business systems, had implemented a different set of strategies to appropriately engage different sectors of its community and had a common understanding of how adaptive management principles were applied to their planning and operations. The Board and senior management had fostered a "learning culture" and there was extensive use of both internal and external reviews and the application of feedback loops in the form of "lessons learned" assessments (ERSA, 2010).

Overall, this period was characterised by on-going discussions and reinforcement between the researchers and MCMA leadership, between the GM and the Board, and between the MCMA leadership with the staff. This in turn led to a growing confidence by staff in the leadership and pathway for change.

The trigger to move to the next phase of learning was the decision to refocus the study on MCMA's CAP process (section 5.3) which was reinforced by the breakdown of the Wakool CSP process (section 5.2).

7.1.2 Phase 2: Leadership for agency building

In this phase the CMA leadership, developed their own new conceptual models of how the organisation should work and where the CAP2 would fit. The leadership encouraged personal learning, built new governance and management structures which boundary spanned, devolved responsibility and empowered staff and community. Researchers were peripheral to this phase of individual and collective learning.

It is in this phase that the cultural shift in the organisation was orchestrated. The new concepts were now introduced to those who hadn't as yet had contact with the study and new functional relationships gradually emerged. At the same time, producer networks were established in the community and the C2C model was being developed ready for implementation at the right time.

Some examples from interview transcripts of the personal and collective learning which took place are provided below.

> "….The GM's mantra is it's all about the journey, it's all about the learning. So it's very strong…..it takes a lot of the nervousness out of it…[why?] ….because this is an experiment, a big experiment doing it this way….".(MCMA staff member, 2012)

> "…lot of concern by those [staff] with not much involvement [CAP2], those closer to the CAP process not as concerned…." (MCMA staff member, 2012)

> "……we expected the rewards to far outweigh the risks – so that's why we were comfortable with it [C2C] – also, personally, I have a high degree of confidence in it because we had all of those things in the background working for us – we had good staff-board relationships, we had procedures and processes in place…." (MCMA staff member, 2012)

> "…..I think the fact that there's a group understanding of a concept and a direction, has built a really good sense of common purpose which has been really interesting……..you know it's been an interesting thing watching mutual respect and understanding…." (MCMA Board member, 2012)

> "….they [C2C] would be genuinely consulting with the community, not just consulting, engaging with the community and all that feed back was going to be fed into it [CAP2]. I think once they understood that it was genuine, that was the big thing they got excited once they realised that it wasn't like other government consultations…:" (MCMA Board member, 2012)

7.1.3 Phase 3: Reflective transfer

In this phase researchers Paul Ryan and Michael Mitchell worked with empowered staff and community representatives within new governance structures, to apply the new thinking and experience gained through working with other partners to the development of CAP2. As stated in Section 6 researchers had ensured in the development of frameworks, heuristics and tools that collective learning theory was incorporated as seamlessly as it could be. The 'clouds' diagram (Figure 6.2) is the contemporary expression of this learning based, resilience driven approach to NRM planning. The key collective learning principles applied to its development and refinement from early trials in the Wakool pilot includes:

- Multiple knowledges at the table – ensures that different perspectives and value positions are brought to the analysis and design

- Deliberative processes respecting individuals' prior knowledge – ensure that discussions are creative, constructive and respectful yet deal with tensions that arise from sharing different ideals and perspectives

- Start where people are at with individual lived experience – ensures that existing knowledge is captured and that people will participate knowing they have been heard and their perspective acknowledged

- Draw out ideals before analysis of system dynamics – ensures that a reference point in the future is established against which analysis of existing and future system dynamics can be assessed – also ensures the process does not get bogged down trying to fix existing problems.

- Progress from individual learning to collective learning through sharing –sets up the conditions for collaborative design and action

- Ensure learning is continued – provides opportunity for re-engaging and reinforcing.

Initially staff had envisaged a formal process of skills training and a written set of practice notes as their preferred mode of learning on how to implement an SES approach. The actual mode of learning which evolved could be called 'reflective transfer'. This involved providing heuristics and tools (section 6.2) at requested stages in the CAP2 planning process and sharing experiences gained through working with other regions. These transfer sessions also included sessions with the C2C. In some cases the tools were used as provided but in most cases they were taken away, reflected upon and modified to suit the Murray context. Often they were changed because there was not enough time to implement processes as they had been suggested. Hence the process was not just being implemented as theory might suggest, or as other NRM organisation had done, instead new heuristics and processes were being developed to accommodate local circumstances. Some examples from interviews of personal and collective learning in this phase are provided below.

> "...... when [a C2C member] stood up after the presentation from [Paul Ryan] and said ..... this is exactly the way we've all been thinking …….. this is great…" (MCMA Board member, 2012)

> "I've been managing systems for years – it's not new to me". (C2C Community member, 2012)

> "...... but we have also developed our skills in communicating resilience concepts in ways that make it easier for people to understand and practically apply them. So for example, instead of referring to the R word, and the need to build resilience, we will instead refer to an ability to cope with change…" (GM MCMA, 2012)

> "…And it's really interesting, because it's making staff become more proactive instead of reactive like thinking things through, rather than waiting for them to happen and then going we should do this or we need to do that. Start thinking where the opportunities are, where the possibilities are and what we need to look out for and I think it's really changed that dynamic….: (MCMA Board member, 2012).

7.1.4 Phase 4: Diffusion of agency in the region

In this phase empowered and skilled staff and community representatives worked directly with the catchment communities to help identify and understand their SES, and develop NRM priorities for inclusion into CAP2. The Chair and GM devolved responsibility and stood back from the process. Researchers had a support or 'on call' role in this phase. They played no active part in the engagement process apart from attending some community meetings to experience the interaction first hand.

> "…the social learning component, which has essentially helped us to design the engagement plan for CAP2, which is all about social learning, ……..we're getting a full and frank exchange from the community on what they see as the values that they cherish, the threats and the opportunities, their vision for the future, and they get to hear the views of other people around the table at the same time…." (GM MCMA, June 2012)

> "……you need to understand the local scene – the ecology, environment and community – that's where a lot of the innovative and original thinking comes from. Farmers have a lot of time on their tractors – how many translate that original thinking and plans into future strategic directions or policies…." (C2C member, 2012)

> "….Many times there is zero intention by government departments through their consultations of actually changing one thing. It reiterates that the closer you can get to your subject – in this case the landholder – and have that subject involved, you're always going to get a better outcome…." (C2C member, 2012)

> "…….. but seeing them [C2C] understanding it and getting the depth of it is really good…. if they can see logic in it, they can present it to the community as a logical thing that would be

supported, because they've got a lot of credibility and respect amongst the community…" (MCMA Board member, 2012)

"…….. telecommunications are a big issue to be a sustainable producer or a conservationist. It is good roads, it is health systems, it is education, it is keeping youth in towns and you need all of those dots lined up if you want to have healthy soils…" (MCMA staff member, 2012)

"……..but the clear message we're receiving from the catchment community is that "their priorities don't always align with agency priorities". The main example of this is that "the community input so far has strongly focused on social and human capital", which has been absent in the past because we haven't engaged with the community…"   (GM MCMA, 2012)

"…they [community forum participants] all said afterwards without exception that the meeting was nothing like what they thought it would be, because they're so used to any agencies going up consulting them and it's giving them information – this is what's happening, this is what we're doing instead of... They really felt like they were having input…………….. And you know I got two phone calls after I left and I had spoken to them at the end of it over a cup of coffee ….. saying that was a really interesting day, because they had gone home and they were thinking about the things that had come up in conversation. And the other thing that was really good, I think it reinforced for them a lot of their values, and made them realise they're not just their values. One of them said the thing they valued was the sense of community and commonality and bonding and belonging and I think that highlighted it for them…" (MCMA Board member, 2012)

A fifth phase in the change strategy is planned which uses investment incentives and available instruments, to embed the new paradigm both internally and among the catchment communities.

7.2 Ongoing learning

The learning process is now embedded in the culture of the organisation and its associated governance structures. As documented in Section 6 MCMA has prepared a draft Adaptation Strategy. Key staff who have been involved in the CAP2 process are promoting the idea that planning is about a process not a plan, and that it may be CAP4 or CAP5 before the full impact of a social-ecological approach is realised. Until then it is an ongoing learning journey as illustrated in Table 7.1. The table shows that MCMA Adaptation Strategy introduces the notion of triple loop learning, one of the key factors influencing transformation. This is covered in more detail in Section 8.

