

University of Wollongong Thesis Collections

University of Wollongong Thesis Collection

University of Wollongong

Year 2006

Collaborative natural resource
management in a changing institutional
landscape : rhetoric and practice of
catchment management in New South
Wales, Australia

Pedro I. J. Fidelman
University of Wollongong

Fidelman, Pedro I, Collaborative natural resource management in a changing institutional landscape: rhetoric and practice of catchment management in New South Wales, Australia, PhD thesis, School of Earth and Environmental Sciences, University of Wollongong, 2006. <http://ro.uow.edu.au/theses/837>

This paper is posted at Research Online.
<http://ro.uow.edu.au/theses/837>

NOTE

This online version of the thesis may have different page formatting and pagination from the paper copy held in the University of Wollongong Library.

UNIVERSITY OF WOLLONGONG

COPYRIGHT WARNING

You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site. You are reminded of the following:

Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material. Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

**Collaborative Natural Resource Management
in a Changing Institutional Landscape:
Rhetoric and Practice of Catchment Management
in New South Wales, Australia**

A thesis submitted in partial fulfilment of the
requirements for the award of the degree

Doctor of Philosophy

from

UNIVERSITY OF WOLLONGONG

By

PEDRO I. J. FIDELMAN

BSc (Hons), MSc

School of Earth and Environmental Sciences

2006

Certification

I, Pedro I. J. Fidelman, declare that this thesis, submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Earth and Environmental Sciences, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

.....

Pedro I. J. Fidelman

31 August 2006

Table of Contents

<i>Certification</i>	<i>i</i>
<i>Table of Contents</i>	<i>ii</i>
<i>List of Tables</i>	<i>vi</i>
<i>List of Figures</i>	<i>vii</i>
<i>Acronyms</i>	<i>viii</i>
<i>Abstract</i>	<i>ix</i>
<i>Acknowledgements</i>	<i>xi</i>
Chapter 1 Introduction: Collaborative Natural Resource Management in a Changing Institutional Landscape	1
1.1 Collaborative Natural Resource Management.....	3
1.2 Catchment Management: A Collaborative Approach to NRM.....	9
1.3 Summary.....	14
Chapter 2 The Institutional Analysis and Development (IAD) Framework	15
2.1 Introduction.....	15
2.2 Defining Institutions.....	15
2.3 Analysing Institutions: The IAD Framework.....	16
2.4 Summary.....	22
Chapter 3 Research Design and Methods	23
3.1 Introduction.....	23
3.2 Research Approach	23
3.3 Selection of Catchment Management Institutions	24
3.4 Data collection and analysis	26
3.5 Analytical Framing.....	29
3.6 Evaluation Criteria.....	31
3.7 Enhancing Research Quality.....	31
3.8 Limitations and Excluded Areas of Research.....	32

Chapter 4 Analysing Catchment Management in New South Wales, Australia: An Institutional Approach	34
4.1 <i>Introduction</i>	34
4.2 <i>The IAD framework and Catchment Management</i>	34
4.2.1 Position Rules	36
4.2.2 Boundary Rules	37
4.2.3 Choice Rules	37
4.2.4 Aggregation Rules	37
4.2.5 Information Rules	38
4.2.6 Payoff rules	38
4.2.7 Scope rules	38
4.3 <i>Methods</i>	39
4.4 <i>Analysing Catchment Management in a Changing Institutional Setting</i>	41
4.4.1 The Initial Institutional Setting (T_0)	42
4.4.2 Creating Catchment Management Institutions (T_1)	43
4.4.2.1 The Constitutional-Choice Level: Adoption of Catchment Management as a State-Wide Policy	43
4.4.2.1.1 Focal Events	43
4.4.2.1.2 Actions, Outputs and Outcomes	44
4.4.2.2 The Collective-Choice Level: Catchment Management Committees	46
4.4.2.2.1 Institutional Rules: The Illawarra Catchment Management Committee	47
Position Rules	49
Boundary Rules	49
Choice Rules	50
Aggregation Rules	52
Information Rules	53
Payoff Rules	55
Scope Rules	57
4.4.3 Reviewing Catchment Management Institutions (T_2)	59
4.4.3.1 The Constitutional-Choice Level: Review of Total Catchment Management	59
4.4.3.1.1 Focal Event	59
4.4.3.1.2 Actions, Outputs and Outcomes	61
4.4.3.2 The Collective-Choice Level: Catchment Management Boards	62
4.4.3.2.1 Institutional Rules: The Southern Catchment Management Board	63
Position Rules	64
Boundary Rules	65
Choice Rules	66
Aggregation Rules	68

Information Rules.....	68
Payoff Rules	70
Scope Rules.....	72
4.4.4 Reforming NSW Natural Resource Management (T_3).....	75
4.4.4.1 The Constitutional-Choice Level: NSW Natural Resource Management Reform....	75
4.4.4.1.1 Focal Event	75
4.4.4.1.2 Actions, Outputs and Outcomes.....	76
4.4.4.2 Linking NSW Catchment Management to Other Action Arenas: National NRM Initiatives	80
4.4.4.3 The Collective-Choice Level: Catchment Management Authorities	83
4.4.4.3.1 Institutional Rules: The Southern Rivers Catchment Management Authority	83
Position Rules.....	85
Boundary Rules	85
Choice Rules	87
Aggregation Rules.....	88
Information Rules.....	89
Payoff Rules	91
Scope Rules.....	95
4.5 Conclusions	98

Chapter 5 From Collaboration to Deconcentration? Rhetoric and Practice of Catchment Management in New South Wales..... 100

5.1 Introduction.....	100
5.2 A Framework of Collaborative NRM Institutions	100
5.2.1 Position rules.....	103
5.2.2 Boundary rules	104
5.2.3 Choice rules.....	106
5.2.4 Aggregation rules	107
5.2.5 Information rules.....	108
5.2.6 Payoff rules	109
5.2.7 Scope rules	110
5.3 Methods	111
5.4 Evaluating Institutional Change.....	112
5.4.1 Position Rules.....	116
5.4.2 Boundary Rules	119
5.4.3 Choice Rules	123
5.4.4 Aggregation Rules.....	130
5.4.5 Information Rules.....	133

5.4.6	Payoff Rules	136
5.4.7	Scope Rules	139
5.5	<i>Understanding Institutional Change: From Constrained Collaboration towards Deconcentration</i>	143
5.5.1	Institutional Design and Change	144
5.5.2	Collaborative NRM Paradoxes.....	145
5.5.3	Politics of Decentralisation	146
5.6	<i>Conclusions</i>	149
Chapter 6 Summary and Conclusions		151
6.1	<i>Introduction</i>	151
6.2	<i>Collaborative Institutions: Rhetoric and Practice</i>	151
6.3	<i>Implications for Theory, Policy and Practice</i>	152
6.4	<i>Limits of the Study</i>	157
6.5	<i>Recommendations for Further Research</i>	159
6.6	<i>Concluding Remarks</i>	160
References.....		161
Appendix A: Research Approach Information – Relationship between research questions, variables and data		179
Appendix B: Core Documentation and Archival Records Collected		183
Appendix C: Research Consultation and Interview Process Information.....		188
Appendix D: Consent Forms and Research Ethics Clearance.....		191
Appendix E: Interview Guide		197
Appendix F: Initial List of Codes		200

List of Tables

Table 1-1: Comparison of traditional and emerging approaches to NRM.....	6
Table 3-1: Observation research	29
Table 3-2: Temporal scale and levels for the analysis of catchment management institutions in New South Wales	30
Table 4-1: Institutional rules of the Illawarra Catchment Management Committee	48
Table 4-2: Membership of the Illawarra CMC members on other NRM fora.....	54
Table 4-3: Terms of reference of the 1996 NSW Catchment Management Review	60
Table 4-4: Major issues identified in the 1996 NSW Catchment Management Review	61
Table 4-5: Institutional rules for the Southern Catchment Management Board.....	63
Table 4-6: Composition of CMBs and selection of board members.....	66
Table 4-7: NHT investment secured by the Southern CMB in 2002/03.....	71
Table 4-8: Membership of the NRAC.....	78
Table 4-9: Institutional rules for the Southern Rivers Catchment Management Authority	84
Table 4-10: Investment sought by the Southern Rivers CMA from the NHT for the period 2004/05-2006/07	94
Table 4-11: Investment anticipated from the NSW government (i.e., matching state contribution in cash and in-kind) for the period 2004/05-2006/07	94
Table 4-12: Distribution of NHT and NSW Sustainability Trust funds in the period 2004/05 – 2006/07	95
Table 5-1: Evaluative framework of collaborative NRM institutions	102
Table 5-2: Institutional change in the NSW Catchment Management initiative.	111
Table 5-3: Main institutional changes in the NSW Catchment Management Initiative.	113
Table 5-4: Examples of NSW plans and strategies at state, regional and local levels (as of 2003).	125
Table 6-1: Design principles for complex collaborative NRM institutions.....	154

List of Figures

Figure 2-1: Main features of the IAD framework.....	18
Figure 2-2: Levels of institutional analysis.....	21
Figure 3-1: Area of operation of the institutions selected for analysis.	26
Figure 4-1: Rules as exogenous factors affecting the action situation.....	36
Figure 4-2: Institutional Analysis of NSW Catchment Management initiative.....	39
Figure 4-3: Key elements of the NSW catchment management framework in the 1990s.	46
Figure 4-4: Area covered by Catchment Management Committees in New South Wales.	58
Figure 4-5: Area covered by Catchment Management Boards in New South Wales.....	74
Figure 4-6: Key elements of the framework for NRM in NSW.	77
Figure 4-7: Organisation structure of the Southern Rivers CMA (as of 2005).....	92
Figure 4-8: Area covered by the CMAs.....	96
Figure 5-1: Change in the geographical domain of catchment management institutions in New South Wales (east to the Great Dividing Range).....	141
Figure 5-2: The area of the Southern Rivers CMA and the areas of the former CMCs and CMBs	142

Acronyms

CaLM	Department of Land Conservation
CAP	Catchment Action Plan
CMA	Catchment Management Authority
CMB	Catchment Management Board
CMC	Catchment Management Committee
CMTs	Catchment Management Trusts
DIPNR	Department of Infrastructure Planning and Natural Resources
DLWC	Department of Land and Water Conservation
DNR	Department of Natural Resources
DUAP	Department of Urban Affairs and Planning
EPA	Environment Protection Authority
GDR	Great Dividing Range
IAD	Institutional Analysis and Development
NAP	National Action Plan for Salinity and Water Quality
NGOs	Non Government Organisations
NHT	National Heritage Trust
NPWS	National Parks and Wildlife Service
NRAC	Natural Resources Advisory Council
NRC	Natural Resources Commission
NRM	Natural Resource Management
NSW	New South Wales
RCCCs	Regional Catchments Coordinating Committees
SCMCC	State Catchment Management Coordinating Committee
TCM	Total Catchment Management

Abstract

Collaborative approaches to natural resource management (NRM), emphasising participatory and decentralised forms of decision-making, such as catchment management, have been experimented with in Australia over the past 15 years or so. These experiments have taken place in an institutional context that has been changing frequently and rapidly, as many states have, particularly in recent years, reviewed legislative and administrative arrangements for NRM. Such reforms may involve significant changes in the legislative and administrative arrangements, such as new and specific legislation, NRM entities with diverse names, structures and functions, as well as new processes.

In New South Wales (NSW), for instance, such changes have often altered the structure and process of NRM decision-making (e.g., the interests represented, the level of authority and power devolved, community participation, geographic domain, etc.).

Although, these reforms have sought to improve NRM performance and outcomes, they have occurred in a context where the exact requirements for institutional change, in order to facilitate collaborative NRM, are not well understood. In this context, it is not explicit how (and if) these institutional reforms are establishing, or are likely to establish, appropriate arrangements to translate the rhetoric of collaborative NRM into practice.

This research examined the design of and change in institutional arrangements for collaborative NRM in the context of the NSW experience. The study used a case study research approach to undertake a comparative analysis of the arrangements experimented with over the history of the NSW catchment management initiative (late 1980s-mid 00s). The Institutional Analysis and Development framework was used to examine three catchment management institutions, representatives of periods characterised by institutional change.

The research aimed to provide a better understanding of how (and why) institutional design and change have taken place, and how such design and change have facilitated (or otherwise) collaborative NRM.

The study showed that institutional arrangements, in terms of who participate in NRM decision-making and how they are selected, authority, powers and resources devolved, decision-making and aggregation arrangements, arrangements for communication, interaction, reporting and monitoring, functional scope and geographic domain, varied considerably throughout the history of the NSW catchment management initiative.

Despite the variations, institutional arrangements were characterised by significant constraints and have been limited in facilitating collaborative NRM. In many cases, institutional change reinforced the constraints to collaborative processes, such as those associated with stakeholder and citizen engagement, levels of authority and power devolved, and autonomy and flexibility of catchment management institutions. The analysis also provided insights into the challenges and complexities surrounding the development and implementation of collaborative NRM. Another key issue demonstrated in this study was an emerging trend in terms of institutional arrangements in NSW, where the current arrangements have evolved away from a collaborative model towards one of deconcentration (i.e., administrative decentralisation). Given the complexities and challenges involving the development and implementation of collaborative NRM, the adequacy and appropriateness of indiscriminately pursuing collaborative approaches was considered.

Acknowledgements

Doing a PhD may be a challenge in its own right. Doing a PhD in a different country, culture and language was a rewarding experience. Many people contributed to make study and life “down under” worthwhile. I would like to thank the support and assistance of Sandra Quinn, Prof. John Morrison, A/Prof. Ron West, friends, PhD fellows and staff from the School of Earth and Environmental Sciences and the Centre for Maritime Policy at the University of Wollongong. The assistance provided by Jane Caldwell and Sandy Fritz, currently at the Southern Rivers Catchment Management Authority, particularly in retrieving the information about the Illawarra Catchment Management Committee and the Southern Catchment Management Board, is very much appreciated. I would also like to acknowledge the kind help from the Southern Rivers CMA Board members and staff. The time and knowledge contributed by many individuals that took part in the consultations and interviews are also appreciated. Very special thanks go to friends and family for their support throughout this PhD, in particular my parents for being supportive and understanding of my “endeavours”, which have often resulted in erratic routes and considerable time away from home, and Gill for the care and support, and much needed “hand” in the last days of this thesis. Last, I would like to acknowledge the PhD scholarship provided by CAPES, Government of Brazil.

Chapter 1

Introduction: Collaborative Natural Resource Management in a Changing Institutional Landscape

Collaborative approaches to natural resource management (NRM), emphasising participatory and decentralised forms of decision-making, such as catchment management, have been experimented with in Australia over the past 15 years or so. Currently, collaborative approaches provide the basis for considerable investment in NRM across the country, particularly through programs such as the National Heritage Trust (NHT) (CoA, 2002).

These NRM “experiments” have taken place in an institutional context that has been changing frequently and rapidly, as many states have, particularly in recent years, reviewed legislative and administrative arrangements for NRM (Pannell et al., 2004). For instance, New South Wales announced, in 2003, a major reform of its NRM system (DIPNR, 2003b), while South Australia established, in 2004, an entirely new framework for NRM (Lane et al., 2005).

Such reforms may involve significant changes in the legislative and administrative arrangements, such as new and specific legislation, NRM entities with diverse names, structures and functions, as well as new processes. In New South Wales (NSW), for instance, such changes have often altered the structure and process of NRM decision-making (e.g., the interests represented, the level of authority and power devolved, community participation, geographic domain, etc.).

Although, these reforms have sought to improve NRM performance and outcomes, the feasibility of achieving benefits from collaborative approaches remains largely unknown (Marshall, 2001), as the understanding of the extent to which the institutional arrangements adopted have served to facilitate collaborative action is limited (Bellamy et al., 2002).

In this context, it is not explicit how (and if) these institutional reforms, that have been taking place in the country, are establishing, or are likely to establish, appropriate arrangements to translate the rhetoric of collaborative NRM into practice.

Elsewhere, reforms pursuing decentralised, collaborative forms of NRM are failing to establish the necessary conditions that theorists believe will produce positive outcomes (e.g., Ribot, 2002b; Larson and Ribot, 2004).

This thesis examines the design and change of institutional arrangements for collaborative NRM in the context of the NSW experience. The study uses a case study research approach to undertake a comparative analysis of the arrangements experimented with over the history of the NSW catchment management initiative. The Institutional Analysis and Development framework (Ostrom, 2005) is used to examine three institutions, which are representative of periods characterised by institutional change. The aims of the study are to provide a better understanding of how (and why) institutional design and change have taken place, and how institutional design and change have facilitated (or otherwise) collaborative NRM arrangements.

The rest of this chapter provides a concise overview of collaborative NRM, and introduces catchment management as a collaborative approach used in Australia, with emphasis on the NSW experience.

Chapter 2 presents the theoretical background for the analytical framework used in the thesis. Chapter 3 presents the case study research design and overall methods employed in this research. Chapter 4 examines institutional change in the context of NSW catchment management initiative. The institutional aspects of the Institutional Analysis and Development framework has been adapted to examine the arrangements experimented with over the history of the NSW initiative. The chapter investigates how and why institutional change has taken place. Chapter 5 examines how institutional design and change have facilitated (or otherwise) collaborative NRM. An evaluative framework is proposed, against which institutional arrangements are assessed. The last chapter presents the summary and conclusions of the thesis, together with proposed areas of further research.

1.1 Collaborative Natural Resource Management

In the context of this study, the term collaborative NRM includes a wide range of initiatives featuring innovative approaches to the management of natural resources and the environment, such as watershed partnerships (Leach et al., 2002; Lubell et al., 2002), integrated watershed management (Blomquist and Schlager, 2005), ecosystem management (Slocombe, 1993; Grumbine, 1994; Cortner and Moote, 1999), integrated environmental management (Cairns and Crawford, 1991; Margerum and Born, 1995), co-management (Carlsson and Berkes, 2005), integrated coastal management (Cicin-Sain and Knecht, 1998), integrated water (resources) management (Mitchell, 1990b; Jønch-Clausen and Fugl, 2001; Mitchell, 2005), integrated resource management (Mitchell, 1986; Bellamy et al., 1999; Bellamy and Johnson, 2000), integrated catchment management (Mitchell and Hollick, 1993; Johnson et al., 1996), community-based environmental planning or community-based natural resource management (Armitage, 2005; Lane and McDonald, 2005), citizen regionalism (Lane et al., 2005), among others.