Table 7.1: Ongoing adaptation strategies and multi-layer learning by MCMA – DRAFT (Source: MCMA)

STRATEGIES	LEARNING FROM ACTIONS (0-1 year timeframe) *Incremental improvements to projects and practices* Intent and Key Result Area	LEARNING FOR REFRAMING (1-3 year timeframe) *Changes in strategies, targets and underlying assumptions* Intent and Key Result Area	LEARNING FOR TRANSFORMATION (3-10 year timeframe) *Changes in governance and values* Intent and Key Result Area
Refine and Adapt	• Projects are refined, adapted, improved and implemented based on recommendations derived from what has been learnt through M&E. • *Incremental improvements to projects and practices.*	• Refinement and adaptation of strategies, targets and projects occurs as part of Business Plan review • CMA, partners and other external participants are involved. • *Reframed strategies, targets and projects in updated Business Plan*	• Changes in governance processes, social values and norms, and/or world views needed to achieve catchment goals and visions are implemented • *Appropriate transformation of governance arrangements and values are evident in updated CAP Strategy*
Engender a Learning Culture	• Identify and document what has been learnt from the gaining of information, evidence and knowledge through M&E. • Provide opportunity for the sharing of information, evidence and knowledge within/between business units and partners. • *Annual gathering where lessons learnt are shared within/between business units*	• Through facilitated workshops CMA, partners and other participating actors undertake strategic evaluation of strategies, targets, underlying assumptions and evidence that underpin project planning and resource allocations • Provide opportunity for the sharing of information, evidence and knowledge (including new ideas) between CMA, partners and other external participants. • Identify and document aspects that suggest transformative change in governance, social values and norms, or world views is needed • Incorporate relevant lessons learnt from project evaluations • *The need for reframing of strategies and targets that results from strategic evaluation is understood and accepted by all participants* • *Key aspects of strategies, targets and projects that need reframing are identified and changes implemented*	• Through facilitated workshops CMA, partners and other external participants at different levels in the governance hierarchy, engage with each other in constructive reflection, strategic evaluation and innovative thinking about catchment vision, goals and strategies. • They identify where there is a need for changes to governance processes, social values and norms, and/or world views needed to achieve catchment vision, goals and strategies • Relevant lessons from other levels of MER (Learning) are considered • *Aspects of governance, values, vision, goals and strategies that require transformation are identified* • *Mechanisms for achieving transformation are identified* • *CMA Board, partners and other external actors have a shared understanding and acceptance of the transformative changes needed to achieve catchment vision, goals and strategies*
Gain Evidence and Knowledge	• M&E activities result in the generation of information which allows evidence and knowledge to be gained • *Documentation and reporting of M&E evidence and knowledge*	• Generation of information that allows evidence and knowledge about higher level knowledge gaps and impediments to be gained and shared • *Higher level knowledge gaps and impediments are identified and understood*	• Generation of information which allows evidence and knowledge about structural and procedural impediments to the attainment of catchment vision, goals and strategies to be gained and shared • *Impediments to attainment of catchment vision, goals and strategies are identified and understood*
Develop Partnerships and Participation by Diverse Actors	• Partnerships developed that allow the sharing of costs and benefits associated with M&E • *Partners gaining from the sharing of M&E costs and benefits*	• CMA, partners and other actors participate in evaluation of strategies, targets and guiding assumptions that underpin project planning and resource allocations • *Annual "shareholder" forums to garner advice/opinion from partners and other actors*	• Partners, CMA Board and other actors participate in evaluation of governance structures and processes, world views, social norms and value systems that require transformation to achieve catchment strategies, goals and vision • *Mid-late term CAP evaluations to garner advice/opinions/ideas from partners and other actors*
Apply Sound Principles and Procedures	• Development of project planning procedures and plans with M&E needs integrated. • Use of project objectives, program logic and other conceptual models to determine M&E needs • Implementation of projects and their priority M&E needs • *All project plans developed and implemented with priority M&E needs.*	• Development of procedures and principles for strategic evaluation, including the use of program logic and other conceptual models, to question strategies, targets, underlying assumptions and evidence that underpin project planning and resource allocations • *Strategic evaluation of strategies, targets, underlying assumptions and evidence is based on sound procedures and principles*	• Development of procedures and principles for strategic evaluation, including the use of program logic and other conceptual models, to identify governance structures and processes, world views, social norms and value systems that require transformation to achieve catchment goals and vision • *Strategic evaluation of governance arrangements, social norms and value systems are evaluated according to sound procedures and principles*

8   MCMA's capacity for transformative action

The aims of this study are to explore how rural communities and sectors can build the capacity to take intentional transformative action, and to build such capacity as the study progresses.

A framework for building and assessing capacity for transformative action (transformability) has been developed by this study (section 3.4.4), which is designed to assist in evaluating the case study. The Framework has three major aspects:

- Six (6) transformative management capacities supported by adaptive governance which together create conditions for critical learning and self-organisation
- Five (5) key stimulants of transformative action which push change beyond incremental adjustment
- Access to capital stocks and flows (the 5 Capitals) which provide the resources for renewal and the innovation required for transformation.
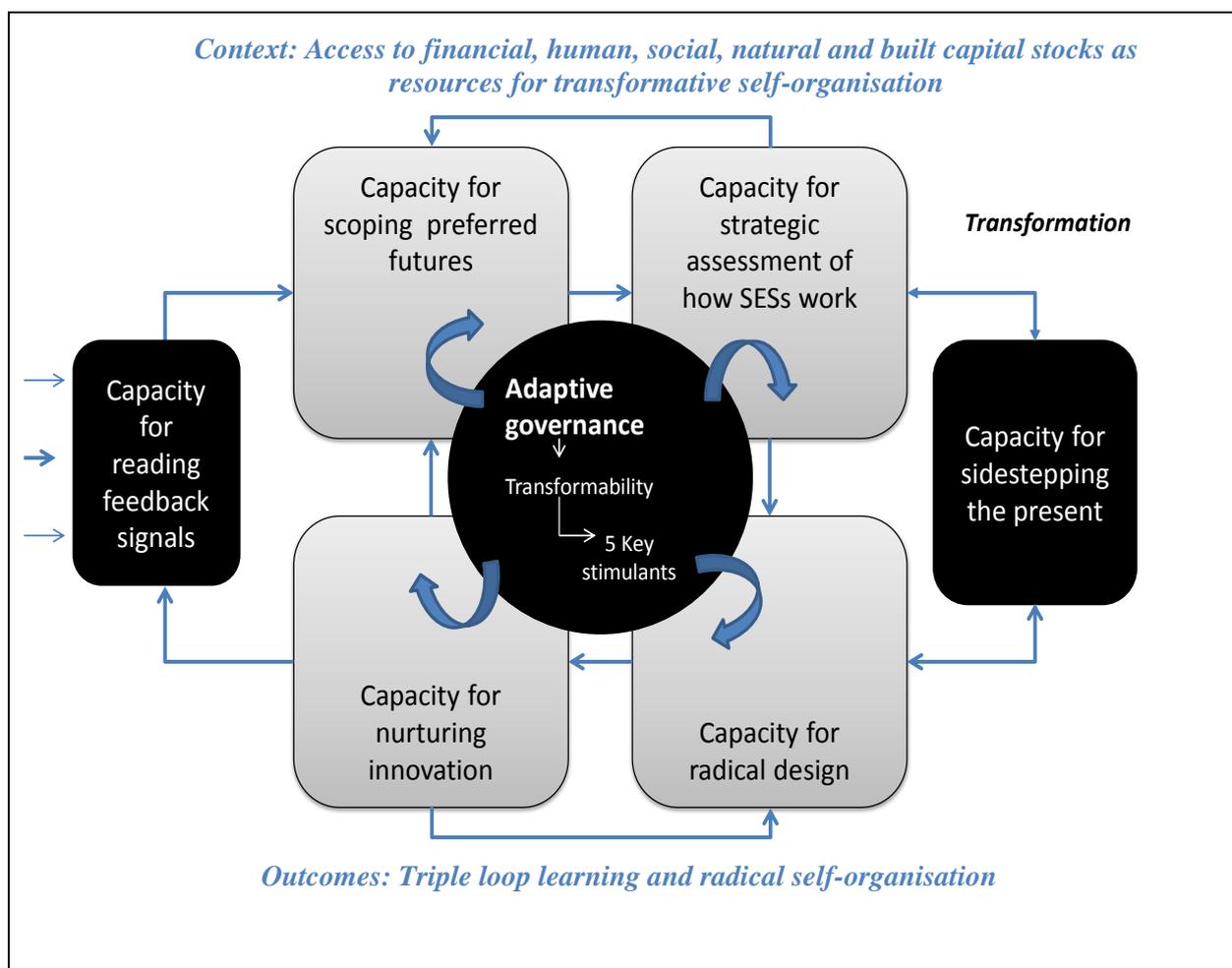
Figure 8.1: Transformability Framework - A framework for assessing capacity for intentional transformative action

The Transformation study comes from a position that there isn't a particular point at which transformability is built, and even if it is built, it will be subject to on-going fluctuations. The research proposition is that, at any point in time, if all six capacities are in place and the five stimulants are applied, then communities should be equipped to intentionally transform parts of or even the whole social-ecological system, so long as the timing, with respect to the adaptive cycle (Table 6.1 No 14 / Figure 6.1) is favourable for change, and communities can access adequate resources (the five capitals).

In this section the Transformability Framework is applied as a diagnostic tool for assessing if capacity building efforts so far by the MCMA amount to transformability. Evidence has been presented in sections 5, 6 and 7 of intentional and purposeful change agency by MCMA in relation to governance, the business model, organisational culture and NRM planning and practice. Links are also made in those sections to the influence of the three foundational concepts used in this study: resilience, collective learning and adaptive governance. This agency and the very significant changes that have resulted have occurred despite the MCMA on the whole, seemingly taking little interest in or paying much regard to the notion of transformability.

Based on components of the Framework, preliminary assessments are made of whether the six capacities have been built, adaptive governance has been institutionalised and the five key stimulants of transformative action applied. Some evaluation questions are addressed which seek to clarify:

- Whether any factors associated with transformability separately or together played a part in generating transformative action and if so how?

- If there are other factors or influences operating in this case study not included in the Transformability Framework developed for this study?

- Whether any or all of the observed changes outlined in this report can be interpreted as transformation?

- If the innovations highlighted in the report are likely to scale up to a wider social-ecological transition or reinforce resilience in the Murray region?

8.1   Progress with building adaptive governance

Adaptive governance (section 3.2) is the enabler of the six transformative management capacities described in the Transformability Framework. It sits at the centre of the Framework to illustrate that governance is influential in driving change and is itself changed through the learning associated with the development of various capacities and structures, and the processes developed to support them. Therefore it is also a learning space.

There are seven principles of adaptive governance all of which are necessary for building capacities. Transformability is the principle of most interest to this study and in particular the influence of five key stimulants on transformative action, each of which are discussed in section 8.3.

The baseline conditions and governance operating on MCMA and the region prior to the study has been outlined in Section 4 and the significant changes to governance structures and function discussed in Section 5. These changes include:

- Implementation of localism through devolution of power, authority and funding to community networks and C2C regional planning committee.

- More polycentric decision making (i.e. multiple centres of decision making) from new and empowered networks and better relationships with local government

- Purposeful and meaningful engagement around social-ecological systems identity that promote and value social learning

- Encouragement of emergent decision making structures through community self organisation

- Open audits for accountability and transparency

- Linkages between networks and with CMA upwards, sideways and downwards

- Processes at Board and staff levels for stopping & reflecting

- Capacity to design and implement effective change processes

As a result, MCMA now has higher levels of earned legitimacy, improved and rigorous processes to ensure procedural and distributional fairness and strong multi-directional accountability. These conditions provide a sound basis for the much enhanced connectedness (inside and outside the region), reflexivity and adaptability which is documented in Sections 5, 6 and 7 of this report. Together these principles allow the CMA to be both proactive and reactive in times of change without undue risk. They have also provided the supportive structures for building transformative management capacities and enabling key stimulants to be applied which together represent transformability as the remaining principle. An assessment of these two aspects of transformability is provided below.

8.2   Building the six transformative management capacities

The following sub sections cover the six component capacities in the Transformability Framework. They provide a brief statement on the importance of the respective capacity and an assessment of changes to structures and behaviour observed in the Murray case study, which have supported or inhibited transformative action and transformation.

8.2.1   Capacity for reading feedback signals

In this learning space communities and support organisations like the CMA can make sense of the various signals of change, identify issues of concern and reflect deeply on the current set of conditions, actions, experiments and practices which generate those signals and the validity of the assumptions that underpin current responses. This capacity, to receive, interpret and communicate signals of change to feedbacks, is important for understanding tipping points, the effectiveness of current strategies and establishing conditions for change. It is also important because of the high levels of uncertainty and complexity associated with addressing NRM issues which often results in unintended consequences that have associated risks.

Prior to the study, this capacity could be described as limited to poorly developed formal MER (without the evaluation) with little external participation and poor linkages to key decision makers. Willingness of leadership (Board) to listen and learn is now evident dating from the NRC Audit Report in 2008.

Governance structures and processes put in place by MCMA to build and support this capacity since 2009 include:

- Ongoing special strategic sessions held by the Board together with senior staff to explore issues which arise

- Closer links between portfolio Directors and staff which foster a timely exchange of signals

- New formal and informal relationships between the CMA and community which provide a conduit for signals of change based on locally based groups and their employees tuned in to local conditions

- Expanded monitoring evaluation and reporting processes including the prospect of community monitoring associated with social-ecological systems

- Better communications processes and social media use to facilitate exchange

- C2C as a vehicle for community information and accountability

- CAP2 processes such as key informant interviews, surveys and C2C driven meetings

- Specific attention to ecological and social signals and assumptions in water management and biodiversity projects

Our assessment is that MCMA is making good progress as an organisation for this capacity. There is evidence of better coordination and communication with communities in the region and with government agencies, leading to better feedback and improved responses. As a result of experience with working in these structures and processes MCMA is now tuned in to its community and to social, economic and ecological dimensions of NRM. Some landholders have received the signals that governance and the approach to NRM has changed. There is a new awareness that different mental models generate different signals. The new engagement strategy developed and refined for the CAP2 process illustrates this awareness. The explicit documentation and experimental testing of assumptions involving local communities, as demonstrated in the Wakool River water management project, is an important step towards this capacity. Another area of improvement is the scanning for new knowledge and ideas from both academia and practice. This is a practice which researchers have facilitated and fostered over the course of the study and seems to be enduring.

Opportunities for further attention by the MCMA and communities include:

- Development of community monitoring

- Focus on tracking variables as they approach potential thresholds

- Regular key informant interviews

8.2.2 Capacity for scoping preferred futures

In this learning space people come together to share their values and ideals with the aim of developing shared goals and preferred futures for the social-ecological systems with which they identify. The capacity is driven by the adaptive governance principle of procedural and distributional fairness and the collective learning principle of multiple knowledges. Working together in this deliberative space provides an opportunity for community members to tap into social memory, explore and critically reflect on their mental models, values, worldviews and identities (i.e.to engage in triple loop learning). The capacity is important for shaping system outcomes because it generates a deeply held and timeless reference point against which current trends can be gauged. It also helps set boundaries of acceptable change and safe operating spaces and brings to the surface shared values and identity. The ice cream in the 'ice cream' diagram (Table 6.1 No 13 / Figure 6.1) is an example of a heuristic applicable to this space. The use of deliberative and inclusive processes is important for guiding interactions between people to maximise opportunities for shared values and ideals and minimise outcomes based on power differences.

We have limited information on how goals for NRM in the region were established prior to this study other than a brief description of stakeholder engagement contained in CAP1. However governance structures and processes put in place to build and support this capacity since 2009 include:

- A major community strategic planning workshop in Wakool Shire - this part of the workshop actually worked quite well

- CAP2 planning processes that encourage and bring together multiple perspectives

- A community engagement strategy that provides a range of opportunities to be heard on aspirations for the future

- Facilitation approaches that are designed to explore preferred futures

The processes put in place by the MDB Authority to develop the Basin Plan are in direct contrast with those of CAP2 and this point was highlighted during interviews with staff, Board members and C2C members.

8.2.3 Capacity for strategic assessment of how social-ecological systems work

In this learning space communities can explore how their particular social-ecological systems (SES) work, how they have worked in the past and how they might plausibly work in the future, based on sharing lived experience. They can identify barriers and enablers of change, as well as possible tipping points and leverage points for system intervention. These leverage points may be social, ecological or economic and are often narrowed down to governance issues. This capacity is important as it assists communities to assess whether 'business as usual' is likely to deliver the shared preferred futures to which they aspire, and if not, establishes a case for either incremental or radical adaptation (transformation). A number of heuristics are relevant here including force field analysis, the 'clouds' diagram, conceptual models, the adaptive cycle, time lines and scenarios (Table 6.1).

Prior to the study the capacity to take a whole systems perspective was very limited though some farmers report that they have always thought this way. Some progress was made in the Wakool Shire where leaders and some community representatives developed a resilience assessment of the Shire. The CAP2 planning process consolidated early learning and provided the learning space for communities to explore the dynamics of how particular SES work. Conceptual models of these systems have now been developed and areas for intervention identified

As the results in Section 6 demonstrate the CAP2 process is close to cutting edge practice for this capacity.