Despite not being precisely the same – their strategies vary considerably in terms of scope and focus – these approaches have several characteristics in common. These include (e.g., Mitchell, 1986; Born and Sonzogni, 1995; Margerum and Born, 1995; Bellamy, 1999; Cortner and Moote, 1999; McGuinnis et al., 1999; Wondolleck and Yaffe, 2000; Born and Genskow, 2001; Ribot, 2002b; Gunton and Day, 2003, among many others):

- reduced state involvement and transfer of some degree of decision-making authority, power and resources to local actors and/or institutions;
- systemic and holistic approach to NRM that recognises the complexity, interrelationships and connections among ecological processes and components, multiple resource uses and jurisdictions;
- addressing multiple and interrelated NRM and socioeconomic problems, balancing exploitation and conservation;
- coordinating government, non-government, and community activities, programs and policies;
- place-based scope, usually catchments, sub-catchments or bioregions;
- inclusive of a broad array of interests, engagement of a range of government and non-government stakeholders and the public;

- multiple stakeholders build shared information, preferences, values and resources;
- integration of local knowledge and technical/scientific information;
- deliberative approach to policy formulation;
- consensual decision-making built on social capital, emphasising voluntary implementation under existing policies and programs;
- conflict resolution through negotiation and mediation among stakeholders; and,
- adopting a long-term perspective, learning through adaptive management.

Current thinking on collaborative NRM has also promoted more democratic and rights-based approaches (e.g., Moote et al., 1997; Agrawal and Ribot, 1999; Cortner and Moote, 1999; Ribot, 2002b; Moore, 2005; Trachtenberg and Focht, 2005). With this regard, collaborative approaches are regarded as a means of enhancing local democracy, increasing government legitimacy and accountability, improving equity and empowering disenfranchised segments of society¹.

Collaborative approaches have developed over the past two decades in response to limitations of the traditional centralised approaches based on regulation/command-and-control strategies (Wondolleck and Yaffe, 2000; Sabatier et al., 2005a). In Australia, for example, traditional approaches to NRM were responsible for *ad hoc* decision-making and piece-meal action, which usually addressed the symptoms rather than the causes of NRM problems (Bellamy et al., 1999).

Other factors believed to have influenced the emergence of collaborative NRM include (Wondolleck and Yaffe, 2000):

- response to problems caused by past policies and management practices;
- reflection of the current organisational and social context of management;
- conflicts/impasses at various arenas (e.g., legislative, administrative, judicial arenas) and levels of decision making, which have high transaction costs as they involve time, money and human resources;
- general declined trust in government, aversion to government programs, and aversion to further regulation; and,

¹ The characteristics of collaborative NRM are elaborated in further detail in Chapter 5.

- resource constraints, reduced budget for government agencies, understaffing and overworking.

It has been widely acknowledged that contemporary NRM problems cannot be solved by traditional approaches alone (Born and Genskow, 2001). Catchments, for instance, are complex systems featuring interconnected ecological process, which are transboundary in nature, i.e., operate at various spatial and temporal scales. They present down-stream and up-stream interactions with complex cause-effect relationships (Heathcote, 1998). Catchments may also host multiple, fragmented, and sometimes conflicting communities and interest groups (O'Neil, 2005; Brunckhorst and Reeve, 2006). It usually features multiple resource uses and property rights (e.g. private, public, and common-pool), e.g., water quality results from combined and cumulative impacts of many individual activities throughout the catchment (Lubell, 2004). Furthermore, catchments generally span multiple jurisdictions, where responsibility over NRM is fragmented, involving many agencies and departments, at multiple levels of government (Burton, 1985).

The complex nature of NRM presents major challenges to traditional command-and-control policies based on standardised regulations administered by a central agency (Lubell, 2004). Collaborative approaches, therefore, indicate that there are no simple or short-term solutions, nor single perspectives when dealing with complex NRM problems within a regional or catchment context. Such NRM problems are perceived to be beyond the scope of purely technical solutions and the government domain alone (Bellamy et al., 1999).

In this context, collaborative NRM is regarded as an emerging paradigm (Bellamy, 1999; Cortner and Moote, 1999), which recognises the interdependencies of the natural, social, political and technological systems in addressing complex NRM problems featuring interconnectedness, uncertainty, ambiguity, conflict, and societal constraints (Table 1-1). It replaces the fragmented and frequently reactive sectoral approaches with more flexible and integrated ones (Bellamy et al., 1999).

Despite the emphasis on increased involvement of non-government stakeholders and citizens in general, and, accordingly, reduced state involvement, it is important to note that collaborative approaches do not replace government; rather they complement traditional approaches to NRM (Born and Genskow, 2001).

Table 1-1: Comparison of traditional and emerging approaches to NRM

Please see print copy for image




Table 1-1: continued.

Please see print copy for image

Source: Bellamy et al. (1999).

Collaborative approaches to NRM have been widely promoted overseas and in Australia. In the USA, for example, they are reflected in a growing number of initiatives such as partnerships, consensus groups, watershed councils and other groups involved in NRM (e.g., Kenney et al., 2000; Born and Genskow, 2001; Conley and Moote, 2001; Leach et al., 2002), featuring highly diverse processes that differ in scale, involvement, levels of formality and institutionalisation (Yaffe and Wondolleck, 2003).

In Australia, collaborative approaches to NRM are manifest, for example, in the Landcare initiative, catchment management and the Natural Heritage Trust (NHT) (Conacher and Conacher, 2000). In the case of Landcare, a local community-based initiative, it was estimated that there were some 4,000 Landcare groups in the country (Curtis and De Lacy, 1996 apud Curtis and Lockwood, 2000). Under the regional NRM arrangements, another example, there are 57 NRM regions across Australia that feature collaborative approaches under the NHT and/or the National Action Plan for Water Quality and Salinity (NAP) (CoA, 2004c).

As collaborative initiatives proliferate, so does the literature related to collaborative NRM. Such literature comes from a range of different disciplines, each with its own publications, theoretical constructs and jargon. As Conley and Moote (2001) noted, the works comprising this literature may not explicitly mention collaborative approaches, they, however, present ideas that have been employed to develop, justify and understand collaborative NRM. Such literature comprises a formidable number of journal articles, books, theses and reports that cover a wide range

of aspects of collaborative NRM. These include, for example, literature reviews (e.g., Conley and Moote, 2001; Leach and Pelkey, 2001; Oliver, 2003), the formation of collaborative initiatives (e.g., Cortner and Moote, 1999; Lubell et al., 2002), the practice of collaborative NRM (e.g., Mitchell and Pigram, 1989; Mitchell and Hollick, 1993; Bellamy and Johnson, 2000), facilitating or inhibiting factors (e.g., Cortner and Moote, 1999; e.g., Margerum, 1999b; Wondolleck and Yaffe, 2000; Leach and Pelkey, 2001), theoretical frameworks (e.g., Imperial, 1999b; Kenney and Lord, 1999; Sabatier et al., 2005c), evaluation (e.g., Wallace et al., 1995; Bellamy et al., 2001; Leach et al., 2002; Conley and Moote, 2003; Bellamy, 2005), and criticism as well (e.g., Kenney, 2000; McCloskey, 2001; Lane et al., 2004b).

Noteworthy is the fact that there are, relatively, not as many works on critiques of collaborative NRM, such as those raising thorny issues regarding the effectiveness and appropriateness of collaborative approaches to NRM (see, e.g., Kenney, 2000). Particularly when efforts are based on simplistic and ambiguous premises (e.g., Lane and McDonald, 2005), drawbacks and perverse outcomes can result from the implementation of collaborative approaches, such as the implementation of imposed agendas and reinforcement of inequalities among stakeholders, favouring the dominance of powerful actors (e.g., Lane, 1997; Ribot, 2002b).

Calls for decentralisation and devolution of NRM often fail to acknowledge, for example, the potential of powerful stakeholders to subvert, rather than promote, democratic processes and outcomes (Lane, 2003). In Australia, Lane (2003) identified anti-democratic implications of collaborative efforts, i.e., outcomes that fail to reflect diverse values and interests as a result of uncritical engagement of stakeholders. Likewise, Rockloff and Lockie (2006) assert that community participation without an explicit strategy for democratization and capacity-building is likely to mask decisions made in the interests of elite groups.

These and other concerns over the potential and significant limitations and drawbacks that collaborative approaches may have are frequently lost in the “fervour” to endorse and implement them (Kenney, 2000). Fortunately, the need to examine such thorny issues related to collaborative NRM has become more commonly acknowledged, including as a means to promote an active and constructive arena of debate (Kenney, 2000; Lane et al., 2004b). Experimentation with collaborative NRM needs to be guided by explicit scholarly critiques, particularly, if efforts are to be progressively refined (Kenney, 2000; Lane et al., 2004a).

1.2 Catchment Management: A Collaborative Approach to NRM

Before, presenting catchment management as a collaborative approach to NRM in Australia, it is useful to understand the responsibilities for NRM in the context of Australia's federal system of government. This system of government comprises the national government and 6 states and 2 territories. Local government form the third tier of government. Under the constitution, responsibility for NRM rests with the states² (Woodhill, 1996; CoA, 2003), particularly in terms of environmental protection, including the management of protected areas and resource production (e.g., mining, fishing, forestry) (Jennings and Moore, 2000). Nevertheless, federal and local governments also play significant roles in NRM. Local government are important players in NRM, as they are involved in statutory environmental planning and protection, and a multitude of processes and institutions related to NRM (Wild-River, 2003). Federal government has influenced NRM by developing national strategies and policies (e.g., the Natural Heritage Trust) and, in particular, by providing funding to implement those strategies and policies.

In this context, catchment management has been one of the several collaborative approaches to NRM experimented with in Australia. Catchment management has been promoted, over the past 15 years or so, as a community-based model of governance, and is regarded as a pioneer of formalised partnerships on NRM between government and community (Bellamy et al., 2002). All states in Australia have adopted a range of policy frameworks, institutional arrangements and implementation processes for catchment management, based on collaborative partnerships (Bellamy et al., 2002).

The drivers for NRM in the Australian states were historically focused on water diversions and soil erosion, emphasising the maintenance of agricultural productivity and expansion. Responses to NRM problems have evolved differently due to variation in the states' resource use and management contexts (Bellamy et al., 2002). The frameworks, arrangements and processes for NRM have varied between states (Bellamy et al., 2002).

Several works present information on the approaches to catchment management adopted by the states across Australia, at different periods (e.g., Syme et al., 1993; AACM and CWPR, 1995; CoA, 2000; Bellamy et al., 2002; Ewing, 2003; Pannell et al., 2004). The specifics of the current arrangements also vary considerably between states.

² Hereafter the term state or states refers, in the Australian context, to both states and territories.

For example, as of early 2004, catchment management bodies (i.e., Catchment Management Authorities) in NSW and Victoria were statutory authorities, whereas in Western Australia the Catchment Councils were non-statutory (Pannell et al., 2004). Despite the differences, the states' approaches converge in terms of thinking and institutional design, centring on processes of civic engagement organised at the regional scale (Lane et al., 2005). This is because national programs such as NHT and NAP – which subscribe to what Lane et al. (2005) call “civic regionalism” approach – are now the main drivers for NRM throughout Australia³ (Bellamy, 2005).

New South Wales (NSW) was the first Australian State to adopt, in the late 1980s, catchment management as a state-wide statutory policy. Early approaches to catchment management date, however, back to the 19th century (Burton, 1992). A sectoral management focused on problems such as soil erosion, dry-land salinity, flood mitigation, and/or water quality dominated until the first half of the 20th century (Burton, 1992). During the 1950s, a new approach to catchment management emerged as a result of severe floods in many coastal rivers of NSW. A number of flood mitigation authorities were then formed to coordinate flood mitigation activities. Among these authorities, the Hunter Valley Conservation Trust, which is considered as the first instance, in Australia, of a catchment management entity established specifically to coordinate the management of land and water resources across the catchment (Burton, 1992). In the 1980s, the concept of coordination of NRM on a catchment basis re-emerged within the NSW government in the form of Total Catchment Management (Burton, 1985, 1986). In 1989, the passage of the Catchment Management Act institutionalised catchment management as a state policy. Catchment management was proposed as an approach to coordinate the management of natural resources on a catchment basis, emphasising the participation and coordination of multiple government and non-government actors, as well as voluntary implementation (Burton, 1985, 1986). The arrangements for catchment management have, therefore, evolved away from sectoral and government-centred to more integrated approaches to land and water management, and emphasising community involvement (Bellamy et al., 2002; Ewing, 2003). Catchment management has also been shaped by trends in NRM policy, including broader problem framing, devolution of roles and responsibilities,

³ NHT and NAP programs are discussed in Chapter 4.

adaptive management and partnership approaches, learning communities, regionalism, and changing science-policy relationships (Bellamy et al., 2002).

Catchment management, like other collaborative approaches, has proven challenging to implement, particularly, due to institutional challenges. Institutional challenges figure among the most formidable obstacles inhibiting the transition of policy into practice. In some cases, institutional problems are believed to be “more prominent, persistent and perplexing than technical, physical, or even economic problems...” (Ingram et al., 1984). Significant institutional barriers and challenges to catchment management in Australia and NSW, have been identified in a number of works and reviews (e.g., Syme et al., 1993; AACM and CWPR, 1995; AACM, 1996; Margerum, 1996; Bellamy et al., 1999; CoA, 2000; Conacher and Conacher, 2000; Marshall, 2001; Bellamy et al., 2002; Reeve et al., 2002). They include:

- limited resources and access to expertise;
- inadequate funding
- inappropriate scale/boundaries of operation;
- inadequate authority of catchment management bodies;
- imbalance in participation/representation in catchment management bodies;
- lack of coordination of programs and policies;
- ineffective community involvement;
- lack of implementation of the plans developed;
- inadequate monitoring and evaluation of processes, investments and outcomes;
- challenges posed by vertical hierarchies and horizontal integration;
- lack of whole-of-government approach;
- challenges to cater for differences in jurisdictional arrangements and powers across geographical, legal, administrative and cultural boundaries; and,
- accountability issues.

In addition, catchment management, as other components of the broader regional NRM policy system, is confronted by a number, and often conflicting, social and institutional challenges. These include (Bellamy and McDonald, 2005):

- the need to balance traditional business and industry development interests with social and environmental constraints;
- conflicting approaches to the recognition of cultural diversity and difference;

- contest over the optimum degree of community ownership and commitment in the setting of regional priorities;
- the adequacy of regional shares of public revenues, resources and regulatory power; and,
- developing whole-of-government responses to regional demands.

As collaborative NRM calls for a reassessment of how nature, science and politics are approached, institutional change is accordingly required (Cortner et al., 1998). In acknowledging the need to respond and adapt to institutional challenges, catchment management has been reviewed and reformed over time (e.g., Ewing, 2003). Particularly in recent years, institutional arrangements have been changing frequently and very quickly (Bellamy et al., 2002; Pannell et al., 2004). As Pannell et al. (2004: 1) well illustrate:

“The rapidity of change can be gauged by the fact that a book chapter published in 2003 documenting catchment management institutional arrangements state by state (Ewing, 2003) was substantially out of date before the end of the year”.

The changes include legislative powers of catchment management bodies, their responsibilities, their names, their reporting channels through government, as well as new government agencies with which they must work (Pannell et al., 2004). With this regard, these changes have also taken place in response to the requirements of national programs (e.g., NHT), as noted earlier.

In NSW, specific legislation has been introduced and reformed, such as the Catchment Management Act 1989, the Catchment Management Regulation 1999, and the Catchment Management Authorities Act 2003. Similarly, a number of catchment management entities with diverse names, structures and functions have also been tried. These include Catchment Management Committees, Catchment Management Trusts, State Catchment Management Coordinating Committees, Catchment Management Boards and Catchment Management Authorities.

Accordingly, the arrangements that define the structure and process of catchment management decision-making (e.g., the interest represented, the level of authority and power devolved, community participation, geographic domain etc.) in NSW have thus varied over time. In the 1990s, for example, catchment management bodies (e.g., Catchment Management Committees) comprised representatives from

government and non-government stakeholders and had advisory functions over NRM. Catchment Management Authorities, which were established recently, comprise non-government members with expertise in areas related to NRM, and have advisory, as well as governing and operational functions.

The changes in these arrangements have been heralded as major steps in improving NRM in the state. In 1999, for example, as a result of the NSW catchment review it was announced, under the heading of ‘strengthening catchment management in New South Wales’, a *new* and *stronger* system of catchment management that would concentrate community, industry and government agency efforts on managing natural resources in a more integrated way for a sustainable future (DLWC, 1999). Likewise, it was announced in 2003, under the heading of ‘a new approach to natural resource management’, that NRM in NSW would undergo historic change with new arrangements that would be a *significant improvement* on the then current system, ensuring a solid foundation for better protection of natural resources (DIPNR, 2003b).

Whereas collaborative NRM requires changes in the existing institutions, the exact requirements for institutional change are, however, not well understood (Cortner et al., 1998). In Australia, institutional change in the NRM arena has been characterised as *ad hoc*, disjointed and incremental, featuring limited understanding of the extent to which the institutional arrangements adopted have served to make collaborative action possible (Bellamy et al., 2002). Marshall (2001) states that despite more than a decade of Australian experience with catchment management, the feasibility of achieving the benefits from collaboration remains largely unknown. In fact, the extent to which existing institutional arrangements may constrain or facilitate the development and implementation of collaborative policies, programs, and practices is regraded as one of the major problem areas, in the field of NRM, urging improved understanding (Cortner et al., 1998). Morrison et al. (2004) state that there is insufficient accumulated wisdom and insufficient theory developed to inform policy in Australia, as “practice is ahead of theory and evaluation” (Morrison et al., 2004). In part, this has been attributed to a failure to learn systematically from experience (Marshall, 2001).

Various authors have stressed the need for institutional learning (e.g., Connor and Dovers, 2004), particularly, because the contemporary models of environmental governance, emphasising collaborative approaches, are largely regarded as experiments (Sabatier et al., 2005c). Learning from NRM experience will require efforts that are simultaneously more empirical and more theoretical (Morrison et al., 2004).

In this context, a critical systematic analysis of the NSW catchment management experience may provide a better understanding on how institutional change may facilitate and/or constrain collaborative processes, the institutional requirements for implementing collaborative NRM, and to where catchment management/regional NRM is heading in terms of institutional arrangements. It also may provide insights on the complexities surrounding the implementation of collaborative approaches, as well as on thorny issues related to the effectiveness and appropriateness of collaborative NRM, as discussed in the previous section.

1.3 Summary

An introduction to the present study was provided in this chapter. Collaborative NRM was conceptualised as comprising a wide range of initiatives featuring innovative approaches to NRM. Catchment management was discussed as one of such approaches employed in Australia, with emphasis on the NSW experience. The development and implementation of catchment management, like other collaborative approaches, have been challenged by institutional barriers. The arrangements for NSW catchment management have also been subject to frequent and rapid changes, in a context where the exact requirements for institutional change, in order to facilitate collaborative processes, are not well understood. A critical analysis of institutional change in the context of NRM is proposed to be imperative.

Chapter 2

The Institutional Analysis and Development (IAD) Framework

2.1 Introduction

As discussed in the previous chapter, catchment management in NSW has undergone several changes in the course of its history. Examining such changes represents a challenging task, for example: how to grasp the different regulations, decision-making procedures, and NRM entities in a logical manner? Which variables and relationships should be analysed? How to compare NRM entities featuring different structures and functions (e.g., membership, roles, geographic domain, authority and powers), as well as dissimilar life span? This chapter presents the Institutional Analysis and Development (IAD) framework as one of the means to systematically describe, analyse and compare the institutional arrangements experimented with, in the NSW catchment management initiative.

2.2 Defining Institutions

Different concepts and definitions of the term *institution* exist (see e.g., Goodin, 1996; Hollingsworth, 2000; Connor and Dovers, 2004; Jentoft, 2004). There has been, however, limited consensus (if any) among scholars as to the meaning of “institution” (Hollingsworth, 2000). In this study, institutions are conceptualised in terms of the rules, norms, and strategies adopted by individuals operating within or across organisations (Ostrom, 1999).

Institutions are shared concepts used by humans in repetitive situations organised by rules, norms and strategies (Crawford and Ostrom, 1995). Rules are shared prescriptions (must, must not, or may) that forbid, permit or require some action or outcome, and the sanctions associated with non-compliance of a rule. Norms are shared prescriptions usually informally enforced by participants themselves. Strategies are regularised plans made by individuals within the structure of incentives produced by

rules and norms, and the expectations of the likely behaviour of others in a situation affected by relevant physical and material conditions (Ostrom, 1999).

In sum, institutions can be seen as sets of rules, which constrain and extend behavioural options available to individuals or organisations in a given setting (Kenney and Lord, 1999; Ostrom, 2005). Institutions are systems of rules, decision-making procedures, and programs that cause social practices, assign roles to participants in such practices, and guide interactions among occupants of relevant roles (Young, 2005).

In this sense, institutions include, for example, catchment management bodies, as they can be defined by formal rules, such as statutes and regulations (e.g., catchment management legislation, catchment management plans) and informal means (norms), such as unwritten agreements and behavioural norms adopted by participants (Margerum and Born, 2000).

It is important to note that, in the context of this study, organisations and institutions refer to different concepts. Whereas an institution consists of sets of rules, as seen above, an organisation refers to a specific agency, interest group, or similar body, which comprises one of the many players having a role in an institution (Kenney and Lord, 1999).

2.3 Analysing Institutions: The IAD Framework

Institutional analysis is an attempt to examine how the rules adopted by individuals and/or organisations address their problems, leading to desired outcomes (Imperial, 1999a). Understanding NRM institutions requires, therefore, understanding a number of human and non-human elements, and their interactions, in facilitating or hindering the achievement of outcomes in a given situation (Kenney and Lord, 1999).

As there are many definitions of the term institution, there are also many ways of doing institutional analysis, since several of the social science disciplines and sub-disciplines have their own approaches to investigate institutions (Hollingsworth, 2000). The Institutional Analysis and Development framework (IAD) framework is one of the theoretical frameworks used for analysing institutions and explaining aspects of policy change (see, e.g., Sabatier, 1999; Sabatier et al., 2005c).

The IAD framework is an integrated approach that seeks to explain the patterns of interactions and outcomes (e.g., conflict resolution and collaboration, catchment management plans, improvement of environmental qualities) resulting from actors

(individuals and/or organisations) making decisions and behaving within a set of institutional constraints (Sabatier et al., 2005c), as will be explained in detail below.

The IAD framework was developed by Elinor Ostrom and her colleagues at the Workshop in Political Theory and Policy Analysis of the Indiana University, during the past two decades or so (e.g., Ostrom, 1986a, b; Oakerson, 1990; Ostrom, 1990; Ostrom et al., 1994; Ostrom, 2005). The IAD framework is built upon various theories, such as classic political economy, neoclassical microeconomic theory, institutional economics, public choice theory, transaction-cost economics, and non-cooperative game theory (Ostrom et al., 1994).

The IAD is a well established and robust framework, which emphasises the influence of rules in decision-making and action of individuals and organisations. It is well suited to examining strategic political behaviour and choices, and a relative strength is the ability to address challenges of collective action (Schlager and Blomquits, 1996 apud Koontz, 2005). Furthermore, the focus on rules rather than policies broadens the analysis to address a much wider range of (organisational) relationships (Imperial, 1999b). On the other hand, the IAD is less robust in incorporating ideological changes and learning over the long term among political actors, focusing on the components of discourse and deliberation within a group (Koontz, 2005), or considering values, preferences and beliefs of the actors (Lubell, 1999).

The IAD framework has been applied to the analysis of different empirical settings addressing various issues, such as metropolitan organisation, theory of public goods, the sustenance of public goods in developing countries, privatisation in developed and developing countries, and particularly – and most important in the context of this research – to the governance of common-pool resources (Ostrom et al., 1994; Ostrom, 1999, 2005).

In the context of NRM, the IAD framework has been used (or built upon) in a number of empirical studies on a wide range of issues and settings, such as wildlife management regimes (Buck, 1999), historical and socio-political contexts of NRM and coastal zone management (Torell, 2002), forest management (Gibson et al., 1998), biodiversity conservation initiatives (Rudd, 2005), fisheries management (ICLARM and NSC, 1996; Rudd, 2003, 2004; Imperial and Yandle, 2005), implementation of environmental restoration programs (Sproule-Jones, 1999; Waage, 2003), impacts of collaborative planning on land use policy (Koontz, 2005), coordination arrangements

for NRM (Margerum, 1999a; Margerum and Born, 2000), and water and watershed management (Gregg et al., 1991; Margerum, 1995; Kenney and Lord, 1999; Imperial, 2001; Lubell et al., 2002; Kauneckis and Imperial, 2005).

The IAD framework consists primarily of an *action arena*, which is comprised of an *action situation* and the *actors* in that situation. The action situation and actors, influenced by contextual factors – the biophysical environment, the attributes of the community, and the institutional rules-in-use – create patterns of interaction and outcomes (Figure 2-1) (Ostrom et al., 1994; Ostrom, 1999, 2005).

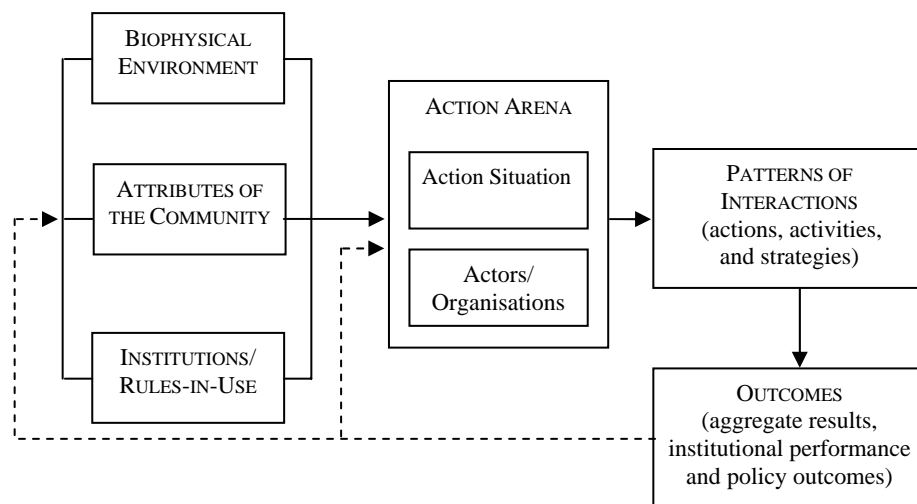


Figure 2-1: Main features of the IAD framework

Source: modified from Ostrom (1999).

The action arena is the core conceptual unit of the IAD framework. It consists of the social space where the mix of individuals and organisations interact, exchange goods and services, solve problems, dominate one another, or fight (Ostrom, 1999). The action arena is, as noted above, comprised of two sets of variables, i.e., an *action situation* and the *actors* in that situation.

In this research, the catchment is considered as an action arena, where the various actors, such as resource users, environmental conservation, state government agencies, local government and other interest groups and individuals interact, make decisions and take action to use and manage natural resources within a “catchment management situation”. The action arena is the physical, social, economic and political context in

which collective action problems emerge and are solved, or not solved, through the process of catchment management (Lubell, 1999).

The actors' component of the IAD framework assumes that the actors (individuals and/or organisations) behave according to an explicit theory or *model of the individual*. The model of the individual – or model of the decision-maker – includes assumptions about the actors' resources, values, information, information-processing capabilities, and decision rules (Ostrom, 1999).

The IAD framework assumes that the actors are intentionally rational but only limitedly so, as they are constrained by limited resources, incomplete knowledge and information-processing capabilities (Ostrom, 1999). This assumption of *bounded rationality* means that in a catchment management situation, decision-making is constrained by limited time, resources, availability/accessibility of information, and the imperfect information-processing capabilities of the actors (Ostrom, 1999). Consequently, the actors may make mistakes when choosing a course of action for achieving goals (V. Ostrom, 1986 apud Ostrom, 1999). Over time, as experience accumulates, the actors can adopt strategies and change the rules rationally to improve the outcomes (Ostrom, 1999). In other words, in the context of catchment management, it would be expected that actors engage in great deal of “trial-and-error”, learning as they experiment with different approaches and react to emerging problems (Sabatier et al., 2005c).

The action situation can be described and analysed using seven types of variables: (1) the set of participants, (2) the specific positions to be filled by participants, (3) the potential outcomes, (4) the set of allowable actions and the function that maps actions into realised outcomes, (5) the control that participants exercise in regard to this function, (6) the information available to participants about actions and outcomes and their linkages, and (7) the costs and benefits – which serve as incentives and disincentives – assigned to actions and outcomes (Ostrom, 2005).

The action arena/situation is affected by contextual factors comprising variables pertaining to three categories, i.e., characteristics of the biophysical environment, attributes of the community, and institutional rules-in-use. These factors are interrelated and jointly affect the actions, activities and strategies that the actors can take (i.e., patterns of interaction) and the resulting outcomes (Ostrom, 1999).

The *characteristics of the biophysical environment* affect (and are affected by) the action arena (i.e., the actors and the variables of the action situation). Consequently,

the biophysical environment and its transformations influence the actions and outcomes (Ostrom et al., 1994). The characteristics of the biophysical environment that influence an action arena in a catchment management setting, include the nature, scope, severity, complexity and tractability of the problems that need to be addressed by the catchment management initiative. These characteristics determine the appropriate management strategies to be taken (Sabatier et al., 2005c), as well as can impose constraints on the choices available for policy and decision-making (Imperial, 1999b).

The structure of an action arena is affected by the *attributes of the community* in which an action situation is located. These attributes refer to generally accepted norms and behaviour, the degree of common understanding about action arenas, the extent to which the preferences are homogeneous, and the distribution of resources among members of that community (Ostrom et al., 1994). These attributes are frequently termed *culture* and include forms of human and social capital (Ostrom et al., 1994), such as levels of income, education, trust and norms of reciprocity among members of the community (Sabatier et al., 2005c). The characteristics of the actors involved in a given catchment management institution are usually largely influenced by the attributes of the community they come from (Sabatier et al., 2005c). Such attributes can influence preferences over policies as well as whether these policies operate as intended (Imperial, 1999b).

The *rules-in-use* refer to sets of rules currently in place, established by individuals, that determine how new rules are made or how resources are used (Sabatier et al., 2005c). These rules can be classified according to their impact on the seven elements of an action situation outlined above. These rules comprise seven broad categories: scope, position, boundary, authority, aggregation, information, and payoff rules (Ostrom, 1986a, b; Ostrom and Crawford, 2005). Position rules create positions (e.g., a member of a catchment management committee). Boundary rules affect how participants enter or leave positions. Choice rules affect the assignment of particular sets of actions to positions. Aggregation rules affect the level of control that participants exercise. Information rules affect the level of information available about actions and outcomes. Payoff rules affect the benefits and costs assigned to outcomes due to the actions chosen by the participants (Ostrom and Crawford, 2005). Each of these rules categories and how they affect an action situation are elaborated in Chapter 4, as they comprise the elements used in this study to examine institutional change in the NSW catchment management initiative.

It is important to note that most social reality is composed of multiple arenas/situations linked sequentially or simultaneously (Ostrom, 1999, 2005). Rarely action arenas/situations exist independently of other situations. For example, catchment management is linked to several other action arenas/situations at local, state and federal levels, which influence decision-making and action of the catchment arena/situation. Drawing the boundaries on the analysis of linked situations will depend on the questions of interest to the analyst (Ostrom, 2005).

Action arenas are also linked across several levels of analysis, where the sets of rules are nested in a hierarchical manner. The IAD framework distinguishes three levels of analysis, i.e., operational-choice, collective-choice, and constitutional-choice levels (Ostrom, 1999) (Figure 2-2). These levels of analysis have been acknowledged by other authors with slightly different terminology, e.g., the constitutional-choice level has been referred to as the policy (Gregg et al., 1991; Margerum, 1995) or legislative (Edwards and Steins, 1999) level; organisational (Margerum, 1995; Steins and Edwards, 1998) and implementation (Gregg et al., 1991) levels have been used to refer to the collective-choice level.

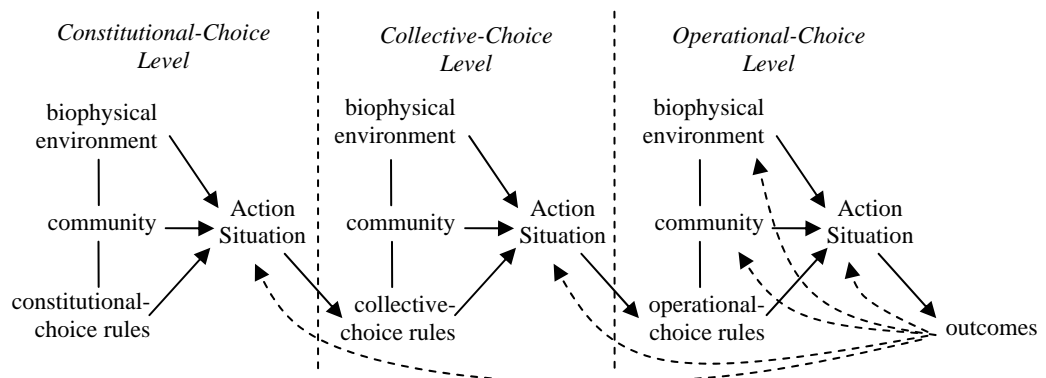


Figure 2-2: Levels of institutional analysis

Source: modified from Ostrom et al. (1994).

The *operational-choice level* is the lowest level of decision-making and action. Decisions and actions at this level directly determine how resources are used, and thus directly affect the biophysical environment (Ostrom, 1999). The second and higher level of decision-making is the *collective-choice level*, where operational-choice rules are made and revised, usually in a group setting, such as, a catchment management

committee. NRM is itself an activity carried out at the collective-choice level. Institutional reforms to improve NRM need, therefore, to be investigated particularly at this level, as it is the locus where action is taken to resolve inadequacies at the operational-choice level (Kenney and Lord, 1999).

The *constitutional-choice* level is the third and highest institutional level of analysis, where collective-choice rules are made and revised (Ostrom, 1999, 2005). Constitutional-choice rules do not necessarily refer to the constitutions of various jurisdictions per se, but to the process of articulating and aggregating the preferences of various members or sectors of the society (Evans et al., 2002). Constitutional-choice rules can, therefore, be contained in any documents, which do not necessarily bear the term constitution (Evans et al., 2002). The broad “constitution” of catchment management bodies in NSW, for instance, is embedded in various pieces of state legislation and policies.

The higher the level of institutional analysis, the more stable are the rules at that level, i.e., constitutional-choice rules change more slowly than collective-choice rules, which in turn change more slowly than operational-choice rules. This concept is particularly important in addressing questions about institutional reforms, as changes in higher level rules are usually more difficult and more costly to accomplish (Ostrom, 1999). At any one level of analysis the combinations of rules, characteristics of the biophysical environment, and attributes of the communities of individuals involved are combined in a configurational rather than an additive manner (Ostrom, 1999).

2.4 Summary

In this chapter, the IAD framework was presented as an established theoretical framework, frequently used in the analysis of common-pool resources governance. The framework is applicable to the case of catchment management and may prove useful for examining institutional change in the NSW initiative. The institutional rules aspect of the IAD framework is conceptualised in Chapter 4 to analyse NSW catchment management.

Chapter 3

Research Design and Methods

3.1 Introduction

This chapter presents the case study research design and overall methods employed in this research. It covers the selection of the cases, qualitative methods of data collection and analysis, analytical framing, criteria for evaluation, procedures used to improve the quality of the research, and limitations and excluded areas of research.

3.2 Research Approach

This study used a qualitative case study research approach to undertake the analysis of catchment management institutions.

At the outset, this study had a coastal and marine focus. It then aimed to examine institutional challenges and opportunities to incorporate coastal and marine issues as part of catchment management (see Fidelman et al., 2004b, a; Fidelman et al., 2005). In the course of the research, however, institutional change emerged as a more prominent issue needing attention. When major changes to catchment management institutions were introduced (for the third time in just over 10 years) as a result of New South Wales NRM reforms in late 2003, it was realised that the NSW catchment management initiative offered a very unique case to analyse collaborative institutions in a changing policy context⁴.

Given that collaborative NRM has, in general, been characterised by a gap between the rhetoric and practice, the NSW changing institutional landscape where several catchment management institutions have been tried, the limited understanding of the design and change of these institutions, as well as of the role they have played in

⁴ The findings from this research have, however, also shed light on some of this author's initial concerns about coastal and marine issues. Management and policy implications from the present research have also provided insights that warrant consideration in the coastal and marine arenas. They will be addressed elsewhere, e.g., in a future journal paper.

facilitating collaborative NRM, enabled this research to focus on the following broad research questions:

- *What institutional design and change have been tried in the context of NSW catchment management initiative?*
- *How and why have institutional design and change occurred?*
- *How have institutional design and change facilitated collaborative NRM?*

These questions guided the research design and the collection and analysis of data for this research. Specific research questions are outlined in Appendix A, which also shows how these questions relate to the variables examined and the data collected and analysed.

The case study, as a research strategy, is used in many situations to contribute to better understanding of individual, group, organisational, social, political and related phenomena (Yin, 2003). The case study research approach was adopted in this thesis because it represents a preferred strategy when questions are being posed about a contemporary phenomenon, over which the investigator has little control (Yin, 2003). Questions on *what* institutional design and change have been tested, and *how* (and if) such institutional design and change have facilitated collaborative processes warrant, therefore, the adoption of a case study approach.