8.2.4 Capacity for sidestepping the present

In this learning space communities are encouraged to think differently about the situations they face, reframe knowledge and problems as opportunities, and break out of the confinement of current norms and practices. The capacity is important because it focuses attention on denial as a key factor in inhibiting transformative action, fosters creative thinking and provides legitimacy for radical innovation. Leadership and guidance from those who have done it before and a critical mass in innovation networks have been shown to help but we are unsure yet if these are critical factors. The prerequisite is the capacity to understand if and when transformation is an appropriate option.

Prior to the study some embryonic sidestepping had commenced. One example was a group of irrigators in the Wakool Shire had offered their water as a package to the Government. Another example was some deep reflection by the Board following the 2008 NRC audit which had led to minor governance innovation. In general though the capacity was undeveloped and the GM in

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particular has acknowledged the early role played by the research team in thought leadership and reframing NRM problems.

Structures and processes put in place by MCMA since 2009 which have supported building of this capacity include:

- Board strategic sessions which now work as an innovation network

- Challenges set by GM to key staff to re-examine and reframe themes from a resilience perspective

- The C2C reframing problems and tasks for staff, though generally for better fit with existing community thinking rather than radical innovation

- More open public meetings which foster discussion and new solutions, which may provide the space for sidestepping current thinking

Progress with developing this capacity is readily apparent though much of the capacity until recently resided in one individual. Our assessment is that the CMA is still reliant on the GM to a large extent for thought leadership and knowledge reframing, though at least two managers, some board members and some C2C members appear to be developing the skills and the confidence for sidestepping. The most important enabler is the culture shift (section 5.4) which now legitimises deep reflection, new ways of framing issues and innovation.

Opportunities for further development of this capacity probably requires more leaders or facilitators skilled in creative thinking techniques and providing enough opportunities to work through which ones best suit the characteristics of Murray communities.

8.2.5 Capacity for radical design

In this learning space people collaborate to put forward and flesh out radically different ideas for transformative action. This capacity is important because radically different ideas are a potential means for delivering on the ideal futures developed with capacity 8.2.2 around issues of shared concern.

Prior to the study MCMA had been driven by the rapid throughput of projects and were in the process of embarking on purposeful incremental improvement. Innovation was not high on the agenda or part of a culture focused on delivering biophysical science based projects. The CMA was aware of some existing innovation capacity at farm scale.

Development of this capacity since 2009 includes:

- radical innovation mostly conceptualised by the MCMA General Manager, tested with the Board and then tested with wider audiences – this is a vulnerability

- C2C as an important source of incremental innovation which has potential to generate more radical innovation if its scope is expanded

- New networks tapping into producer capacity which has demonstrated some innovation in the past so there are prospects for future innovation

While the CMA has been reliant on the GM for innovation, new thought leaders are starting to emerge. Opportunities to improve this capacity will probably arise as the CAP2 is implemented provided newly established trust, built through different approaches to engagement, is maintained. There is also scope for inter-staff partnerships and the staff/C2C member associations developed

during the CAP2 process, to persist and act as adaptive networks and therefore as sources of radical innovation. At least one C2C member interviewed had the enthusiasm for more radical change.

8.2.6 Capacity for nurturing innovation

In this learning space groups of people with a passion or responsibility for particular innovations come together to activate potentially transformative actions. This includes designing, testing of intended and unintended consequences, resource gathering, implementation or diffusion of the innovation and monitoring/communication of progress in the spirit of experimentation.

Murray CMA did not have a history of innovative or collaborative project development. Early attempts at collaborative development of radical innovation projects in the WSC pilot were unsuccessful to the extent that Wakool Shire Council returned substantial funding to the Australian Government which had been provided to support radical innovations in the area of water management. Conversely, strategies for radical innovation in governance led by MCMA have been very successful resulting in new structures and paradigm and culture shifts.

In summary, the basic conditions for nurturing of innovation have improved significantly as a result of learning gained from those experiences, emergence of a new adaptive culture in the MCMA and more interest and engagement from regional communities.

8.3 Applying stimulants of transformative action

This study is interested in an interdependent set of five key stimulants of transformative action as a further test of the extent to which transformability has been built through the Murray Case study. This set is one we have developed from the literature for testing in the wider study. It is not intended as an exclusive set. The five key stimulants are:

- Critical reflection

- Knowledge repackaging

- Innovation networking

- Transformative leadership

- Tipping point incentives

Our analysis of results from the Murray case study would suggest that despite a lack of explicit interest in transformability by MCMA there is strong evidence of four stimulants having been developed and applied intentionally with the preconditions operating for the fifth. The evidence for making such a claim is discussed below for each of the five stimulants in the Murray context.

8.3.1 Critical reflection

Critical reflection is deep reflection that challenges and delves into the assumptions behind actions. It encompasses examination of causal relations, norms, worldviews, contexts and the quality of knowledge used in deciding to take a particular action. Failing to challenge existing norms and hidden assumptions usually just leads to 'more of the same' or minor incremental improvements in responses. Therefore critical reflection is important for opening up space for considering alternative perspectives.

MCMA acknowledges that it was neither a reflective nor proactive organisation prior to the study. The capacity for deep reflection developed slowly at first between the new Chair and GM.

Subsequently it mushroomed as trust was built with the researchers working on the ground and the new thinking absorbed. Deep reflection is now accepted, spreading among the management group and consolidated in the culture of MCMA. These changes mirror the phases of learning described in Section 7 and result from the same set of interpersonal and institutional processes put in train by the MCMA leadership.

Our assessment is that critical reflection has been a significant influence on the change process taking place both inside the MCMA and in the region. In its adaptation strategy MCMA has shown that it understands links between critical reflection and triple loop learning and is prepared to acknowledge in principle the proposition that transformation is sometimes necessary for adaptation. Critical reflection is now institutionalised in the CMA built into CAP2 (and intended for subsequent upgrades) and is evident in community engagement processes.

8.3.2 Knowledge repackaging

There are circumstances such as perceived crises and activism where more proactive and radical thought leadership is required beyond critical reflection. In these situations purposeful re-framing, re-contextualising of perspectives and re-packaging of knowledge has been shown to be an important factor in transformation case studies (Biggs et al 2010). This repackaging provides communities with new perspectives and options. It can open opportunities to envisage a serious situation in a new and different way that often enables new possibilities to emerge, for example, articulating a crisis as an opportunity, or waste as an asset.

We have observed this process of thought leadership develop within the MCMA over the three years of the study following the same pattern observed for overall learning and critical reflection. An example is an outstanding presentation given by the GM to partners and researchers in November 2010 in which the study's foundational concepts were reframed, re-contextualised and repackaged as a new opportunity for NRM in the region. This repacking of information provoked new thinking and discussion at the Board level and provided an exciting example of theory into practice for the researchers. Much of the innovation evident in this report has stemmed from that repackaging process and its articulation.

Our assessment is that knowledge repackaging has been used strategically and with appropriate timing and has had a significant impact on the change process. There would appear to be a balance between purposeful thought leadership and promotion of wider critical reflection that is appropriate for the Murray context.

8.3.3 Innovation networking

Innovation networks include shadow networks (informal community networks operating in the background), epistemic (new knowledge) networks and adaptive networks (equivalent to shadow networks in the policy area and government agencies). These networks are where 'business as usual' futures are questioned and existing knowledge is reframed, re-contextualised and repackaged. It is important to include social entrepreneurs as they act as nodes in these networks (Biggs, 2010; Westley, 2010).

A preliminary network analysis (2010) highlighted that networking by the CMA was limited and almost non-existent by WSC. Original innovators who were members of Land and Water Management Plans and Landcare groups had drifted apart as funding dried up. Attempts to establish a new network around resilience thinking in Wakool Shire did not succeed though some learning took place.

Initial thought leadership (2009-2011) was provided by networking between researchers and the MCMA GM in the background to mainstream business, enabling knowledge repackaging. New

people were gradually introduced into this network in late 2010. The CMA instigated an intentional effort in 2011 to strengthen Landcare and producer networks and to link these networks. The Board and leadership of MCMA are now active in cross border peer networks and in establishing links to other policy networks at state and national scales. New networks are being developed through the planning process and focus on local social-ecological systems. The C2C also appears to be operating as a bridging group displaying some social entrepreneurship and may progress from incremental to radical forms of innovation if the need arises.

Our assessment is firstly that innovation networks were established through the study and are now being expanded and linked. Secondly those networking opportunities have been highly influential in promoting transformative action. It seems probable that these networks will endure or lead to new networking for future radical adaptation.

8.3.4 Transformative leadership

Leadership is a process. It can be carried out by individuals or organisations and operate simultaneously at many levels. It is important in many forms of change but particularly so for transformation. The management literature has identified a type of leadership called transformative leadership which is often defined in relation to a range of idealised skills or abilities of particular leaders. Recent management literature on transformative leadership seems to focus on empowerment, role building and relationship skills, networks and coalitions, with authenticity and respect for individual differences as important characteristics. According to Olsson et al (2006), for NRM these include:

- Motivation and mobilisation of networks

- Emergence of a bridging function (linking networks and reconciling problem domains)

- Boundary spanning (spatially, temporally, administratively and paradigmatically)

- Knowledge integration and communication

- Strategic use of windows of opportunity

- Navigation through turbulent times with few reference points

When the study commenced the new leadership team at the CMA was just getting established and WSC had a relatively new GM. Based on the above criteria, our assessment is that individual and collective leadership exhibited by the MCMA has been a very significant factor influencing the changes to governance and planning and could certainly be regarded as transformative. Leaders in the MCMA have been able to design successful transformative change processes which remarkably demonstrate every one of the transformative leadership characteristics listed above. The evidence also indicates that WSC could not sustain the same level of leadership when its GM moved on to another Council. Leadership became fragmented and fell away rapidly despite a new champion stepping in to provide thought leadership.

8.3.5 Tipping point incentives

Tipping point incentives are hypothetical at this stage of our study. They would be applied at critical points in the trajectory of social-ecological systems. Or they would be applied to key variables of the system to either prevent a threshold or tipping point and hence a regime shift from being triggered, or conversely, in the case of intentional transformative action, to push a variable past a critical threshold. They may also be used at critical times in the adaptive cycle to trigger renewal.

The kinds of indicators that have tentatively been suggested for assessing the impact of tipping point incentives include:

- Knowledge of thresholds as a prerequisite to applying incentives

- % of incentives programs aimed at thresholds

- Incentives that aim to radically influence social and practice change

- Diversity of incentives and dis-incentives available

- Position in the adaptive cycle

- Success or failure stories

MCMA has made considerable progress with identifying potential thresholds and understanding the dynamics with changes to key variables and associated feedbacks. Interviews would indicate that MCMA is developing strategies for applying incentives and will direct a proportion of future investment towards managing those thresholds.

8.4   Capacity to intentionally transform

At this point in a much longer study, no attempt has been made to quantify, or use a rating system in, the above assessments of adaptive governance, transformative capacities and use of stimulants of transformative action. However we consider there is sufficient qualitative evidence to support a conclusion that substantial progress has been made towards building transformability within the MCMA and that capacity is starting to be extended into regional communities.

MCMA has built its own practice approach to change which includes capacity building and integrates resilience thinking, collective learning and adaptive governance. This approach is still under development in relation to NRM practice around the social-ecological system as a governance and management unit. From a snapshot of an incomplete process, all of the capacities and stimulants in the theoretical Transformability Framework have equivalents in practice. In many aspects language is the big difference. Overlaying the Transformability Framework on the Murray process also confirms there are no big gaps in its practical process.

Although MCMA has not had an explicit interest in building transformability the outcome appears to be an overall capacity which has been adequate to lead to a transformation of regional NRM governance. The major changes observed over the three years of the case study have been compared (Table 8.1) to a set of conditions which serve as criteria to indicate whether any change could be interpreted as transformational change. The results of applying this test, to change in MCMA over the study period, supports a legitimate claim of transformation of the MCMA as an organisation, including its culture and its leadership role as a change agency and bridging organisation in the region. Claims of a wider NRM governance transformation are still partial but also have merit and changes to the regional planning approach could also qualify as transformational based on change from the starting conditions in mid 2009.

There is acknowledgement that the study as participatory action research and all three foundational concepts have played a significant role in shaping and at times acting as a catalyst in the change process which had delivered the observed transformations.

> "……I'd like to acknowledge that there have been some profound changes, and to a very large extent they've originated through the contacts with the researchers in this project who have introduced me, my staff and the Board to a range of concepts that were at first unfamiliar ..."
> (GM MCMA, 2012)

However, MCMA leadership have 'hosed down' the claim of transformational change, instead portraying the structural and functional changes evident in this story as a process of continual improvement. Transformation it seems at least in this region is not a term communities want to hear ("people don't particularly like the idea of transformation") and hence understandably not what the CMA particularly wants to publicise. It has however appeared in its recently compiled draft Adaptation Strategy as an option in a ten year time frame.

Table 8.1: Institutional change in the Murray region in relation to transformation criteria

Transformation criteria	Significant change led by Murray CMA
Introduction of new key elements and the loss of others	Novel and unique governance structures such as community CAP Committee (C2C) have been introduced leading to new relationships. Introduction of new thinking and associated methods of NRM practice which were not present prior to the study Community networks have been legitimised, expanded and linked together.
Recognisable, more or less stable change in form and function of the entity or system being transformed	Governance and management structures have changed, including the policy base, organisational structure, Board structures and new community based structures consistent with adaptive governance principles. The governance principle of devolution leading to localism is also evident. Functionally there has been a profound change in attitudes, individual and collective behaviour, organisational culture and reported relationships between Board and staff and organisation and community. Is it stable – probably not! Expecting ongoing transformation as new externally driven policies take effect.
An identity shift or break with the past	A very different culture exists within the CMA which is articulated, championed and followed by the majority of staff and Board. There is a sense of pride, achievement and belonging, and new relationships are being forged upwards, downwards and sideways Evidence of a paradigm shift in the way NRM is conceptualised and practiced comes from the CAP development process In the community the new paradigm allows social-ecological identity to be uncovered and discussed which may extend the organisational and governance transformations to place-based transformations

8.5 Scaling up to transformation for resilient landscapes and communities

It is too soon to tell whether transformative action and transformations at the organisational level of an institutional scale, and their extension to regional scale institutions initiated by the CMA, will result in transformations in landuse or land management practices or in a transition of any of the landscape scale social-ecological systems, or the whole regional system to sustainable resource use.

MCMA is still working through potential change strategies in this regard and we do not yet have access to a draft CAP. However, the GM has commented (June 2012) that the likelihood for transformational change, and influence on resilience was not considered possible at a LGA or CMA scale because of little or no power or leverage and insufficient resources or capacity. Change to, or significant impact on, one SES was considered possible, however this was likely to use most of MCMA's resources. In this case it would risk legitimacy with others in the catchment.

Complex systems theory would suggest that to scale up transformation, intentional change strategies will require attention to cross-scale dynamics. Case studies of past transformations have shown that the timing of interventions can be critical to success.

9 Murray case study contribution to study objectives

This section reflects on the contribution the Murray case study has made over a three year period to the overall study objectives of the *Transformation for Resilient Landscapes and Communities* study objectives.

The three propositions on which the research objectives are based are that:

- Many NRM issues can be classed as persistent, wicked or intractable problems with roots deep in the social system

- Transformational change including transformation of NRM will be necessary at times to tackle these problems and move towards sustainable resource use

- Resilience thinking, adaptive governance and collective learning are useful concepts and strategies for rural resource based communities in Australia, facing intractable natural resource management problems. Further to that proposition is that the concepts usefulness would be strengthened in situations where transformation is an option if the three concepts were linked, to generate emergent synergies or synthesised into a single framework.

9.1 The influence of foundational concepts in shaping change (Objectives 1 & 2)

Transformation was not the primary agenda or motivation for MCMA's involvement in this study. All leaders interviewed in this case study, even mid way through, had difficulty with the idea. While they had first-hand experience of transformation from scales above (e.g. MDB Plan) they took some time to accept the notion of transformations in parts of the system under study, as necessary to manage resilience. As it turns out the Murray case study is a good example of how transformation of the governance system has had positive effects on the resilience of the wider system.

For MCMA the resilience concept had resonance and attracted the most interest from the outset. Resilience thinking offered opportunities to address deficiencies in the social dimensions of its business while promoting adaptive management and maintaining an evidence-based approach to NRM. Despite a continuing prominence of resilience thinking in MCMA planning and operations, all three concepts separately and together have been influential in the journey of change so far in the Murray region. As demonstrated in Sections 5, 6 and 7, the concepts have made significant contributions to:

- The design and implementation of a successful governance change strategy which has resulted in a transformation to adaptive governance, radically affecting the outlook and behaviour of individuals, the overall culture of the organisation and the nature and effectiveness of community and government agency relationships with the CMA

- The approach to the development of CAP2 which operationalises resilience thinking and collective learning and has resulted in a paradigm shift in the way NRM is practised.

These two inter-connected initiatives informed by resilience, adaptive governance and collective learning have underpinned effective community engagement making communities feel valued and motivated to work with MCMA.