In order to undertake the present investigation, which is largely exploratory in nature, an embedded case study design (Yin, 2003) was employed. The broader unit of analysis was the NSW catchment management initiative. Collective-choice catchment management institutions – which comprise sets of institutional rules/arrangements – were the embedded units of analysis. The study examined the NSW catchment management initiative at different points in time, covering the period between its initiation in the 1980s and early 2006 (see Table 3-2 below).

3.3 Selection of Catchment Management Institutions

The catchment management institutions selected for analysis consisted of a construct of the social sciences, defined as sets of rules that constrain and/or foster individual and organisational behaviour (Ostrom, 2005), as discussed in Chapter 2.

Two main criteria were used for selecting catchment management institutions. First, the institutions needed to be typical of collective-choice level operating over time, as part of the NSW catchment management initiative. They should, therefore, represent institutional arrangements from periods characterised by change. The prevalent collective-choice institutions in NSW catchment management initiative were comprised of the Catchment Management Committees (CMCs), in the 1990s; Catchment Management Boards (CMBs), from 2000 to 2003; and the current Catchment Management Authorities (CMAs) (see Table 3-2 below). Each of these institutions has been established and operated according to the same general sets of institutional rules defined by the government, at the constitutional-choice level. At different periods of time, these CMCs, CMBs or CMAs were, therefore, typical collective-choice catchment management institutions in the State⁵. One institution for each period of the catchment management history characterised by change, was then selected. A second consideration was the availability and accessibility of data and information about the institutions, and funding and logistics limitations to carry out this research.

In mid-2002, when this research began, CMBs were the collective-choice catchment management institutions prevalent in NSW. The Southern CMB, the first institution chosen, was selected on the basis of accessibility of information and data (as its area of operation comprised the region where the University of Wollongong is located). The jurisdiction of the Southern CMB once covered the area of 4 CMCs, i.e., the Hacking, Illawarra, Upper Shoalhaven and Lower Shoalhaven⁶ CMCs. From these four CMCs, the Illawarra was the first CMC to be established in the region and one of the pioneers in NSW (and possibly also in Australia). The longer history and the availability and accessibility of information and data made the Illawarra CMC the most appropriate choice. The third institution selected was, naturally, the Southern Rivers CMA, which currently encompasses the areas of the former Southern CMB and the Illawarra CMC (Figure 3-1).

⁵ Despite being typical in terms of institutional arrangements, these institutions vary in terms of environmental and socioeconomic contexts across NSW.

⁶ The Upper and Lower Shoalhaven CMCs were later merged to form the Shoalhaven CMC.

Please see print copy for image

Figure 3-1: Area of operation of the institutions selected for analysis.

3.4 Data collection and analysis

As mentioned above, this study uses a qualitative research approach. Data collection and analysis were on-going and iterative processes, by which preliminary analysis of the data collected oriented further data collection and analysis (Miles and Huberman, 1994).

Multiple sources of data were used in this research, namely documentation, archival records, interviews, and observations. The rationale for using multiple sources of data is the development of converging lines of inquiry (i.e., triangulation), by which a research finding is supported, or at least not contradicted, by these multiple sources (Miles and Huberman, 1994; Patton, 2002; Yin, 2003).

Documentation and archival records comprised a core source of data on institutional arrangements used for catchment management in NSW, as well as background information (Appendix A details the data used to examine institutional rules). These included written materials and other documents from catchment management records, such as meeting minutes, official reports, management plans, submissions, formal studies and evaluations, legislation, policy statements, fact sheets, newsletters, news and media releases. Documentation and archival records provided a formidable (and challenging) amount of data and information (see Appendix B).

Copies of most of these materials were obtained from the files of government agencies and their staff, during visits to such organisations. For example, meeting minutes, annual reports, management plans and strategies were collected from the regional office of the then NSW Department of Land and Water Conservation (DLWC),

in Nowra, and the head office of the Southern Rivers CMA, in Wollongong. The later is also the repository of the Illawarra CMC library and database, comprising a good collection of “fugitive” and “grey” literature documenting the “history” of the Illawarra CMC and catchment management in the 1990s. Such literature also included previous research and review/evaluation reports on the NSW catchment management initiative, such as the Review of Catchment Management prepared for the NSW government (AACM, 1996). Additional grey literature was obtained by contacting research institutions, such as the Centre for Water Policy and Research of the University of New England, and email inquiries to government agencies and staff. Documentation was also obtained from the websites of the government agencies, and the Southern CMB and Southern Rivers CMA, such as annual reports, management plans and strategies, media releases, among others. Also from the internet, copies of the NSW catchment and NRM legislation were collected.

The qualitative interview is a method of inquiry suitable for acquiring information not directly observable, such as peoples’ experiences, perceptions, opinions and knowledge (Patton, 2002). Interviews comprised the second source of data for this research. They were used in different stages of this research. At first, consultations (i.e., informal conversations) helped to develop a better understanding and complement factual and background information obtained from documents and archival records. They also helped to find out about further sources of documents. In the later stages, questions and probes were employed to explicitly explore the respondents’ perceptions, experiences, perspectives and opinions with regard to catchment management institutions.

Twenty seven consultations and 6 interviews with key informants were undertaken. These individuals comprised participants in catchment management and knowledgeable non-participant observers. Participants included coordinators and members of catchment management bodies, and program staff. Non-participant observers included academics, researchers and government officials. They were selected to include various categories of stakeholders, in order to minimise potential biases, as recommended by Leach (2002). These individuals were identified primarily from archival records, e.g., lists of members of the institutions selected for this analysis, and by using a snowball sampling technique, where individuals were asked to identify others that could provide useful information. In addition, the selection of key informants sought to include members of different stakeholder groups, who had a long history of

involvement in NRM institutions in NSW, and possessed considerable institutional knowledge. Some of these informants, for example, were participants in the different catchment management institutions at different stages of the NSW initiative. Others had a long history of employment with NRM agencies Appendix C provides further information on the consultation and interview process.

The interviews were confidential and anonymous, and followed the requirements of the Human Research Ethics Committee of the University of Wollongong (see Appendix D). The interviews took the form of a semi-structured conversation using an interview guide containing a list of topics and probes to be explored in the course of the interview (Patton, 2002). The interview guide served to ensure that standard basic lines of inquiry were pursued with each interviewee (Patton, 2002). The guide was based on the research questions and structured according to the institutional rules of the Institutional Analysis and Development (IAD) framework. The interview guide comprised sets of topics derived directly from the specific research questions developed in Appendix A. The questions pertaining to the same institutional rule category were combined in the form of topics in the interview guide, which is also structured according to the same seven institutional rules used for developing the specific research questions (the interview guide is presented in Appendix E).

Notes were taken during most of the consultations and interviews. In addition, most of the interviews with key informants were also taped. Following the interviews, write-ups were prepared from the interview notes, and relevant parts of the taped interviews were transcribed. Write-ups and transcripts were later analysed. A triangulation strategy (Miles and Huberman, 1994; Yin, 2003) was used to assess the inclusion of the information obtained during the consultations and interviews in the analysis. It was, therefore, possible to determine whether this information was consistent with other sources of data and information used in this study (Yin, 2003).

Observations provided additional information for this study. Observations consisted of descriptions of activities, behaviours, actions, conversations and other interpersonal interactions and organisational processes (Patton, 2002). Observations included participation in 4 board meetings and 1 public consultation of the Southern Rivers CMA, between June and December 2005 (Table 3-1).

Table 3-1: Observation research

OBSERVATION	DATE	LOCATION
SRCMA board meeting	23.06.2005	Wollongong
SRCMA board meeting	24.06.2005	Wollongong
CAP consultation	22.09.2005	Kiama
SRCMA board meeting	23.09.2005	Gerringong
SRCMA board meeting	25.11.2005	Wollongong

In addition, observations were also undertaken during field visits and interviews, and at NRM workshops, fora and conferences, at which stakeholders related to catchment management were present. These instances also provided opportunity for informal conversations with participants in catchment management institutions, stakeholders and non-participant observers. In every occasion, field notes were prepared, which were later converted into write-ups and then analysed.

Systematic qualitative techniques were used to analyse data (Weber, 1985; Miles and Huberman, 1994; Denzin and Lincoln, 2000; Patton, 2002). Early analysis involved coding the documents, transcripts and write-ups. Coding consisted of using tags or labels (codes) for assigning units of meaning to descriptive or inferential information collected during the study (Weber, 1985; Miles and Huberman, 1994). The initial list of codes was derived deductively from the key elements of the IAD framework, namely the institutional rules. The coding process yielded patterns and themes, which were consolidated by using matrices and displays (Miles and Huberman, 1994). The emerging generalisations and conclusions were compared to, and verified with, other studies, particularly those from Australia, and the broader theory on collaborative NRM. This process of data reduction, display and conclusion drawing (Miles and Huberman, 1994) was successive and continuous throughout this research.

3.5 Analytical Framing

This study built on the IAD framework (Ostrom et al., 1994; Ostrom, 1999, 2005) to analyse catchment management institutions. The IAD framework comprises an established theoretical framework widely used to investigate the governance of common-pool resources, and is thus directly applicable to the case of catchment management (Sabatier et al., 2005c). As discussed in Chapter 2, several attributes make

the IAD framework a suitable approach to particularly analyse institutional design, hierarchy and change in the context of this research.

The present analysis focused on the institutional aspects of the IAD framework, i.e., the institutional rules/arrangements that structure the action/decision situation (Ostrom, 2005). As mentioned above, the analysis covered the entire history of the NSW catchment management initiative. This began at Time 0 (T_0), in the mid-1980s when catchment management was adopted as a state-wide policy in NSW; it then proceeded with the analysis of three successive points in time, characterised by institutional change: T_1 corresponds to the period following legal institutionalisation of catchment management with the enactment of the Catchment Management Act in 1989; T_2 is the time after the NSW Catchment Management Review when the Catchment Management Regulation 1999 was introduced; and T_3 the period subsequent to the NSW NRM reform that resulted in the Catchment Management Authorities Act 2003 (Table 3-2).

The seven categories or sets of institutional rules (i.e., position, boundary, choice, aggregation, information, payoff and scope rules) were used to describe, compare, analyse and evaluate catchment management institutions. Chapter 4 reports on how these rules were used to systematically describe and analyse the design and change of catchment management institutions. Chapter 5 describes how the seven sets of institutional rules were employed in combination with evaluative criteria, as briefly explained in the next section, to assess such institutions.

Table 3-2: Temporal scale and levels for the analysis of catchment management institutions in New South Wales

LEVELS OF ANALYSIS	TIME (T)			
	Mid-1980s (T_0)	1989 (T_1)	1999 (T_2)	2003 (T_3)
Constitutional-choice	Adoption of Catchment Management as a State Policy	Catchment Management Act	Catchment Management Regulation	Catchment Management Authorities Act
Collective-choice	Emergence of first catchment management groups	Catchment Management Committees	Catchment Management Boards	Catchment Management Authorities
Operational-choice	Local groups, e.g., Landcare, Bushcare; resource users; government agencies; local government etc.			

3.6 Evaluation Criteria

Evaluation consists of comparing reality to a set of criteria (Conley and Moote, 2003). There are various approaches, standards for comparison, and methods for evaluating NRM. In this study, a deductive approach was adopted by employing theory-based criteria. To evaluate catchment management institutions, a set of evaluative criteria was developed based on a review of the literature on collaborative NRM. The main concepts and principles of collaborative NRM were combined with the institutional aspects of the IAD framework. These concepts and principles were defined in terms of the institutional rules of the IAD framework (i.e., position, boundary, choice, aggregation, information, payoff and scope rules). The resulting evaluative framework was then used to assess the rules comprising NSW catchment management institutions. The evaluation focused on the procedural nature of decision-making (i.e., how decisions are made by catchment management institutions – the structure and process of decision-making), rather than with the substantive nature of decision-making (i.e., what is proposed by these institutions). The evaluative framework is developed in detail in Chapter 5.

3.7 Enhancing Research Quality

Case study and qualitative investigations are complex by nature. Their reliability and validity can be jeopardised if explicit, rigorous and systematic methods are not observed (Miles and Huberman, 1994; Yin, 2003). Formal methodological procedures (Miles and Huberman, 1994; Denzin and Lincoln, 2000; Patton, 2002; Yin, 2003) were, therefore, employed throughout the course of this research to ensure quality and validity.

These procedures included establishing construct validity, external validity, and reliability (Yin, 2003). Accordingly, this study employed multiple sources of data to support convergent lines of inquiry (*construct validity*). It was built on an established theoretical framework (i.e., the IAD framework) and the literature on collaborative NRM, so that the findings can be generalised to the broader and related theories (*external validity*). This study also followed, as much as possible, the case study operational protocol to collect and analyse data, and strived to develop a case study data base (*Reliability*). Other procedures to minimise bias included consultation with various

stakeholder groups (Leach, 2002), being explicit about the evaluative goals and criteria employed (Conley and Moote, 2003), and the overall neutrality of the researcher⁷.

3.8 Limitations and Excluded Areas of Research

Whereas this study investigated a small set of, nonetheless complex, catchment management arenas featuring complicated chains of action, as noted in Chapter 2, most social reality comprises multiple arenas linked sequentially and simultaneously (Ostrom, 2005). For example, a number of policy and decision-making arenas affect catchment management in NSW. At the constitutional-choice level, numerous policies and pieces of legislation, at various levels of government, affect which decisions can be made by catchment management bodies. Similarly, at the collective-choice level, various agencies, departments and other NRM bodies influence how resources are used and managed at the operational-choice level. Future research that investigates these other arenas, particularly how they are linked to and influence catchment management will be valuable.

The IAD framework is a complex and comprehensive approach to investigate institutions. It addresses various elements and relationships of the policy/decision-making setting under analysis, as seen in Chapter 2. A complete investigation of all its elements and relationships was beyond the scope of this study. Future research that explores the other components and relationships of the IAD framework to analyse catchment management institutions in NSW will be beneficial. This research concentrated instead on the most relevant aspect of the IAD framework (i.e., institutional rules) in light of the research questions stated above. It is important to note that, it is not advocated in this study that institutional rules are the most important aspect in understanding institutions.

Conversely, in order to understand both direct and indirect effects of institutional design and change (e.g., how changes in given sets of rules may affect other sets of institutional rules), this study strived to adopt an integrated approach. This study endeavoured, therefore, to examine the configurational nature and the interconnectedness of institutional rules, as opposed to a narrower, though more in-depth, analysis of a limited number of such rules.

⁷ Prior to this research, this author had no contact or relationship, professional or otherwise, with the NSW catchment management initiative or its participants.

Despite the limitations inherent to the nature of a PhD thesis and this particular research topic, it is strongly believed that this study provided a rigorous and systematic comparative analysis of catchment management institutions. It goes beyond many of the analysis conducted to date on NSW catchment management, by using an internationally established theoretical framework to examine institutional design and change, at multiple levels of analysis, and throughout the entire history of the NSW initiative.

Chapter 4

Analysing Catchment Management in New South Wales, Australia: An Institutional Approach

4.1 Introduction

This chapter examines the institutional arrangements experimented over the history of the NSW initiative, by employing the Institutional Analysis and Development framework, discussed in Chapter 2. The main objective of this chapter is to investigate how and why institutional change has taken place. The analysis identifies hierarchical levels of catchment management decision-making and action. The policy level describes the institutional context under which catchment management institutions (catchment bodies) have been created and changed. At the organisational level, these institutions are systematically described, analysed and compared.

The following section conceptualises the analytical framework. The third section covers the methods used in the present analysis. The fourth section analyses catchment management in a changing institutional setting, by examining catchment management institutions, at multiple levels, at periods characterised by institutional change. The fifth section presents a brief conclusion.

4.2 The IAD framework and Catchment Management

The IAD framework is, as described in Chapter 2, an integrated approach to the description and analysis of institutions. Nevertheless, not all components of the framework are explicitly used in every analysis. Particular elements/features are usually emphasised depending, for instance, on the objectives of the analysis and/or on the analyst's interests. A comprehensive analysis using the IAD framework would,

however, include attention to the details of the entire framework (a formidable challenge in its own right) (Ostrom, 2005).

The preset study focuses primarily on the internal structure of the catchment management action situation and how it is affected by institutional rules designed and changed over the history of the NSW initiative. The action situation of a catchment institution (or any other institution) can be described and analysed, as seen in Chapter 2, using seven types of variables: (1) the set of participants, (2) the specific positions to be filled by participants, (3) the potential outcomes, (4) the set of allowable actions and the function that maps actions into realised outcomes, (5) the control that participants exercise in regard to this function, (6) the information available to participants about actions and outcomes and their linkages, and (7) the costs and benefits – which serve as incentives and disincentive – assigned to actions and outcomes (Ostrom, 2005).

In this context, the action situation – characterised by the above seven clusters of variables – can be conceptualised in the context of a catchment management body (e.g., a catchment management committee or board), where individuals and/or organisations, representatives of diverse interest groups (i.e., the *participants*), occupy certain *positions* in such body (e.g., members, coordinator/facilitator, chairperson, deputy chairperson). They make decisions (i.e., *the control that participants exercise*) about *actions* to be taken (e.g., the preparation of a management plan, implementation of catchment management actions) to address the problems facing the catchment. The decisions are based on the *information* they have about how actions are linked to *potential outcomes*, such as improvement of environmental condition in the catchment, as well as the *costs and benefits assigned to actions and outcomes* (Ostrom et al., 1994).

The elements of the action situation are directly affected by seven categories of institutional rules, i.e., position, boundary, choice, aggregation, information, payoff and scope rules (Ostrom, 2005). Figure 4-1 shows the direct relationship among rules and the elements of the action situation. It is important to note that these institutional rules work together in a configurational manner rather than independently. One set of rules may, through its direct impact on one of the components of the action situation, affect other components of the situation (Ostrom and Crawford, 2005). This will be demonstrated in Chapter 5, where changes in one set of institutional rules resulted in significant implications to other rules.

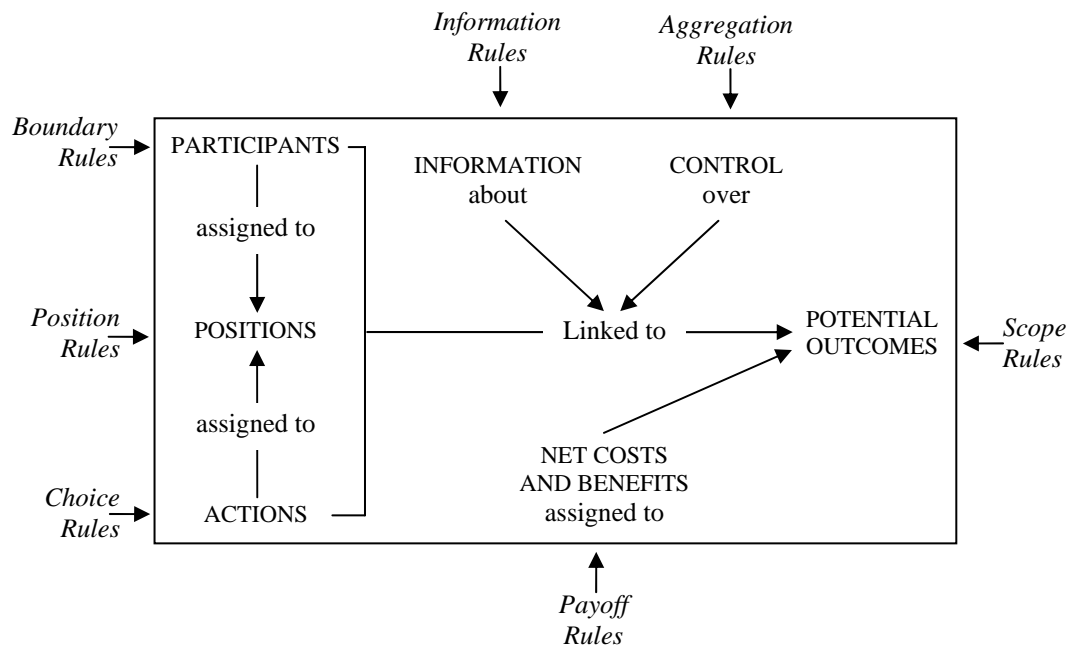


Figure 4-1: Rules as exogenous factors affecting the action situation

Source: Ostrom (2005).

Furthermore, institutional rules explicitly constitute human creations and are subject to deliberate change through individual and collective action (Kenney and Lord, 1999; Ostrom, 2005). Policies and their implementation procedures consist of rules governing action within a particular situation or class of situations (Gregg et al., 1991). Institutional rules can, therefore, constrain the ability to solve problems in a desired manner (Blomquist, 1992 apud Imperial, 1999b). Conversely, institutional rules can also be changed to solve problems (Gregg et al., 1991).

These institutional rules are the key elements to describe, analyse and compare catchment management institutions, in this study. They are conceptualised in the context of NRM, as follow:

4.2.1 Position Rules

Position rules specify the positions that actors may occupy in a situation and the actions that the position holders can take. Positions, as shown in Figure 4-1 above, are thus links connecting participants and authorised actions (Ostrom and Crawford, 2005). Position rules specify, therefore, the positions participants (individuals or organisations)

can occupy in an institution (e.g., member of a catchment management committee) and their roles in such institution. Position rules may also specify certain conditions, such as the (minimum and/or maximum) number of participants occupying a certain position (Ostrom and Crawford, 2005).

4.2.2 Boundary Rules

Boundary rules are entry and exit rules, which define (a) who is eligible to enter a position, (b) the process that determines which eligible participants may enter (or must enter) positions, and (c) how a participant may leave (or must leave) a position (Ostrom and Crawford, 2005). Boundary rules specify, therefore, who is eligible to become a participant in a catchment management institution, and how participants are selected.

4.2.3 Choice Rules

Choice or authority rules define the set of actions that participants occupying a position must, must not, or may do at particular times in a decision process. They define the activities and actions that are required, permitted and forbidden for participants in the catchment management decision-making. Choice rules empower (or otherwise), i.e., they affect the power created in action situations by limiting or expanding the authority (e.g., alternative actions available) of catchment management institutions (Ostrom and Crawford, 2005). Choice rules assign participants collective responsibility over certain activities and actions related to catchment management.

4.2.4 Aggregation Rules

Aggregation or decision rules determine the level of control that a participant holding a position exercises in a decision process (Ostrom and Crawford, 2005). In collective action situations, such as catchment management, multiple participants (e.g., committee members) jointly control decision-making. A decision as to whether to take a particular action or set of activities is, therefore, subject to joint decision of the participants (Ostrom and Crawford, 2005). Aggregation rules specify the procedures by which the participants in a catchment management situation make collective decisions, (e.g., by vote or consensus). They also include arrangements to aggregate the

preferences, values and needs of catchment actors (e.g., populations and stakeholders) into decision-making. Aggregation rules are thus key rules affecting whose interests are taken into account when decisions are made (Ostrom, 2005).

4.2.5 Information Rules

Information rules affect the level of information available to participants. These rules authorise channels of information flow among participants, assign the obligation, permission, or prohibition to communicate to participants and the form in which communication can take place (Ostrom and Crawford, 2005). Information rules determine, therefore, the arrangements for communication and interaction between participants (e.g., regular meetings) and between participants and the public, stakeholders, and other institutions (e.g., public consultations, stakeholder fora, newsletters and reports). In the context of this study, they may also include arrangements for monitoring and reporting on the institutional activities and performance.

4.2.6 Payoff rules

Payoff rules assign external rewards or sanctions to particular actions that have been taken in an action situation. Payoff rules directly affect the net costs and benefits that will be assigned to particular combinations of actions and outcomes, as they establish the incentives and disincentives for action (Ostrom and Crawford, 2005). Payoff rules are conceptualised in this study as incentives and disincentives in terms of human resources and funding, which reduce or increase transaction costs associated with decision-making and action.

4.2.7 Scope rules

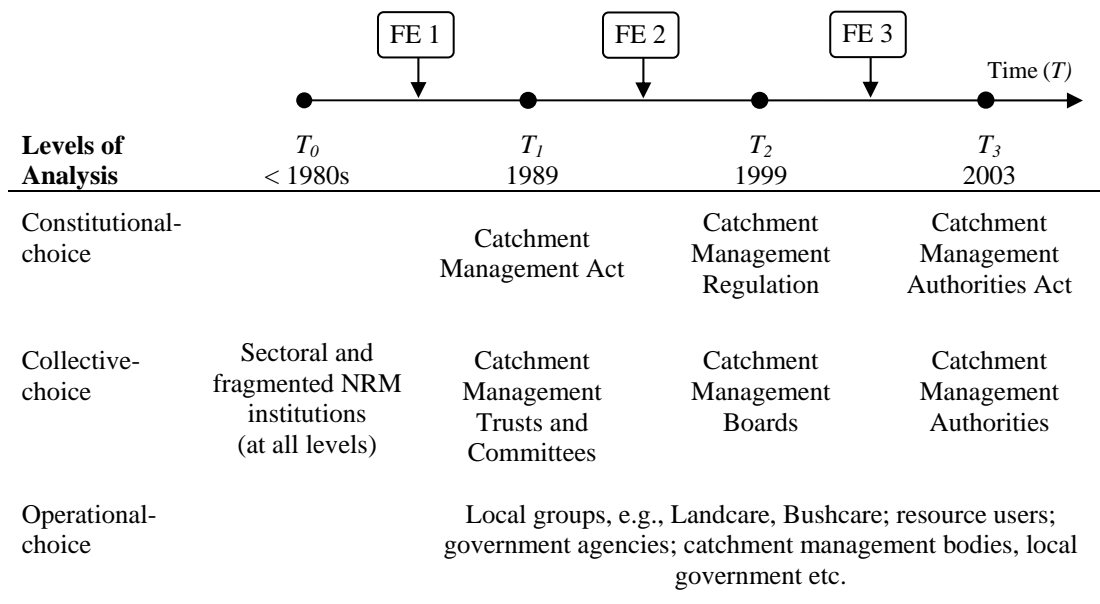
Scope rules define the potential outcomes that must, must not or may be affected as a result of actions taken within a situation. Scope rules relate to outcomes rather than actions (which, instead, are related to choice rules), though they affect actions through their effect on outcome variables (Ostrom and Crawford, 2005). In this study, scope

rules define the functional scope and the geographic domain that can be affected by a catchment management institution.

4.3 Methods

The IAD framework, as conceptualised above, was used to examine catchment management institutions in NSW. Multiple levels of decision-making and action (i.e., the constitutional-choice, collective-choice and operational-choice levels of analysis) were distinguished, as discussed in Chapter 2. Again, such levels comprise a nested system, where outputs of the higher levels affect the institutional rules at the lower levels. The present analysis covered the constitutional-choice and collective-choice levels, with emphasis on the latter. It did not analyse decision-making and action at the operational-choice level⁸.

The study covered the history of catchment management in NSW. It began with the initial setting, Time 0 (T_0), in the mid-1980s when catchment management emerged in the state. Then three successive points in time, characterised by institutional change, i.e., T_1, T_2, T_3 (Figure 4-2), were identified and described.



Note: FE = Focal events, i.e., events that induced change; FE1 = Adoption of Catchment Management; FE2 = Catchment Management Review; FE3 = NRM reform

Figure 4-2: Institutional Analysis of NSW Catchment Management initiative.

⁸ The operational-choice level of catchment management in NSW includes local voluntary groups, such as Landcare, Bushcare; farmers and land managers; as well as government agencies. Local groups have, in general, been regarded as one of the main means to implement strategies and plans developed by the catchment management bodies, by delivering on ground activities.

T_1 corresponds to the period following the adoption of catchment management as a statutory state policy; T_2 is the time after the review of catchment management undertaken in the mid 1990s; and T_3 the period subsequent to the NSW NRM reform. The actions, outputs and outcomes of the constitutional-choice level, at each of these points, led to the creation, review and reform of catchment management institutions at the collective-choice level (i.e., CMCs, CMBs, and CMAs).

Despite focusing on the collective-choice level, understanding the context in which these collective-choice institutions have been created, reviewed and reformed required examining the constitutional-choice level. At this level, the focal events (FE), i.e., the events that primarily induced institutional change for T_1 , T_2 , and T_3 and the resulting actions, outputs and outcomes were described and examined. The main purpose here was, again, to review the institutional context in which collective-choice catchment institutions have been designed and changed; rather than to analyse the rules governing decision-making and action at the constitutional-choice level⁹ itself.

As discussed previously, the constitutional-choice level can be comprised of a number of policies and legislation that affect catchment management. Similarly, at the collective-choice level, a variety of government and non-government entities can influence how resources are used and managed in a given catchment. In this Chapter, however, the focus is primarily on the catchment management and specifically related policies and on the collective-choice institutions established to coordinate NRM on a catchment basis.

In describing and analysing catchment management institutions at the collective-choice level, the seven categories or sets of institutional rules that define any given institution (i.e., position, boundary, choice, aggregation, information, payoff and scope rules) were employed, i.e., each of the catchment management institutions was systematically described by applying the rules aspects of the IAD framework, as conceptualised above. Accordingly, the institutions were investigated in terms of:

- (1) participants;
- (2) process for selecting participants;
- (3) institution's authority and power;
- (4) decision-making and aggregation arrangements;

⁹ Ostrom et al. (1994, 1999, 2005) propose the existence of a supra-constitutional level, where the constitutional-choice level rules are made.

- (5) arrangements for communication, interaction, reporting and monitoring;
- (6) human and financial resources; and,
- (7) functional scope and geographic domain.

To gain further insights into NSW catchment management initiative, 3 catchment management institutions, representatives of collective-choice institutions at the different points in time (i.e., The Illawarra Catchment Management Committee, the Southern Catchment Management Board and the Catchment Management Authority) were used. Other Australian and NSW cases available in the literature were also considered.

Institutional change was examined by comparing the changes, for each set of institutional rules (e.g., position rules change, boundary rules change, choice rules change, and so on), that occurred between T_n and the next point in time (T_{n+1}), as proposed by Gregg et al. (1991) and Margerum and Born (2000).

As discussed in Chapter 3, multiple sources of information and data have been used in this analysis, including documentation, archival records, interviews and observations. The data were collected and analysed using qualitative research methods (e.g., Weber, 1985; Miles and Huberman, 1994; Patton, 2002; Yin, 2003).

4.4 Analysing Catchment Management in a Changing Institutional Setting

In this Section, catchment management institutions are described and analysed at periods characterised by change, from the adoption of catchment management as a state-wide policy in the late 1980s to early 2006. In the first part of this Section, catchment management institutions are examined at different points in time (i.e., T_1 , T_2 and T_3). For each of the periods examined, the focal events that have led to institutional change, the choices made (and their context), and the resulting actions, outputs and outcomes are described at the constitutional-choice level, i.e., the institutional context in which collective-choice catchment management institutions were created, reviewed and reformed over time are thus reviewed. For each of these same periods, each of the collective-choice catchment management institutions (i.e., CMCs, CMBs and CMAs) are, in turn, systematically described in terms of institutional rules.

4.4.1 The Initial Institutional Setting (T_0)

T_0 corresponds to the initial institutional setting, which also describes the issues requiring institutional response. At T_0 , Natural Resource Management (NRM) is characterised by sectoral and fragmented approaches. Policies, legislation, entities and management activities in NSW were primarily organised around single issues such as water, vegetation or soil, with limited or loose coordination among them (Burton, 1986; NSWSCS, 1987; Farrier et al., 1998; Gardner, 1999; Farrier, 2002). The NSW Catchment Management Policy presented the following view (NSWSCS, 1987):

“The current lack of coordination, awareness, liaison and commitment [among entities relating to NRM] combined with the existence of artificial administrative boundaries contributes to a lessened effectiveness in the planning of land use and the management of our state’s natural resources.”

The various entities making decisions and taking actions separately without a clear framework for collaboration, resulted in overlapping and conflicting programs, as well as conflicts between governments, government agencies, organisations and users (AACM and CWPR, 1995; Margerum and Born, 2000). Consequently, NRM has been unable to address, in a more effective manner, difficult environmental problems (NSWSCS, 1987); i.e., those collective-action problems that are complex in nature, interlinked through a number of natural, socio-economic and political processes, and that can span many jurisdictions.

This initial setting comprised an instance of misfit arising from jurisdictional and functional fragmentation, where characteristics of the environment and the attributes of the institutions guiding the human interactions with such environment were incongruent (Young, 2003). In this context, institutions figured highly among the causes of the NRM inadequacies in NSW. Designing new institutions (and/or changing the existing ones) is seen as a natural and appropriate response to attempting to overcome those inadequacies and improving outcomes (Young, 2003; Ostrom, 2005).

“...Total Catchment Management is needed to ensure the effective coordination of policies and activities impinging upon conservation, sustainable use and the management of the State’s natural resources.” (NSWSCS, 1987)

In this context, catchment management was adopted as an institutional response to ineffective NRM regimes. It aimed to reduce the problems emerging from shared

jurisdiction by various agencies relating to NRM, by providing for improved coordination arrangements (Mitchell and Pigram, 1989).

4.4.2 Creating Catchment Management Institutions (T_1)

4.4.2.1 The Constitutional-Choice Level: Adoption of Catchment Management as a State-Wide Policy

4.4.2.1.1 Focal Events

The concept of integrated management of land, water and other resources on a catchment basis re-emerged with enthusiasm within the NSW government in the early 1980s. This concept gained the support of influential individuals, such as the Commissioner of the Soil Conservation Service of NSW and his Minister (i.e., the Minister for Agriculture) (Burton, 1985, 1986). In 1984, a steering committee was established by the Commissioner of the Soil Conservation Service to investigate the principles of the catchment management concept, and to make recommendations to Cabinet about the catchment management approach as a new state government initiative. The Minister's proposal to set-up an Inter-Departmental Committee on catchment management was successful (Burton, 1985, 1986), and as part of the 1984 pre-election rural policy statement, the Premier announced that the NSW government intended to commit to Total Catchment Management (TCM) (NSWSCS, 1987):

“The concept of Total Catchment Management will be comprehensively implemented in each of the major river valleys of this State, protecting the land, improving stream flow and controlling erosion as an integrated policy”. (NSW Premier's rural policy speech, quoted in NSWSCS, 1987)

In 1986, catchment management was formally endorsed with bi-partisan support (Burton, 1986), and in 1987, it was released in the document entitled “*Total Catchment Management: A State Policy*” outlining the new TCM policy (NSWSCS, 1987). As mentioned previously, the policy aimed at providing for a coordinated use and management of land, water, vegetation and other natural resources on a catchment basis. This was to be achieved by (NSWSCS, 1987):

- (a) establishing better coordinating mechanisms between state government agencies;

- (b) facilitating the development of TCM strategies (i.e., catchment management plans);
- (c) requiring consideration of TCM and its strategies in the environmental planning processes of the state; and,
- (d) fostering the involvement and participation of community groups and individuals.

TCM was to be achieved by combined efforts of state and local government agencies with input from the community, and through the existing statutory and planning framework (NSWSCS, 1987).

Again, TCM was intended to minimise the problems emerging from shared jurisdiction by various agencies responsible for NRM (Mitchell and Pigram, 1989). The TCM policy represented a major shift and was believed to have set the scene for an innovative approach to catchment management in Australia (Mitchell and Pigram, 1989; AACM and CWPR, 1995).

4.4.2.1.2 Actions, Outputs and Outcomes

In 1989, the NSW *Catchment Management Act 1989* was passed in the NSW parliament, formalising the first state-wide statutory catchment management policy in Australia. This Act defined the key institutional rules for managing natural resources on a catchment basis across the state.

Under the Catchment Management Act, Total Catchment Management (TCM) was defined as:

“...the co-ordinated and sustainable use and management of land, water, vegetation and other natural resources on a water catchment basis so as to balance resource utilisation and conservation.” (NSW, 1989).

Where the term coordination meant:

“... to bring together or liaise with authorities, groups or individuals to ensure effective total catchment management, but does not include the control or direction of the activities of those authorities, groups or individuals” (NSW, 1989).

Coordination was thus to be achieved by bringing together or liaising with the different actors involved, rather than controlling the activities of those actors. Furthermore, TCM also aimed at (NSW, 1989):

- (a) achieving active community participation in NRM;
- (b) identifying and rectifying natural resource degradation;
- (c) promoting the sustainable use of natural resources; and,
- (d) providing stable and productive soil, high quality water and protective and productive vegetation cover within each of the state's water catchments.

For the purpose of catchment management, some institutions were reformed and others created. The Department of Land Conservation (CaLM), for instance, was assigned the authority to host catchment management and to support catchment management bodies (AACM and CWPR, 1995). The institutions created as part of the overall framework for catchment management included a State Catchment Management Coordinating Committee, and the Catchment Management Trusts and Catchment Management Committees (NSW, 1989). A simplified version of the framework initially set up for catchment management is shown in Figure 4-3.