Reflecting on the Wakool pilot as the first test of the concepts, a remarkable turnaround is evident and illustrates the need for patience and persistence with these difficult concepts. In that pilot, it was unclear after 18 months of application whether the foundational concepts had made a significant contribution to community strategic planning in the Shire or to NRM. Several processes had not progressed as well as planned or had limited impact. Interviews with key leaders in late 2010 revealed that there was still interest in the concepts but still a lot of confusion about how they fitted together and related to each other. The research partnership could have broken down at several points and almost did. However MCMA persisted despite lack of definitive evidence that the concepts and the way they were being applied were making a contribution. During that time its thought leader had explored and digested the concepts in detail and was in the process of re-contextualising them for application to NRM practice. It was this careful considered process of learning that established the conditions for more rapid application of the concepts and set the scene for significant change.

As part of this study the concepts themselves have been enriched by attempts to tap synergies between them and by creative recombination of them. Our ultimate conceptual aim is a synthesis of these three concepts. We have stated in earlier study reports that some team members saw the dominant resilience assessment framework at the time as overly reliant on formal forms of learning, expert and manager input and not well equipped as a social change process. At the same time, other team members perceived Brown's collective learning process as lacking the analytical power to provide confidence to communities and particularly to agencies to take big decisions. There was also disagreement over the origins of adaptive governance and whether it should be given status as a concept separate to resilience thinking. However, there was general agreement that it may be the conceptual bridge between the other two foundational concepts.

Early attempts at synthesis and the development of a single framework were not able to get past the conceptual differences amongst the research team. Nevertheless it was agreed that principles from collective learning would be used in the Wakool pilot to develop a more community friendly approach to resilience assessments in workshops and to develop outputs to inform strategic planning based on the collective learning framework. While the latter strategy stalled, there has been continued development of a participatory learning approach to resilience planning.

During the period of MCMAs change strategy from about April 2011 to early 2012 the research team was only peripherally involved. Instead, team members were testing ideas elsewhere, including in Far North Queensland and other CMAs in NSW and Victoria, in particular through the consultancy work of Paul Ryan from Interface NRM. By the time MCMA was ready to launch its CAP2 process (based on new adaptive governance structures and arrangements) the learning based approach to resilience was well advanced and MCMA staff and the C2C were able to learn the basic principles and techniques very quickly through the use of visual interpretive devices based on heuristics (section 6.2).

The second example was instigated by very thoughtful and effective leadership in the CMA using the Board and researchers as sounding boards. While this leader is reluctant to be too specific about actual tactics or to claim credit for the design, what eventuated over a period of about two years was a practice framework for transformational change in which resilience thinking, adaptive governance and collective learning are embedded. As demonstrated in Section 8, the key components that researchers have identified as necessary for taking transformative action are all present to some degree in the MCMA framework. The three foundational concepts have been seamlessly integrated and the language changed to effectively communicate ideas to others.

9.2   Development and testing of tools (Objective 3)

The Murray case study has been a productive testing ground for the development and refinement of a set of heuristics with potential to help practitioners and communities interpret the way their particular social-ecological systems work. Twenty one of these 'tools' (Table 6.1) have been applied or will be used in the development of CAP2, some of which were used in the preparation of the CSP for Wakool Shire.

Significant advances have also been made over the last three years in translating resilience thinking into practical terms which resonate with professional NRM practitioners, landholders and communities. This translation has taken place in the Murray context with minimal involvement of researchers. However there has been a lot of behind the scenes development by researchers making heuristics accessible including:

- Ways of using visual devices already made available by the international Resilience Alliance based in Stockholm Sweden, of which Brian Walker is a director

- Development of new communication devices such as the 'clouds' diagram (Figure 6.2) for larger comprehensive planning approaches such as those used to develop CAPs, and the rapid appraisal tool designed to introduce complex systems thinking at a project scale.

During the study there were a series of shifts in demand for tools. Early workshops associated with the Wakool pilot were influential in reinforcing to researchers the need for testing tools and more practitioner and community friendly approaches. Initially WSC adopted a position of 'you come and do it for us'. By doing this we assumed that MCMA and WSC staff would become familiar with, and gradually take over, the facilitation with communities. For example the rapid appraisal tool (Table 6.1 No 15) was developed specifically for application to innovations and projects developed from the April 2011strategic planning workshop in Barham. WSC and MCMA staff attended planning meetings with community groups which had indicated they would collaborate to develop innovative

ideas from the workshop into action projects using seed funding provided by the Government. The plan was for staff to become familiar with the rapid appraisal tool and apply it in future projects. The approach was not successful either in promoting widespread interest in the dynamics of how the Wakool social-ecological system works, in stimulating innovation or in transfer of skills to MCMA staff.

Reacting to this situation researchers were directed towards providing a box set of tools with a set of practice notes. In other words MCMA no longer wanted researchers to do it for them. Its approach was 'to give us the toolkit and teach us how to use it so that we can apply the tools'. As the cultural change process within the organisation gained momentum and staff empowerment grew, this approach was also set aside in favour of one which in effect said to researchers 'go through the key ideas and heuristics with us and we will tailor the tools and design our own processes – we will call you when we need you'.

The message here is that a box set toolkit is unlikely to meet the demands of practitioner groups around Australia. Each has different levels of exposure to the concepts, different cultures and hence relationships with communities, and vastly different access to resources.

The Transformability Framework, as a diagnostic aid, has been used for the first time in this report. Ideally it should have been introduced to MCMA as a self-assessment or guided assessment process to maximise participatory learning consistent with the CMA's new culture of reflection and improvement. Unfortunately circumstances have not allowed progression to this next step. However from a research perspective, it has served to test the relevance of the Framework, discussed in the next section. A trial of a revised Transformability Framework as a participatory diagnostic process, which incorporates lessons learnt from the Murray case study, is planned for our Cape York case study in February 2013.

Key lessons in relation to this objective include:

- NRM practitioners empowered to reflect and innovate no longer want fixed ready to use kits particularly for strategic planning

- a box set containing a single framework and tools is not the way forward

- a foundation set of heuristics are useful to introducing the concepts and new ideas

- stories of how other peers have approached similar tasks are highly sought after

- reflective transfer is proving a productive approach -the transfer process is iterative and requires an on-going relationship of mentoring and feedback

- the Transformability Framework works as an evaluation framework and has capacities and stimulants which relate to actual practice by regional NRM organisations – it could be improved with more explicit indicators.

- a method of assessing the 5 Capitals needs to be trialled – this will most probably be an existing method.

9.3   Building Transformability (Objective 4)

The Murray case study is an example of participatory action research. As such researchers have been actively involved in the processes that are being studied and have therefore explicitly influenced the outcomes on the ground. One of the aims of the study is to actually assist our partners and communities to build capacity to take intentional transformative action in circumstances where transformational change is considered an option.

The original study objectives were framed around the research team's understandings prior to the study, specifically stating the intention to build adaptive governance, collaboration, agency and trust on the basis that these attributes would be important to communities wanting to instigate and navigate their way through a transition. As transformability has become commonplace as a term in the literature, and the theory is developing, our understanding has become more sophisticated and we have now developed a Transformability Framework (section 8). In this framework, agency, learning (triple loop) and self-organisation are included as outcomes, while adaptive governance (including collaboration and trust) enables the transformative management which delivers those outcomes. Trust is also a key component of social capital which provides the resources for radical self-organisation.

In previous reports and in Appendix 1 of this report, evaluations have shown that the transformative capacity or transformability according to the Framework, was not built in the Wakool pilot but that substantial progress has been made toward transformability in the MCMA, extending to community networks involved in the development of CAP2.

These conclusions raise questions on what has been learnt about: engagement with new ideas; capacity building with partner organisations; and providing assistance to rural communities as a result of the Murray experience. Exploring these questions has practical value for: the future conduct of this study; for the design, content and communication of support material as a product from the study; and for the ongoing evolution of NRM arrangements in Australia. One way to do this is by asking what made the MCMA change process (motivated by the need to improve performance) successful and the Wakool pilot unsuccessful. The following lessons about process design and timing stand out at this time but there are likely to be more lessons which become apparent as the study progresses in Far North Queensland and further reflection on the Murray case study information.

Key lessons in relation to this objective include:

Crisis as a trigger -there was a crisis, or more correctly, two distantly related crises. The first was part biophysical, an almost decade long severe drought, linked to changing public perspectives on resource access and the debate over climate change. This crisis was very real for both local and regional scale communities. The second was a governance crisis. WSC perceived its crisis as financial or perhaps a competency crisis that had been fixed. For MCMA there was a compelling reason and incentive to change. The NRC had clearly demonstrated through the 2008 audit that the crisis ran deeper and had exposed the underlying causes.