The **State Catchment Management Coordinating Committee** (SCMCC) consisted of 20 members, representatives from senior state agencies' staff, state-wide representatives of rural interests, environmental interests, local government, and catchment management committees, appointed by the Minister. The role of the SCMCC was to provide central coordination of catchment management across NSW, by (NSW, 1989):

- (a) coordinating the implementation of TCM strategies;
- (b) monitoring and evaluating the effectiveness of TCM strategies;
- (c) advising the responsible Minister or other Ministers on any aspect related to TCM; and,
- (d) coordinating the functioning of Catchment Management Committees and by maintaining liaison with Catchment Management Trusts.

Catchment Management Committees (CMCs) and **Catchment Management Trusts** (CMTs) were regional catchment management bodies comprised of landholders or resource users, and representatives of local government authorities, officers of state government departments and authorities, and environmental interests. These institutions

were responsible for overseeing and coordinating catchment management on the regional or catchment basis (NSW, 1989).

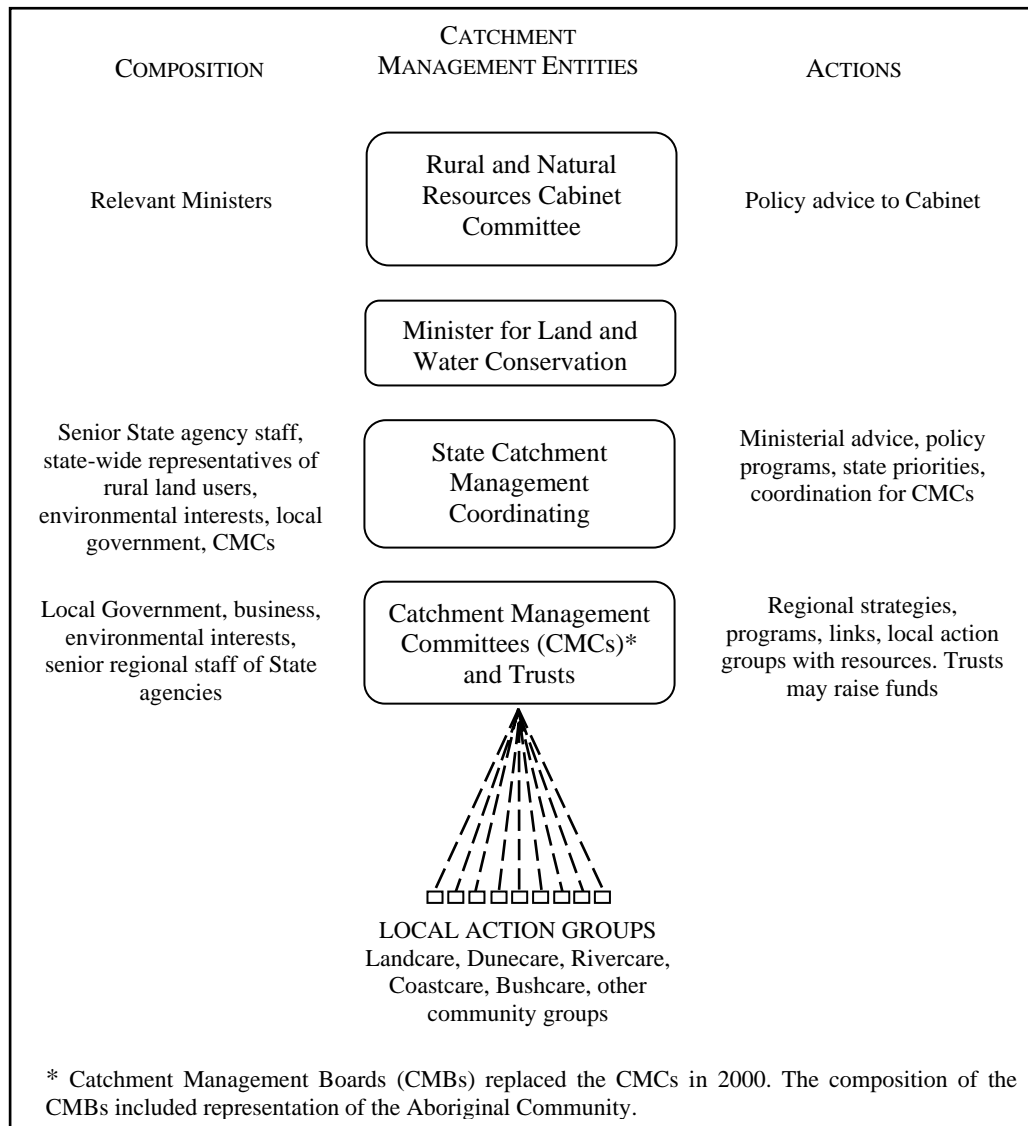


Figure 4-3: Key elements of the NSW catchment management framework in the 1990s.

Source: modified from NSW (1997)

4.4.2.2 The Collective-Choice Level: Catchment Management Committees

The initial setting (T_0), as seen above, is characterised by a number of entities responsible for NRM, acting independently from each other and with no clear framework to coordinate their decisions and actions. At T_1 , new collective-choice institutions in the form of CMCs, were thus designed to provide the needed

coordination for the use and management of natural resources on a catchment basis (NSW, 1989).

Following the adoption of the catchment management policy in the mid 1980s, the first catchment management groups began to emerge in NSW (Burton, 1986; Martin et al., 1992). These groups comprised mostly locally or regionally based staff from state government agencies and local government (Martin et al., 1992). In early 1990s, the first CMCs were established under the *Catchment Management Act 1989*. By the mid 1990s, most of NSW was covered by over 40 CMCs (Verhoeven, 1997). The CMCs operated until early 2000 when they were disbanded to give way to the Catchment Management Boards.

It is important to note that the Catchment Management Trusts (CMTs) were also collective-choice catchment management institutions established under the same *Catchment Management Act 1989*. CMTs were established as incorporated entities (i.e., corporations) and had, in terms of roles, more powers than the CMCs. CMTs could, for example, undertake works and buildings, enter into contracts, levy catchment contributions, employ staff and administer and invest funds (NSW, 1989). Overall, CMTs had to some extent similar roles to the current CMAs, which are examined further below. During the history of the NSW catchment management initiative, only a few CMTs were established, as creating catchment management bodies with rating powers has been a politically sensitive issue (CoA, 1999b). Consequently, the CMCs represented the prevalent catchment management bodies in NSW. They are the focus of the present sub-section.

4.4.2.2.1 Institutional Rules: The Illawarra Catchment Management Committee

The Illawarra Catchment Management Committee was formed in 1991 and comprised one of the first CMCs established in NSW. After nearly one decade of operation, the Illawarra CMC was terminated along with other CMCs across the state to give way to Catchment Management Boards (CMBs). The Illawarra CMC was regarded as a relatively successful CMC in NSW (AACM, 1996). The Illawarra CMC, as other CMCs, presented well defined institutional rules specified largely by the *Catchment Management Act 1989*. Such rules established the overall structure and process for the CMCs across NSW. They are summarised in Table 4-1 and discussed below.

Table 4-1: Institutional rules of the Illawarra Catchment Management Committee

CATEGORY	INSTITUTIONAL RULES	
	DESCRIPTION	
Position	<ul style="list-style-type: none"> • 23 members 	
Boundary	<ul style="list-style-type: none"> • Ministerial appointment of representatives from resource users or land holders, environmental interests, local government, officers of state government departments or authorities. 	
Choice	<ul style="list-style-type: none"> • Largely advisory: <ul style="list-style-type: none"> – to promote and coordinate the implementation of total catchment management policies and programs, – to advise on and coordinate the natural resource management activities of authorities, groups and individuals, – to identify catchment needs and prepare strategies for implementation, – to coordinate the preparation of programs for funding, – to monitor, evaluate and report on progress and performance of total catchment management strategies and programs, – to provide a forum for resolving natural resource conflicts and issues, – to facilitate research into the cause, effect and resolution of natural resource issues, 	
Aggregation	<p><i>Decisions</i></p> <ul style="list-style-type: none"> • Consensus decision-making <p><i>Aggregation arrangements</i></p> <ul style="list-style-type: none"> • Direct participation of selected stakeholder groups • <i>Ad hoc</i> committees, sub-committees, working parties etc. 	
Information	<p><i>Communication & Interaction</i></p> <ul style="list-style-type: none"> • Formal meetings • Public and stakeholders fora • Duplicate membership with other NRM institutions • Personal and professional networks • Submissions to inquiries and surveys • Exchange of meeting minutes, newsletters, reports etc. <p><i>Reporting & Monitoring</i></p> <ul style="list-style-type: none"> • Annual Reports 	
Payoff	<p><i>Staff & Support</i></p> <ul style="list-style-type: none"> • NSW Department of Land and Water Conservation provided limited staff and other support (e.g., administrative and technical support). • Wollongong Council provided office space. <p><i>Funding</i></p> <ul style="list-style-type: none"> • Limited investments from local, state and federal government sources. 	
Scope	<p><i>Functional Scope</i></p> <ul style="list-style-type: none"> • The co-ordinated and sustainable use and management of land, water, vegetation and other natural resources on a water catchment basis so as to balance resource utilisation and conservation. <p><i>Geographical Domain</i></p> <ul style="list-style-type: none"> • Discrete coastal catchment covering an area of 700 km² 	

Position Rules

Overall CMCs consisted of 20 members, on average, comprising representatives of selected stakeholder groups (AACM, 1996). Land holders or resource users should have comprised the majority of the members, as specified in the *Catchment Management Act 1989* (NSW, 1989). On average, CMCs had 14 non-government members (AACM, 1996).

The Illawarra CMC, for example, was comprised (as of 1995) of 23 members, i.e., a majority of resource users (12 representatives), 7 representatives from state government agencies, 1 representative from environmental interests, and 3 representatives from local government (SCMCC, 1995). In the Illawarra CMC, non-government members comprised individuals with diverse backgrounds, which included small farming, mining, fishery industry, local government administration, and expertise in the field of NRM and environmental law, among others. Representation from state government agencies included the Department of Land and Water Conservation (DLWC), the Environment Protection Authority (EPA), NSW Fisheries, Sydney Water, and the Department of Urban Affairs and Planning (DUAP). Local government representatives were from the 3 local government areas encompassed within the Illawarra CMC area (i.e., Wollongong, Kiama and Shellharbour Councils).

CMC members occupied 3 sub-sets of positions, namely chairperson, deputy chairperson and members. In the Illawarra CMC, the positions of chair and deputy chair were occupied by non-government representatives. Participation was on a voluntary basis, as Part 2 of the then Public Sector Management Act 1988 did not apply to, or in respect of, the appointment of a board member (NSW, 1989), i.e., CMC members were not public servants. CMC members were, however, entitled to be paid sitting fees and travelling expenses, as appropriate (NSW, 1989). As of 1996, chairperson fees were around A\$ 5,000 per year (AACM, 1996).

Boundary Rules

CMC members were appointed by the responsible Minister according to the following criteria, as specified in the *Catchment Management Act 1989* (NSW, 1989):

- (a) land users or landholders within the catchment area, who were to constitute the majority of the members;
- (b) persons who in the responsible Minister's opinion had an interest in

- environmental matters within the catchment area,
- (c) persons selected from a panel of 2 or more persons nominated by local government authorities within the catchment area;
 - (d) persons who were officers of government departments or authorities having responsibility for natural resource use or management within the catchment area;
 - (e) in the case of a catchment area that was part of a water catchment system extending into another state or a territory, persons who were officers of government departments or authorities of the relevant state or territory having responsibility for natural resource use or management in that part of the water catchment system within the other state or territory.

Each committee was, therefore, formed by a majority of resource users or land holders, plus environmental interests, local and state government representatives, appointed by the Minister of Land and Water Conservation. Committee members were identified through public advertisement and nominated by their stakeholder groups (AACM, 1996). Considering the case of the Illawarra CMC, an urban coastal catchment, boundary rules somewhat allowed the participation of relatively diverse citizens as resource users representatives (often referred as community representatives in the committee's annual reports [e.g., ICMC, 1998a]). The term of office for committee members was initially of 3 years (AACM, 1996).

Choice Rules

The authority assigned to CMCs was advisory in nature. The main functions of the CMCs within their respective areas of operation were specified in the *Catchment Management Act 1989* (NSW, 1989):

- (a) to promote and coordinate the implementation of Total Catchment Management (TCM) policies and programs;
- (b) to advise on and coordinate the natural resource management activities of authorities, groups and individuals;
- (c) to identify catchment needs and prepare strategies for implementation;
- (d) to coordinate the preparation of programs for funding;

- (e) to monitor, evaluate and report on progress and performance of total catchment management strategies and programs;
- (f) to provide a forum for resolving natural resource conflicts and issues;
- (g) to facilitate research into the cause, effect and resolution of natural resource issues;
- (h) such other functions relating to TCM as are directed by the Coordinating Committee.

The first 2 functions correspond to the overall scope of the NSW catchment management initiative, i.e., to coordinate the management of natural resources on a catchment basis by advising on and coordinating the various catchment actors' activities. In so doing, the CMCs were responsible for preparing, monitoring and reporting of catchment plans and programs, recommending programs and projects for funding under state and federal government schemes, and were, to some extent, to be responsible for conflict resolution.

The CMCs could also have additional functions relating to TCM as conferred or imposed by or under the *Catchment Management Act 1989* or any other Act. (NSW, 1989). In exercising their functions, CMCs were responsible to the SCMCC, which in turn was responsible to the Minister.

In the context of the above set of authorised actions contained in the Catchment Management Act, the Illawarra CMC identified strategies (i.e., actions) available to the committee in undertaking its roles, such as (ICMC, 1997b, 1999b):

- (a) supporting local community groups;
- (b) education and awareness raising;
- (c) collecting, collating and providing access to catchment information;
- (d) advocacy of TCM;
- (e) coordinating funding bids;
- (f) encouraging inter-agency cooperation;
- (g) reviewing and commenting on plans and policies with a catchment perspective;
- (h) establishing demonstration and best practice sites;
- (i) providing "report cards" on progress towards integrated natural resource management;
- (j) providing funding for community projects; and

(k) forming partnerships to undertake specific catchment projects.

Despite being statutory bodies, the CMCs, in undertaking their coordinating roles, had no legal authority to control or direct the activities of organisations or individuals. The catchment strategies developed by the CMCs, for example, were not legally binding. Rather, they were intended to inform and assist the planning and management activities of the range of institutions and individuals relating to NRM (NSW, 1997). Implementation had, therefore, to rely on voluntary and collaborative action and/or on the provisions of related policies.

Aggregation Rules

CMCs used, in general, some form of consensus-based procedures for collective decision-making. In the case of the Illawarra CMC, deliberations sought to achieve consensus by discussion and negotiation among the committee members.

In terms of arrangements to aggregate the preferences of catchment actors, direct participation of different interests in the CMCs, such as citizens, local and state government, for example, was perhaps the primary mechanism for aggregating different preferences, values and needs of some of the catchment's stakeholders. Other arrangements used by the Illawarra CMC to bring stakeholders together included *ad hoc* stakeholders' fora and working groups organised around particular issues/problems.

Furthermore, interaction and communication with catchment actors (i.e., through information rules) can provide additional forms of aggregation. The Illawarra CMC, for instance, used public consultation and meetings, workshops, surveys, among others, to get input from stakeholders into the committee's decision-making process. The workshops and survey of stakeholders as part of the Illawarra CMC Natural Resource and Environmental Management Strategy review is an example of consultation mechanisms used by the Illawarra CMC (ICMC, undated-a). Coordination of meetings of stakeholders to discuss water quality and sedimentation in the Allans Creek/Port Kembla catchments, or to explore support for the formation of a regional vegetation committee (ICMC, 1998a) can also be considered as examples of mechanisms that might have provided aggregation opportunities for the Illawarra CMC.

In addition, information rules in terms of communication and interaction with other stakeholders can also facilitate the input from those stakeholders into decision-

making. With this regard, communication and interaction can take form of duplicate membership/cross representation, public consultation, fora, conferences, and personal and professional networks. Many of these arrangements are addressed below as information arrangements.

Information Rules

Communication and Interaction

CMCs presented various formal and informal procedures for information exchange. The Illawarra CMC, for instance, held meetings on a regular basis, usually at 6 weeks intervals (ICMC, undated-b). Such meetings represented the main formal means for communication among committee members. They provided opportunity for face-to-face communication and interaction among committee members (e.g., sharing of information, analysis of NRM problems and goals).

The Illawarra CMC also used various mechanisms to exchange information with stakeholders and the public. These included membership on other NRM fora, e.g., the Illawarra CMC had representatives on a number of NRM entities such as committees, panels, working parties at local, regional and state levels (Table 4-2). Cross representation, such as with the Lake Illawarra Authority where the chair of the Illawarra CMC represented the committee at this Authority and vice-versa was another mechanism by which the committee communicated and interacted with other NRM entities. Occasionally Illawarra CMC members attended meetings of other organisations. Reports, meeting minutes, and newsletters were also exchanged with other organisations.

The Illawarra CMC organised a number of seminars, fora and workshops, which facilitated information exchange with the catchment populations and stakeholders. A number of publications were also produced and distributed, including newsletters, reports, and educational material and guidelines. Other information mechanisms included media releases and articles in local newspapers and magazines, and radio and television interviews (ICMC, 1998b). At one stage, the Illawarra CMC had a monthly segment on Total Catchment Management on ABC radio (ICMC, 1997a).

Informal means of communication and interaction might have been facilitated by personal and professional networks of CMCs members. Respondents reported that the population and local groups, for instance, used to bring their concerns, questions,

suggestions and proposals before the committee. Furthermore, stakeholders and the public were invited to provide input into documents produced by the Illawarra CMC, such as the Illawarra Wetlands Action Plan (ICMC, 2000). On other occasions, the committee was requested to provide submissions to government and industry inquiries and surveys.

Table 4-2: Membership of the Illawarra CMC members on other NRM fora

Scope	NRM Fora
State	<ul style="list-style-type: none"> • TCM Review Project Management Committee • Urban CMC Group • NSW Water Advisory Council • NSW Wetlands Working Group • State Catchment Management Coordinating Committee
Regional	<ul style="list-style-type: none"> • Illawarra Region Farm Forestry Development Program Committee • Illawarra South East Regional Catchment Committee • Southern Regional Assessment Panel • Southern and Far South Technical Assessment Panel • Urban Catchment Coordinating Committee
Local	<ul style="list-style-type: none"> • Rural Lands Working Party of the Shellharbour Rural Lands Study • Ecoenergy Park Community Consultation Committee • Otford, Stanwell Park, Stanwell Tops, Coalcliff Sewage Program Community Working Group • Lake Illawarra Authority • Lake Illawarra Authority Management Plan Advisory Committee • Port Kembla Harbour Environment Group • Floodplain Management Committees – Allans Creek, Hewitts Creek, Lake Illawarra, Towradgi, Northern Suburbs • Minnamurra Estuary Management Committee • Wollongong Coastal Stormwater Management Committees • EcoEnergy Park Steering Committee • Shoalhaven/Illawarra Farm Forestry Strategy Steering Committee • Wollongong City Council ESD Liaison Committee • I Team

Source: Illawarra CMC (ICMC, 1997a, 1998a; 2000).