Openness to new ideas -the crisis opened the way in MCMA for introduction of new knowledge related to the deficiencies identified in the audit. WSC did not have these same drivers and struggled to see the relevance of new knowledge. MCMA leadership worked in the background taking time and patience to understand and contextualise new thinking including finding more community friendly ways to express new concepts. The GM and Chair worked as a team using mutual respect to develop trust and to tailor and contextualise the new ideas. Expert advice was sought and tested against existing mental models and potential opportunities though experts were not invited to design or run the process. In the foreground of the WSC were tensions in the executive, project deadlines and conservatism, leading to 'outsiders' running a change process in which only one or two leaders had cautious ownership.

Risk reduction – In the Wakool pilot both organisations, but particularly WSC, were risk averse, selecting safe options first and avoiding processes where public anger could be expressed. Concurrently MCMA was working on a different approach for its internal crisis. The embryo of a new conceptual model was starting to form around the new ideas and in particular the governance principle of devolution with clear accountability. A reorganised MCMA leadership put in place a rigorous portfolio of operating policies, management systems and governance processes which later served it well in containing risk associated with the implementation of new knowledge.

Demonstrating success – at critical times in the change strategy employed by MCMA, it took time out to check whether it was on the right path with the research team and other interested parties. This served as reinforcement of the value of the new thinking and commitment to the emerging business model. The follow up audit by the NRC in 2010 boosted confidence in the leadership team and the strategy. The presentations the GM made to the Board and partners on an emerging resilience framework for investment prioritisation also provided positive reinforcement.

Widening Ownership – valuable lessons were learnt in the Wakool pilot about reliance on a single champion to bring about change. This had arisen from conditions in Wakool Shire and within WSC at the time rather than by study design or preference. MCMA leadership carefully orchestrated engagement and empowerment of key people within the organisation and in external organisations in the region. This widened ownership of the new thinking, the emerging organisational culture and the new business model which was taking practical shape.

New structures and relationships – MCMA had reframed itself as a bridging organisation and change agent and established new devolved structures to support the new business model. These structures were both internal and external to the organisation and were skilled, supported and resourced to carry out newly devolved responsibilities. They became crucial in extending the change process from organisation centric change, to governance, and potentially to NRM practice change in the region. The structures provided new opportunities for networking, collaboration and interaction that had not previously existed between different MCMA functions, staff and Board, and staff and influential community members. This has built further trust and agency.

Choice of 'change vehicle' – A change vehicle can be processes that are necessary and will happen anyway, but can be used to facilitate other change agendas or interventions. On the surface, development of a Shire Council CSP and CMA CAP would appear to present similar opportunities for use as change vehicles. However there are differences which may account for different outcomes evident in this study. Firstly the CSP is more comprehensive in scope thus potentially exposing deeply held social and economic issues and potential resistance to change. Secondly WSC did not perceive the CSP or its integrated legislation to be a radical shift from previous planning approaches in the same way as the researchers and, in our view, the designers did. The CSP's importance was limited to the mechanics of having to produce it. Therefore the Council did not approach the CSP as an opportunity for change. The community failed to grasp that through this process it could have established a new relationship with the Council and the CMA. Conversely MCMA leadership were very aware of the importance of the CAP. Early in the study, from a performance perspective and then later as a change opportunity as its new business model unfolded.

9.4 Supporting a community of practice (Objectives 5 & 6)

A community of practice is considered to be important to embedding the new thinking and approaches developed in this study into NRM practice. This importance is illustrated in Figure 9.1. Initially the intention was to develop a number of ways to support the emergence of a community of practice. These included fostering close relationships between the various regional partners in this study and exploring innovative ways of transferring knowledge to other NRM organisations and communities not involved in the study.
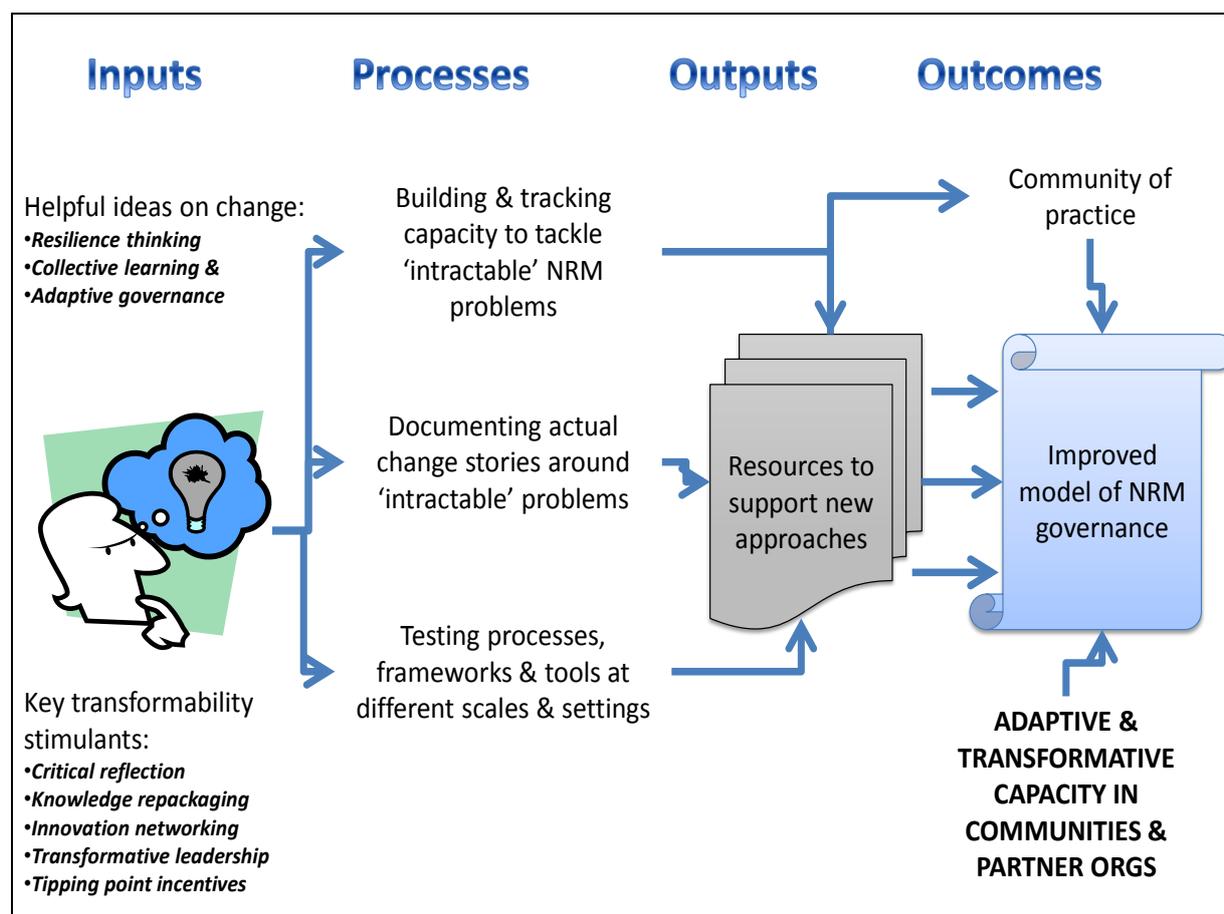
Figure 9.1: Project logic for the *Transformation for Resilient Landscapes and Communities* study

Our efforts to generate linkages between the MCMA and our partner organisations in Far North Queensland have not been successful. While WSC did attend the last partner meeting in July 2011 MCMA did not. However, consistent with the pattern established in other aspects of the case study, MCMA have developed alternative directions for engaging with peers. Leaders at both the political level through the Chair, and organisationally through the GM, have adopted leadership roles in state wide and cross border processes.

A community of practice is developing around this emerging paradigm. The focus is on a social-ecological systems approach, enriched by adoption of a collective learning approach to change and application of adaptive governance principles. At the 2012 NRM Knowledge Conference in Adelaide, resilience was a common theme in many presentations. Paul Ryan, a member of our research team, gave one of the keynote presentations outlining his experiences implementing this emerging paradigm with CMAs in NSW, Victoria, South Australia and Western Australia. Rod Griffith also presented, with Bob Frazer CEO of Cape York NRM Ltd, on the use of this thinking in establishing this most

recent regional NRM organisation. Following the conference, around 30 practitioners attended a separate forum to discuss how they could effectively form a community of practice around this emerging paradigm.

This study, supported by our partners, has adopted an open approach to knowledge sharing in supporting a community of practice. This transparency can lead to premature release of findings which have not been properly tested and leaves researchers open to criticism. The alternative is to wait until all research is completed before releasing a tested support package. This conservative approach limits the level of valuable feedback and input from a wider range of practitioners beyond the case study areas and the potential gains that can be made by early sharing of experiences.

The approach to the study and to building a community of practice is 'reflective transfer'. For each new setting and task within that setting, the cutting edge thinking is being provided to practitioners and at the same time being tested. For example, the 'clouds' diagram (Figure 6.1) is a heuristic that was developed from the foundational concepts, experience in the Wakool pilot and trialling of new ideas for improvement with Cape York NRM. The diagram was then refined by working with other CMAs in NSW and Victoria and used in its new form for the CAP2 process in the Murray and with our partners in FNQ. Many of the other twenty one heuristics (Table 6.1) are on similar journeys of testing and further application. Hence the idea of reflective transfer, which is not so much about knowledge but experiences which practitioners can draw on to tailor their own designs and approaches. This is what MCMA has done with the CAP2 process.

10. Implications of the Research

This report demonstrates that significant changes have taken place in the Murray catchment (NRM) region over the term of the *Transformation for Resilient Landscapes and Communities* study. Innovations led by MCMA in the areas of governance and NRM planning, backed by sound risk management practice have changed the culture of the organisation and as a result it's standing with regional communities and peer organisations. The pace of change was slow and cautious for a long period initially and accelerated rapidly over the last year of the study.

The report also demonstrates that the foundational concepts of resilience, adaptive governance and collective learning can play a strong role informing intentional transformational change processes at the scale of a regional NRM organisation and if the trends continue, to regional NRM governance systems. Similarly these concepts have informed a shift in the way NRM is conceptualised by MCMA and communities which have engaged in the CAP2 planning process. It is reasonable to say that an integrated package of adaptive governance, adaptive management and social-ecological systems, underpinning CAP2, is a cutting edge example of an emerging paradigm of NRM.

As yet, there has not been a demonstration of rural communities willing to intentionally transform whole social-ecological systems or parts of those systems, other than governance, in order to address resilience and sustainability goals.

10.1   Implications for the Murray case study region

For the Murray region much change is yet to come. The new paradigm of NRM now being practised and expanded by MCMA is under threat from transformation of NRM arrangements in NSW driven from above at the state scale. The NSW government is establishing new regional authorities across the state called Local Land Services with new regional boundaries, which in the Murray region will absorb MCMA. In the longer term the Murray region will also experience changes in water allocations and irrigation systems. However, over the past three years, experience has been that MCMA always has a forward agenda under thoughtful consideration, which would suggest that another phase of intentional adaptation is already underway. MCMA will need to deal with this next big challenge while still facing the very significant challenges involved in institutionalising the new paradigm and radical innovations it has fostered over the past three years. The shift to adaptive governance, underpinned by the management systems, developed by MCMA should provide a sound basis for adapting to the imposed transformations. It will require a fresh look, as new connections are developed and designed, and for implementation of a new business model to accommodate the diversity of functions covered by Local Land Services.

The shift to a social-ecological systems basis for the CAP should facilitate a reasonably seamless conceptual integration of the new concept of a region based on landuses rather than catchments and accommodate boundary changes. The governance and particularly engagement structures and processes trialled should also serve well in engaging new communities. We understand at the time of writing that this integration process and the redrafting of CAP and addition of social-ecological systems west of current Murray region boundaries are underway.

Perhaps the most import of the changes as a result of engaging with new ideas and ways of looking at NRM is the transformation of MCMA as a learning organisation which now pauses, deeply reflects, is prepared to experiment, and no longer fears change. As its Adaptive Strategy demonstrates it now has the confidence and runs on the board to embrace both incremental and transformational change and the tools to assess whether it is leading towards the goals of resilience and sustainability.

Interaction with MCMA over the study has been such that most insights developed by the research team and until recently by MCMA have already been shared and implemented. The learning from the

Wakool pilot is an example. As a failed experiment we could have all walked away disappointed and dismissed the foundational concepts as impractical and unhelpful. Instead we jointly asked how it could be done better. MCMA did the rest including institutionalising its own deep reflection and triple loop learning processes to set itself up for future innovation and potential transformation efforts.

With regard to next steps, the leadership group may derive some new insights from having the case study reflected back through this report. In particular, there may be new insights from the report's analysis of MCMA's change process using the Transformability Framework. Also of potential benefit are the perspectives of C2C members and the role they believe they played in mediating and changing engagement approaches and processes for gathering information from communities for CAP2.

MCMA has acknowledged that its CAP is community centric, an approach which is backed by a strong rationale. However agencies have been on the periphery and that risk will play itself out over the coming months. Allied to that issue is an opportunity to use collective learning processes to bring together multiple knowledge perspectives (including community, expert and political) at an early stage of CAP analysis and design, thus grounding community and agency expectations in a shared experience.

More attention to scale issues, including nesting of systems, and particularly the cross-scale dynamics thought to be heavily implicated in resilience and sustainability, might be a fruitful and perhaps necessary area for further development.

10.2   Implications for ongoing research

The Murray case study is part of a longer term participatory action research study. As the report has demonstrated the study aims and objectives have been advanced significantly as a result of engagement with partner organisations and communities in the Murray region and Wakool Shire.

In particular, progress has been made with conceptual integration. We now have two reasonably well integrated frameworks for building and activating transformability. One framework developed by the research team is theoretical and the other developed by MCMA is practical. Next steps in the study will include comparison of theoretical and practical approaches for similarities and differences, attempt further synthesis, then further trials of the Framework in FNQ.

There has been some degree of confirmation about the importance of the five key stimulants of transformative action we have chosen to test. Much has been learned about the practical application of those stimulants. Critical reflection linked to triple loop learning, innovation networks knowledge reframing and repackaging and tipping point incentives have all been applied by MCMA in novel ways which provide new insights for future applications with other partners in FNQ. However, it is the transformative leadership displayed by key leaders and later by MCMA as a change agent and bridging organisation that has been foundational to the successful change process in the Murray region. How these leaders went about their craft enriches our understanding and will make a significant contribution to the study and to future practice models of NRM.

A major contribution to the case studies in progress with Cape York NRM and with collaborating partners in Far North Queensland is that, for the first time, we have an Australian example from NRM of a successful transformational change strategy. This demonstrates to regional NRM organisations and communities firstly that radical change is both possible and can be beneficial and secondly that there is a set of principles available that have been shown to work in the NRM context.

However, some caution should be applied. One observation from the way other CMAs have designed and carried out their CAP upgrades is the lack of radical innovation in relation to addressing intractable NRM problems. In many cases the planning approach and the way CAPs are framed is innovative, and even radical in the case of the Murray region, but the actions which are generated for

change are not. This may stem back to early concerns of researchers about conservatism of resilience assessment processes, which is carried forward into the 'clouds' diagram, which has become an influential heuristic in regional NRM planning. To overcome this deficiency we have started to explore linking wider regional planning processes to the Transformability Framework in a much more explicit way. In practice, this means that when participants in a planning process get to the stage of working on options for system interventions, the Transformability Framework and stimulants are brought into the process to drive new thinking about types of actions and whether transformation is the appropriate option. This linkage is now being trialled in FNQ.

The case study has also made a significant contribution to our thinking about both the appropriate form and content of a package of support resources for rural communities and NRM organisations. This has been a vexing issue for researchers working in this study. A large number of tools and heuristics were trialled in the various aspects and pilots of the Murray case study. Most of these are visual aids to practitioners and communities engaged in regional planning underpinned by analysis of social-ecological systems dynamics. These tools primarily relate to one capacity in our Transformability Framework (capacity for strategic assessment of social-ecological systems in Figure 3.3) and highlights gaps to be addressed in FNQ case studies. Over the course of the study, MCMA had changing needs as competencies with the concepts grew and pilots proved successful. This will need to be addressed and has already led researchers to dispense with the original idea of a 'toolkit'. As a result, a new approach is under development on how the study could engage with, and support, partners and a community of practice.

Lessons from the study have come from both success stories and failed experiments. The failures were partly due to particular social and ecological conditions and partly due to inappropriate strategies including process design. Considerable improvements could be made in establishing clear expectations in the research partnership, explaining the overall study methodology, the timing of engagement and participation of partners in design of change processes.

It is too early to start hypothesising about a new practice model of NRM. However we can see that the embryo of such a model created by the NRC's focus on resilience has been progressed in the Murray approach. Some very important high level characteristics are apparent in this emerging model, such as:

- Regional NRM organisations play a bridging role and are change catalysts – transformational change is sometimes necessary including to the organisation.

- Engagement and decision making is participatory, drawing on social-ecological identity and devolution of power, resources and responsibility to mobilise social capital

- Planning is an ongoing adaptive process of purposeful intervention and responsiveness to change in co-evolving social-ecological systems– plans are the best available product of that ongoing process at any time

- Leadership is focussed on the importance of social processes and perceptions in orchestrating change and on thresholds

- Management is learning based, accepting that interventions are propositional – a culture of deep reflection and triple loop learning is required to support experiments

- Targets are aids to management - not the main game

- Knowledge comes from both the parts and whole of systems and from multiple knowledge perspectives

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