Technical information was provided – upon request – to the Illawarra CMC by other organisations, such as state government agencies, local councils and the University of Wollongong. On the other hand, the committee also played a role in providing information to the public and stakeholders by, for example, assisting them with resources from its information system and data bases (J. Caldwell¹⁰, pers. com.).

¹⁰ J. Caldwell, former Illawarra CMC coordinator.

Reporting and Monitoring

In terms of reporting and monitoring, the CMCs were responsible to the State Catchment Management Coordinating Committee (SCMCC), which in turn reported to the Minister. The annual reports produced by the SCMCC were usually general in nature, comprising descriptive accounts of the activities carried out by the CMCs, with limited consideration, if any, of funding and expenditures (e.g., SCMCC, 1992, 1993, 1994, 1995). Formal accountability mechanisms to the SCMCC, DLWC or the Minister were therefore limited. State-wide, there was a lack of detailed financial/auditing information as well as a clear process to account for outcomes from state government funding (AACM, 1996).

Despite the apparent lack of formal arrangements for accountability, CMCs were, in general, perceived as being able to manage and account for the funding received from the government (AACM, 1996). The Illawarra CMC, for example, was awarded a Streamwatch Award for Excellence in Local Project Management and Support in 1997 (ICMC, 1998c). Systematic mechanisms for monitoring the performance of the CMCs were also lacking (AACM, 1996).

Payoff Rules

Staff and Support Arrangements

As specified in the *Catchment Management Act 1989*, the CMCs could arrange for the use of the services of any staff or facilities of a government department, an administrative office or a public or local authority (NSW, 1989). Very limited staff – usually a full- or part-time coordinator – was provided usually by the NSW Department of Land Conservation, or by the Environment Protection Agency in the case of urban CMCs, such as the Illawarra CMC.

The Illawarra CMC was supported by the equivalent of two full-time staff. These positions provided executive, administrative and project support. They included a CMC coordinator, a catchment education officer and a project officer (ICMC, 2000). As of late 1990s, the staff of the Illawarra CMC was jointly funded by the DLWC, Wollongong City Council and Sydney Water. This joint funding was an arrangement devised between Illawarra CMC and its contributors (CoA, 1999a). Occasionally the

Illawarra CMC engaged consultants and part-time staff on a project basis, depending on the availability of funding. Office space was provided by the Wollongong City Council until late 1990s and by DLWC afterwards (J. Caldwell, pers. com.).

Funding Arrangements

Operational funding was provided primarily by the Department of Land and Water Conservation (DLWC), the host agency for TCM. In the 1996/97 financial year, the allocation to catchment management and community services program managed by the DLWC was A\$68 million. From that sum, A\$10 million was allocated to catchment management, which covered CMC operational costs, CMC coordination costs, DLWC contributions, CMC strategic planning, TCM secretariat and SCMCC operation, and catchment management project funding (AACM, 1996).

The operational funding from the DLWC to catchment management was A\$1.2 million in 1995/96. This included sitting fees and travel costs associated with the meetings, and A\$5,000 per CMC towards administrative support (AACM, 1996). In addition, CMCs received, to varying degrees, contributions, both cash or in-kind, from community members, state agencies other than the DLWC, and local government. Local government, in particular, shared a significant proportion of CMC operational costs (AACM, 1996). The Kiama, Shellharbour and Wollongong Councils, for example, contributed some A\$46,000 per year to the Illawarra CMC. Adding up in-kind contributions, including the office space provided by the Wollongong Council, local government contributions to the Illawarra CMC would match state government contributions (Jane Caldwell, pers. comm.).

AACM (1996) estimated that the total funding available for catchment management in NSW, including other sources than state government, was over A\$ 60 million per year. The funds available were, however, largely captured by state government agencies. As a result, the actual funding delivered to CMCs was a proportion of the amount reportedly committed to catchment management by the various sources (AACM, 1996).

Some of the state and federal government funding for NRM was allocated through Regional Assessment Panels comprised of CMCs. Such panels assessed funding applications against the priorities identified in the catchment strategies, where the outcomes would be endorsed by a state panel and, in some cases, by federal

agencies as well (AACM, 1996). In 1993/94, over A\$27 million in federal and state government project funding was endorsed for approval through the TCM process in NSW (SCMCC, 1994). In addition, an annual provision of state funding was available to CMCs for small scale on-ground projects (A\$ 30,000 approx.; A\$ 5,000 per project), which were delivered by the CMCs (Anonymous, 1997). Other sources of project funding included local government, state government agencies, community and industry contributions, usually to develop projects and programs jointly with the Illawarra CMC.

Scope Rules

Functional Scope

The functional scope of the CMCs as defined in the *Catchment Management Act 1989* was, as seen earlier, to influence and coordinate (i.e., bring together or liaise with) authorities, groups or individuals to ensure effective TCM as their activities relate to NRM (NSW, 1989). Through coordination, CMCs and stakeholders were expected to work together in achieving improved NRM on a catchment basis. Within this context, the functional scope in terms of the outcome envisaged by the Illawarra CMC was defined in its vision statement (ICMC, 1997b, 1999b):

“Healthy and attractive Illawarra catchments characterised by sustainable and productive use and management of natural resources and ensuring the viability and continuity of the area’s diverse ecosystems.”

Furthermore, the Illawarra CMC defined sets of issues to be addressed within its area of operation into four categories, i.e., land management, water management, biodiversity, and education and awareness.

Despite some success in engaging stakeholders, the CMCs were rather limited in affecting coordination of NRM programs and policies (AACM, 1996), due to a number of constraints, as will be discussed in Chapter 5. The actual functional scope, i.e., the outcomes affected by CMCs was, therefore, far narrower. It was basically limited to advice and coordination of local groups’ activities, funding applications, and research and education programs, with a focus on specific issues.

Geographical Domain

On the eastern side of the Great Dividing Range¹¹ (GDR), several CMC regions comprised mostly a number of discrete and relative small coastal catchments areas. Conversely, west to the GDR, there were seven and much larger inland CMCs areas (Figure 4-4). The large areas of inland CMCs were justified by the fact that they covered sparsely populated land with less diverse issues to be addressed than the smaller catchments (NSW, 1997).

Please see print copy for image



Figure 4-4: Area covered by Catchment Management Committees in New South Wales.

The Illawarra CMC covered an area of 700 km² located south of Sydney. It was bounded on the north by Stanwell Park, on the south by Gerroa, at the northern end of Seven Mile Beach, on the west by the Illawarra escarpment and on the east by the South Pacific Ocean (ICMC, undated-a).

¹¹ The Great Dividing Range is a main watershed in Eastern Australia, comprising a series of plateaus and mountain ranges parallel the Eastern coast.

The Illawarra landscape encompassed coastal plains, low hills, steep forested slopes of the Illawarra escarpment, beaches and a number of coastal creeks and rivers, such as Minnamurra and Crooked Rivers and Allans and Fairy Creeks, which flow either directly to the sea or to a coastal lagoon such as the Lake Illawarra (SCMB, n.d.-a).

The Illawarra CMC area had a population of 240,000 people. The major urban centre in the catchment was the city of Wollongong, which is part of one the fastest growing regions in NSW, as a result of urban development. The region is home to important steel, coal and copper industries and port facilities. Despite the growing urbanisation, the lowlands have long supported the dairying industry (SCMB, n.d.-a). Tertiary education, commerce, public services and tourism were other important socio-economic activities in the committee's area.

A number of government and non-government entities affect the use of natural resources within the area of the Illawarra CMC. These include 3 local government areas (i.e., Wollongong, Kiama and Shellharbour); state and federal government agencies and authorities (e.g., Lake Illawarra Authority); Boards and committees (e.g., estuary, floodplain committees), various local environment action groups (e.g., Landcare, Bushcare, Rivercare, Coastcare and Dunecare); NGOs, and industry groups.

4.4.3 Reviewing Catchment Management Institutions (T_2)

4.4.3.1 The Constitutional-Choice Level: Review of Total Catchment Management

4.4.3.1.1 Focal Event

In 1996, the NSW government commissioned a review of catchment management in the state. Such a review was intended to examine the effectiveness of the catchment management initiative and the suite of institutional rules employed, e.g., the area and boundaries, roles, functions and membership selection of the catchment management institutions (Table 4-3).

Table 4-3: Terms of reference of the 1996 NSW Catchment Management Review

-
1. To examine the current TCM program in NSW to assess its effectiveness in meeting its stated objectives.
 2. To assess the cost effectiveness of the TCM program including that of providing:
 - a. Catalytic funding for community group projects and Catchment Management Committees' and Trusts' (CMCs and CMTs) strategic planning.
 - b. Non-replicative added value to natural resource management
 3. To assess the current relationship between TCM committees and state government agencies, local government and other natural resource management committees, boards, and regional organisations; and identify areas where roles and responsibilities need to change.
 4. To evaluate the current TCM structure in NSW from a state and catchment perspective with particular emphasis on CMC/CMT catchment management areas, their existing boundaries; and identify any changes needed.
 5. To evaluate the roles, functions and membership selection of the SCMCC, CMCs and CMTs.
 6. To evaluate the current operation of the SCMCC, CMCs and CMTs with particular emphasis on:
 - a. Committees and sub-committees operational procedures
 - b. Advantages/disadvantages of CMTs versus CMCs
 - c. Resource allocation (financial and human) to CMCs and CMTs by government (federal, state and local), agencies and the community
 - d. The role of CMC Coordinators and support staff.
 7. To review the Catchment Management Act (1989) to:
 - a. Ascertain if its underlying basis is still appropriate and in the light of information from the examination of terms of reference 1-6.
 - b. Identify necessary amendments.
 8. To report to the Minister for Land and Water Conservation on recommendations in relation to the future direction and operation of TCM in NSW.
-

Source: NSW (1997)

As part of the review process, an independent review was undertaken by consultants, whose recommendations were reviewed by members of the State Catchment Management Coordinating Committee and then considered by the Minister. The actions to be implemented as result of the review process were outlined in the report "*Outcomes of the Review of Total Catchment Management in NSW*" of December 1997 (NSW, 1997). In addition, the SCMCC conducted, in 1999, a further review of the number of committees and their functions with concerned stakeholders (DLWC, 1999).

The review of TCM identified a number of shortcomings (AACM, 1996), several of which were related to coordination, as outlined in Table 4-4. It was apparent,

therefore, that coordination – the overall goal of catchment management – was not effectively achieved. The response to the TCM review included reviewing and changing the then existing catchment management institutions.

Table 4-4: Major issues identified in the 1996 NSW Catchment Management Review

-
- Improved integration between state government agencies and TCM programs
 - Greater participation and commitment of local government to TCM
 - Consistency/compatibility between CMC and CMT strategies and policies, and the requirements of the Environmental Planning Assessment Act 1979 and the Local Government Act 1993
 - Improved relationship between CMCs and estuary, floodplain and coastal management committees
 - Community awareness of the links between TCM and the work of Landcare and other community action groups
 - Inclusion of Aboriginal interests and people of non-English background
 - Strategic regional focus
 - Monitoring and reporting
 - Skills training and leadership development for members of TCM bodies
 - Guidelines for CMCs and CMTs.
-

Source: after NSW (1997)

4.4.3.1.2 Actions, Outputs and Outcomes

The initial responses to the problems identified in the review were (far) less comprehensive than the review process. Indeed, the NSW government chose not to implement most of the recommendations of the consultants (CoA, 1999b).

Five **Regional Catchment Coordinating Committees** (RCCCs), comprised of groupings of CMCs, were created. In reality, those institutions had been already crafted, in the form of informal arrangements, by the CMCs themselves and were a means to discuss cross-catchment issues, develop joint solutions and share experiences (NSW, 1997). In this context, this response can be seen more as a formal recognition of these institutions rather the creation of new institutions.

The creation of RCCCs was a response to the limitations associated with the small geographical domain of single CMCs on the eastern side of the Great Dividing Range. These domains were considered too small to ensure strategic and regional focus for catchment management planning (NSW, 1997). The RCCCs were established as sub-committees of the SCMCC. Each of the RCCCs was comprised of chairpersons of the CMCs and/or CMTs. The RCCCs would provide more consistent approach to

developing and implementing catchment and regional strategies. Each of them would complement the CMCs focus on the specific issues of a particular catchment (NSW, 1997).

Additional response to the catchment management review was formalised in 1999 with the Catchment Management Regulation. 18 **Catchment Management Boards** (CMBs) were established to replace the 5 RCCCs mentioned above, and 43 of the 45 existing CMCs (DLWC, 1999, 2002). This was justified in part by the then growing number of the community-based committees – comprising 45 CMCs, 5 RCCs, 22 water management committees, some 70 floodplain and coastal and estuarine committees that, according to NSW government, had been placing strain on human and financial resources (DLWC, 1999). Furthermore, the NSW government argued that the strategies (management plans) prepared by CMCs, because of their narrow scope, had been unable to address the causes of major natural resource problems; and that CMCs had been limited in their capacity to ensure the implementation of such strategies (DLWC, 1999).

Under the *Catchment Management Act 1989*, there were no direct relationships between the then new CMBs and the SCMCC (DLWC, 2000). However, the Act specified that: the SCMCC maintained liaison with CMBs; that the board referred a copy of the corporate plan to the SCMCC; and that the Minister sought advice of the SCMCC in assessing the CMBs' corporate plans (NSW, 1989).

The **Department of Land and Water Conservation** (DLWC) was the host agency and responsible for the oversight and support (e.g., administrative and technical) of CMBs. The DLWC was also responsible for advising the Minister on policy governing the CMBs and their operations (DLWC, 2000).

It is important to note that the focal events and the resulting actions, outputs and outcomes, discussed above, were also influenced by national programs such as the Natural Heritage Trust (NHT) and the National Action Plan for Salinity and Water Quality (NAP). The significance of these programs as drivers to NRM is discussed below, in Section 4.4.4.2.

4.4.3.2 The Collective-Choice Level: Catchment Management Boards

The TCM review identified, as seen above, inadequacies associated with institutions created at T_1 . Such inadequacies demanded response at T_2 , which included putting in place reviewed collective-choice institutions, in the form of Catchment

Management Boards (CMBs). Eighteen CMBs were then established by the *Catchment Management Regulation 1999*, under the *Catchment Management Act 1989*, to replace the CMCs. The CMBs operated from 2000 till late 2003, when they were, in turn, replaced with Catchment Management Authorities (CMAs). Most of the CMBs' existence was primarily dedicated to the development of a catchment management plan (best known as the Catchment Blueprint, or the Blueprint).

4.4.3.2.1 Institutional Rules: The Southern Catchment Management Board

The Southern CMB was established in May 2000 together with other 17 CMBs across NSW. As mentioned above, CMBs were disbanded in late 2003 and replaced with CMAs. Like other CMBs, the Southern CMB featured well defined institutional rules specified primarily under the *Catchment Management Act 1989*. Such rules established the overall structure and process for the CMBs across NSW. These institutional rules are summarised in Table 4-5 and discussed below.

Table 4-5: Institutional rules for the Southern Catchment Management Board

CATEGORY	INSTITUTIONAL RULES
	DESCRIPTION
Position	<ul style="list-style-type: none"> • 19 members
Boundary	<ul style="list-style-type: none"> • Ministerial appointment of representatives from resource users or land holders, environmental interest, Aboriginal community, local government, officers of state government departments or authorities.
Choice	<ul style="list-style-type: none"> • Mostly advisory: <ul style="list-style-type: none"> – to identify opportunities, problems and threats associated with the use of natural resources, – to identify the first order objectives and targets for the management of natural resources, – to develop management options, strategies and actions to address the identified objectives and targets, – to assist in developing a greater understanding within the community of the issues identified and action required, and – to initiate proposals for projects to achieve those functions and assess projects submitted for funding under commonwealth and state NRM grant programs.
Aggregation	<p><i>Decision</i></p> <ul style="list-style-type: none"> • Consensus decision-making <p><i>Aggregation Arrangements</i></p> <ul style="list-style-type: none"> • Direct participation of selected stakeholder groups • Aggregation mechanism, e.g., <i>ad hoc</i> committees, sub-committees and working parties

Continues...

Table 4-5: continued.

CATEGORY	INSTITUTIONAL RULES	
	DESCRIPTION	
Information	<i>Communication & Interaction</i>	
	<ul style="list-style-type: none"> • Formal meetings • Public and stakeholders fora • Duplicate membership with other NRM institutions • Personal and professional networks • Submissions to inquiries and surveys • Exchange of meeting minutes, newsletters, reports etc. 	
	<i>Reporting & Monitoring</i>	
	<ul style="list-style-type: none"> • Annual Reports • Catchment Management Blueprints • Corporate Plans. 	
Payoff	<i>Staff & support</i>	
	<ul style="list-style-type: none"> • NSW Department of Land and Water Conservation provided limited staff and other support (e.g., administrative and technical support). 	
	<i>Funding</i>	
	<ul style="list-style-type: none"> • Limited investments from state and federal government sources. 	
Scope	<i>Functional Scope</i>	
	<ul style="list-style-type: none"> • The co-ordinated and sustainable use and management of land, water, vegetation and other natural resources on a water catchment basis so as to balance resource utilisation and conservation. 	
	<i>Geographical Domain</i>	
	<ul style="list-style-type: none"> • Catchment area of 9,000 km² extending to 3 nautical miles offshore. 	

Position Rules

Overall, the CMBs comprised around 17 members, with a membership similar to the CMCs. In addition to the stakeholder groups represented in the CMCs, the CMBs formally attempted to include representatives from Aboriginal interests. The position of Board member was occupied according to certain conditions, i.e., the number of slots to be occupied by each of the stakeholder groups was set and, similar to CMCs, land holders or resource users were to comprise the majority (see Table 4-6) (DLWC, 2000).

The Southern CMB comprised 5 representatives from resource users, 4 from nature conservation, 2 from the Aboriginal community, 4 from local government and 4 from state government. In the Southern CMB, the positions of chairperson and deputy chairperson were occupied by a nature conservation representative and a local government representative, respectively (SCMB, 2003b).

Members from state government agencies included representatives from the Department of Land and Water Conservation (DLWC), National Parks and Wildlife Service, Environmental Protection Authority and Department of Mineral Resources (SCMB, n.d.-b). Representation from local government included Sutherland, Wollongong, Shoalhaven and Tallaganda councils.

Similar to the CMCs, board members were not considered public servants, nor were they entitled to salaries or employment benefits. Participation was, thus, on a voluntary basis. CMB members were, however, entitled to be paid an annual remuneration, and travelling and subsistence allowances, when appropriate (NSW, 1989; NSWPD, 1999). For the purposes of remuneration, CMBs were classified by the NSW Premier's Department as *Category C Advisory Boards*. Accordingly, as of 2000, the annual stipends were A\$10,000 for Chairpersons and A\$ 4,000 for board members (DLWC, 2000).

Boundary Rules

Members of the Southern CMB were appointed by the Minister for Land and Water Conservation according to the same boundary rules that applied the CMCs, as specified in the *Catchment Management Act 1989*, i.e., CMB members were appointed based on representation of certain stakeholder groups. CMBs were to include, however, representatives from Aboriginal interests, in addition to a majority of landholders or resource users plus environmental interests, and local and state government representatives (DLWC, 1999, 2000). Members were usually selected from a panel nominated by particular interest groups (e.g., Nature Conservation Council, industry groups) and/or through public advertisement (i.e., self nomination) (DLWC, 2000), as shown in Table 4-6.

Board members were initially appointed for two years (DLWC, 2000). The term of office was not to exceed 5 years, but a board member was eligible (if otherwise qualified) for re-appointment (NSW, 1989).

Table 4-6: Composition of CMBs and selection of board members.

Interests Represented	Category	Selection	Reps
Local Government	Local government	Nominated by local government and state agencies	2
	Land holder/user	As above	1
Nature Conservation	Environmental interest	Nominated by Nature Conservation Council	2
	Land holder/user	Identified through public advertisement	2
Natural Resource User	Land holder/user	Nominated by industry groups	2
	Land holder/user	Identified through public advertisement	2
Aboriginal		Nominated by appropriate process – local and state	2
State Government		Selected by state government	4

Note: in urban areas farmer representation could be replaced by other natural resource users

Source: DLWC (1999; 2000)

Choice Rules

The primary choice rules for the CMBs were defined in the *Catchment Management Regulation 1999* (NSW, 1999). CMBs were assigned the following functions in relation to its area of operation (NSW, 1999):

- (a) to identify the critical opportunities, problems and threats associated with the use of natural resources so as to support rural production and to protect the environment;
- (b) to identify the critical first order objectives and targets for the management of natural resources, having regard to any legislation or relevant government policy;
- (c) to develop management options, strategies and actions to address the identified objectives and targets;
- (d) to assist in developing a greater understanding within the community of the issues identified and action required to support rural production and protect the environment; and,

- (e) to initiate proposals for projects to achieve those functions and assess projects submitted for funding under federal and state natural resource management grant programs having regard to targets identified by the Board.

The first three functions corresponded to the preparation of the plans and programs, i.e., the Catchment Blueprint. As mentioned earlier, the short history of the CMBs was dedicated primarily to the development of an integrated catchment management plan (the Blueprint) for their respective areas. This was accomplished shortly before their termination in late 2003. The Blueprints were accredited by a state and federal government Joint Steering Committee so as to guide investment of funds under the National Heritage Trust and National Action Plan for Salinity and Water Quality programs. The Blueprints have been used on an interim basis until the Catchment Action Plans are prepared by the current Catchment Management Authorities, as discussed below (in Section 4.4.4.2). Community education and support, and recommendation of projects to be funded in the CMB area were defined as on-going functions (DLWC, 2000).

Similar to CMCs, the role of CMBs was advisory in nature. The Blueprint – like the Catchment Strategies developed by the CMCs – had no legal status, i.e., it was advisory only, rather than a regulatory document. However, it aimed to guide investments in NRM in NSW (DLWC, 2000).

In exercising their functions, CMBs were subject to the control and direction of the responsible Minister (NSW, 1989). In developing the Catchment Blueprint, for instance, the CMBs were provided with directions on how to develop the Blueprint, including timeframes and how the plan should be structured. This was to ensure consistency in terms of form and content of these plans across CMBs (DLWC, 2000). The DLWC, the host agency, oversaw activities and provided the Board with technical, administrative, and financial support (DLWC, 2000), as will be discussed in the Payoff Rules below.

A CMB could also delegate any of its functions (NSW, 1989). In this regard, the Southern CMB established working groups to help in developing the Blueprint. These groups were then assigned responsibility over refining issues, reviewing existing information and proposing catchment and management targets and actions to the Southern CMB (SCMB, 2003c).

Aggregation Rules

Consensus was the form of collective decision-making specified in the Minister's directions to the CMBs (i.e., DLWC, 2000). Consensus was, similar to CMCs, reached through discussion and negotiation primarily at the Board's regular meetings.

In terms of aggregation arrangements – similar to the former CMCs – appointment of representatives of certain stakeholder groups to CMBs was the primary mechanism for aggregating different preferences of some of those affected by the decisions of the board. Other forms of aggregation mechanisms included *ad hoc* stakeholders' forum and working groups organised around particular issues/problems. The Southern CMB, for example, used working groups during the preparation of the Blueprint, such as the coast and estuary working group. This working group was initially formed by members from state government agencies (e.g., DLWC, EPA, NPWS, NSW Fisheries), local government, the University of Wollongong, aboriginal representatives and Board representatives. Despite comprising mostly technical expertise, the working group might have provided some degree of aggregation. In addition, interaction and communication with other stakeholders and institutions, which can also provide opportunity for aggregation, included duplicate membership, public consultation and meetings, fora, conferences, personal and professional networks, as discussed next in information rules.

Information Rules

Communication and Interaction

Similar to the CMCs, the CMBs used various procedures for exchanging information. Formal meetings provided the main channel for information exchange between board members. Between and at meetings, information such as business and issue papers were circulated among members of the board and support staff. Board meetings were held on a regular basis – some 20 meetings took place during the life span of the Southern CMB, i.e., between September 2000 and November 2003 – at different places within its area of operation.

Communication and interaction with other NRM institutions were facilitated by duplicate membership. Board members were also representatives in other

entities/organisations, such as the Lake Illawarra Authority, Estuary Management Committees and the Illawarra/Shoalhaven Water Management Committee. Personal and professional networks, occasional attendance of CMB members at other organisations meetings, exchange of reports, meetings minutes, newsletters, etc., were other mechanisms facilitating exchange of information with other organisations. Furthermore, the Southern CMB was at times consulted by other NRM institutions and invited to make submissions to government or industry inquiries and surveys, similar to the CMCs.

The board was required to consult with and involve stakeholders and the broader population as part of its functions and, in particular, through the development of its Blueprint (DLWC, 2000). In the case of the Southern CMB, this included briefings held with each local government and workshops with local government representatives to explore the key issues and the preferred actions to tackle those issues (SCMB, 2003c). Information such as brochures, draft discussion and position papers including request for inputs from stakeholders and the public at large, was circulated by mail, internet, and through the press at various stages of the development of the Blueprint, targeting over 500 stakeholders (SCMB, 2003c). Over 10 public meetings took place in different locations within the CMB area (i.e., in Sutherland, Wollongong, Shellharbour, Nowra, Ulladulla and Braidwood) to discuss the Blueprint, as its major components were being developed. Three meetings with representatives of the Aboriginal communities were also held (SCMB, 2003c).

Input of technical information was facilitated through expert focus groups, support by the DLWC and other government agencies, and the establishment of 5 working groups and a specialist team. The working groups comprised of technical staff from state government agencies and stakeholder representatives such as local government, board members and university (SCMB, 2003c), as mentioned above.

Reporting and Monitoring

Information rules in terms of reporting and monitoring arrangements involved the preparation of plans and reports, as specified in the legislation (e.g., NSW, 1989; NSW, 1999). These included corporate plans, annual reports, and catchment management plans. All draft reports and plans were to be submitted to the Minister with

a copy to the director of the Integrated Catchment Planning of the DLWC (DLWC, 2000).

Under Section 28 of the *Catchment Management Act 1989*, the CMBs were required to produce a corporate plan. The corporate plan should contain a detailed written scheme of the strategies and programs to be implemented by the CMB in its area (NSW, 1989). The corporate plan should specify how the CMB would operate to achieve its role, by identifying the board goals for the financial year and how these goals would be achieved (DLWC, 2000).

An annual report was also to be submitted by the CMBs in compliance with the Public Finance and Audit Act 1983, the Annual Reports (Statutory Bodies) Act 1984 and the Annual Reports (Statutory Bodies) Regulation 1995 (DLWC, 2000). The annual report was to contain information about their activities, as well as the outcomes to be achieved in the next year (DLWC, 2000). The DLWC (2000) defined the annual report as an evaluation of the CMB's process, as it would contain information on the progress towards objectives and targets, including information on implementation of management actions and performance assessment of the outcomes.

Payoff Rules

Staff and Support Arrangements

Technical, administrative and financial support was provided to CMBs by the DLWC, as they could not, under the legislation, employ staff, or raise, hold or manage funds or other assets (DLWC, 2000). The Southern CMB had a 3 support staff team provided by the DLWC (SCMB, n.d.-b). Funds for the operation of the CMBs were provided primarily by the NSW government as part of the allocations of the Land and Water Conservation Ministerial portfolio (DLWC, 2000).

Funding Arrangements

Sources of funding for CMBs' programs were primarily from NSW and federal government funding programs. Potential sources from NSW government programs included the Acid Soil Action, NSW Rural Assistance Authority, NSW Wetlands Action Program, Property Agreements and Incentives for Native Vegetation Management, Rivercare Program, Salt Action, Section 10 Soil Conservation Projects,

WaterWise on the Farm, Environmental Trust, and Irrigation Area and Districts Land and Water Management Plan (DLWC, 2000).

At the National level, the Natural Heritage Trust (NHT) and the National Action Plan for Salinity and Water Quality (NAP) were (and continue to be at present) a major source of funding to NRM bodies. As will be discussed later, these programs provided for joint federal and state government investments, and funds were allocated on a competitive basis by a Joint (federal and state government) Steering Committee. Other joint funding programs between state and federal governments or between government and NGOs were also accessible, such as the Murray-Darling 2001, Greening Australia Fencing Incentives and the Threatened Species Network Community Grants (DLWC, 2000).

The funding invested in NSW from the NHT program, for the 2002/03 period, was approximately A\$20.5 million. This funding was targeted at interim projects – as the bi-lateral agreements between the federal and NSW governments were not signed until August 2003, as discussed below (Section 4.4.4.2) – which included foundation activities and priority projects (CoA, 2004b). Table 4-7 indicates the investment secured by the Southern CMB from the NHT in 2002/03.

Table 4-7: NHT investment secured by the Southern CMB in 2002/03

NAME OF PROJECT	NHT FUNDING	PROJECT PARTNERS
Southern Riparian Partnership Project	A\$317,800	Department of Infrastructure Planning and Natural Resources, landcare groups, local government
Protecting Biodiversity in the Southern Catchment	A\$683,478	Department of Infrastructure Planning and Natural Resources, National Parks and Wildlife Service, landcare groups, local government, Rural Lands Protection Boards
Sustainable Land Use Program – Delivering Weed Resilient Landscapes	A\$139,775	NSW Agriculture, local government, South East Private Forestry
Southern Community Capacity Building Initiative	A\$348,957	Department of Infrastructure Planning and Natural Resources, landcare associations, Sutherland Environment Centre, South East Private Forestry
Southern Estuary Monitoring and Reporting Initiative (SEMRI)	Not funded	Department of Infrastructure Planning and Natural Resources, local government
TOTAL	A\$1,490,101	

Source: Southern CMB (SCMB, 2003a).

Almost A\$ 6.3 million was invested in NSW in 2002/03 as part of the Envirofund, which is a component of the NHT, to help individuals and local groups undertake projects aimed at conserving biodiversity and promoting sustainable resource use (CoA, 2005a). Groups and individuals within the Southern CMB area received approximately A\$310 thousand from the Envirofund in 2002/03 (SCMB, 2003a). The National Landcare Program, another funding program available for individuals and local groups, invested approximately A\$7.2 million in NSW in the same period (CoA, 2006).

Funding allocated for NSW from the NAP program, for 2002/03, was approximately A\$27 million. However, the eligible region for NAP investments (i.e., Border Rivers-Gwydir, Central West, Lachlan, Lower Murray, Murray, Murrumbidgee, Namoi and Western [Balonne/Maranoa]) did not cover every CMB in the state (CoA, 2004a).

It is important to note that, though data for some of the funding programs mentioned above was available from the internet, it was beyond the scope of this study to carry out a financial analysis *per se* of NRM in NSW, including the monetary value of in-kind support to catchment management institutions. It focuses, therefore, on aspects of the core funding available for these institutions (i.e., NHT and NAP).

Scope Rules

Functional Scope

The functional scope of the CMBs under the *Catchment Management Act 1989* was the same as for the CMCs, i.e., the coordinated management and use of natural resources on a catchment basis. *Catchment Management Regulation 1999* specified that the Total Catchment Management purpose of the CMBs was (NSW, 1999):

- “... to promote a healthy and productive catchment system in the area in respect of which the Board is established, by:
- a) encouraging the protection, and where appropriate, the restoration of the catchment, and
 - b) promoting and facilitating the ecologically sustainable use, development and management of natural resources”.

Within this context, the scope for the Southern CMB identified 5 major areas of concern: (1) coast and estuaries, (2) water, (3) sustainable land use, (4) biodiversity, and

(5) developed environment (SCMB, 2003b). The desired conditions for the catchment natural resources were defined as “First Order Objectives” in its Blueprint (SCMB, 2003b):

“Healthy coastlines and estuaries with non-polluted waters, diverse aquatic ecosystems, foreshore vegetation and ample opportunities for sustainable public enjoyment.”

“Rivers, streams and wetlands with healthy, vegetated riparian corridors and stable river banks and beds that support good water quality, provision of habitat and sustainable production.”

“Sustainable primary production and use of lands within their capabilities.”

“Protection of native biological diversity and maintenance of the integrity of ecological processes and systems.”

“Healthy urban environments which provide for sustainable balance between natural systems and social, cultural and economic interests.”

For each of these First Order Objectives, catchment and management targets identified specific and measurable outcomes to be achieved within a defined timeframe (SCMB, 2003b).

Geographical Domain

The *Catchment Management Regulation 1999* also specified the area of operation of each of the CMBs (NSW, 1999). The geographical domain of CMBs east to the Great Dividing Range, such as the Southern CMB, comprised larger regional areas (Figure 4-5), as compared to the areas of the CMCs. In addition, the area of the coastal CMBs extended to 3 nautical miles seaward, encompassing the state waters.

Please see print copy for image

Figure 4-5: Area covered by Catchment Management Boards in New South Wales

The Southern CMB covered an area of 9,000 km² located in the South-eastern portion of NSW. The SCMB was limited on the north by Port Hacking, on the south by the border with the Southeast Catchment Management Board, on the west by the Great Dividing Range, and to the east by the limit of 3 nautical miles offshore. The area of the SCMB corresponded to the management areas of the former Hacking, Illawarra (described above in Section 4.4.2.2.1, scope rules), and Shoalhaven CMCs.

The landscape embraces grassland forests, escarpments and coastal areas – characterised by numerous beaches, bays, coastal lakes, lagoons and estuaries – creeks and rivers (SCMB, 2003b), such as the Hacking, Minnamurra, Kangaroo and Shoalhaven rivers (SCMB, n.d.-a). State forests, national parks and nature reserves, and agricultural, residential and industrial areas are also part of the landscape. The SCMB area included a population of some 390,000 people. Sutherland, Wollongong, Shellharbour, Nowra, Ulladulla and Braidwood represented the main urban centres. Socio-economic activities/natural resources use included agriculture, forestry,

commercial fishing and aquaculture, mining, tourism and recreation, and heavy and manufacturing industries (SCMB, 2003b).

The Southern CMB area extended across numerous government and non-government entities, which decision-making and action affected the use of natural resources within the area. These included 8 local governments, state and federal government agencies, authorities, Boards and committees, various local environment action groups, NGOs, and industry groups.

4.4.4 Reforming NSW Natural Resource Management (T_3)

4.4.4.1 The Constitutional-Choice Level: NSW Natural Resource Management Reform

4.4.4.1.1 Focal Event

Six weeks before the NSW General Elections in March 2003, the NSW Premier announced that his re-elected government would adopt a new approach to manage **native vegetation** in the state (NSW, 2003c). This new approach was initially based on the recommendations of the Wentworth Group's report "*A New Model for Landscape Conservation in New South Wales: The Wentworth Group of Concerned Scientists Report to Premier Carr*" (TWG, 2003). The Wentworth Group – a group of high profile Australian scientists convened by the World Wildlife Fund (WWF) Australia – had then been invited by the NSW Premier to work on recommendations for addressing the problem of clearing of native vegetation in the state. This was after the release of the Group's national "*Blueprint for a Living Continent: A Way Forward from the Wentworth Group of Concerned Scientists*" (TWG, 2002), which has attracted considerable attention and enjoyed significant policy influence (Lunney, 2003; Cullen, 2004; Lane et al., 2004b). It is important to note that the Wentworth Group's advocacy (e.g., TWG, 2002; TWG, 2003) is congruent with the federal government's preferred NRM model, as expressed in programs such as the National Plan for Salinity and Water Quality and the extension of the Natural Heritage Trust (Lane et al., 2004a; Head, 2005).

Following the 2003 elections, the re-elected NSW government appointed a Native Vegetation Reform Implementation Group (NVRIG) – comprising representatives of the NSW Farmers' Association, environmental interests, the

Wentworth Group and the NSW government – to oversee the implementation of the new vegetation policies (DIPNR, 2003a). The NVRIG's final report brought a set of recommendations, which formed the basis for the NRM reform. In October 2003, the NSW government announced its new approach to NRM, which proposed (DIPNR, 2003b, a):

- (a) establishing state-wide definitions, standards and targets for NRM;
- (b) introducing new funding and incentives schemes;
- (c) strengthening the compliance framework;
- (d) new legislation such as the Natural Resources Commission Act and Catchment Management Authority;
- (e) reducing the number of state and regional committees and government agencies responsible for land and water conservation; and
- (f) creating NRM institutions, such as the Natural Resources commission, the Natural Resources Advisory Council and Catchment Management Authorities.

4.4.4.1.2 Actions, Outputs and Outcomes

Despite the primary focus of the reform on native vegetation, the overall scope of the new approach to NRM, as specified in the Natural Resource Commission Act 2003, extends to water, native vegetation, salinity, soil, biodiversity, coastal protection, marine environment, forestry, and any other matter concerning natural resources prescribed by the regulations relating to the management of natural resources (NSW, 2003b).

The new institutions created as part of the NRM reform, as mentioned above, included the Natural Resources Commission, the Natural Resources Advisory Council and, at the regional or catchment level, the Catchment Management Authorities, as illustrated in Figure 4-6.

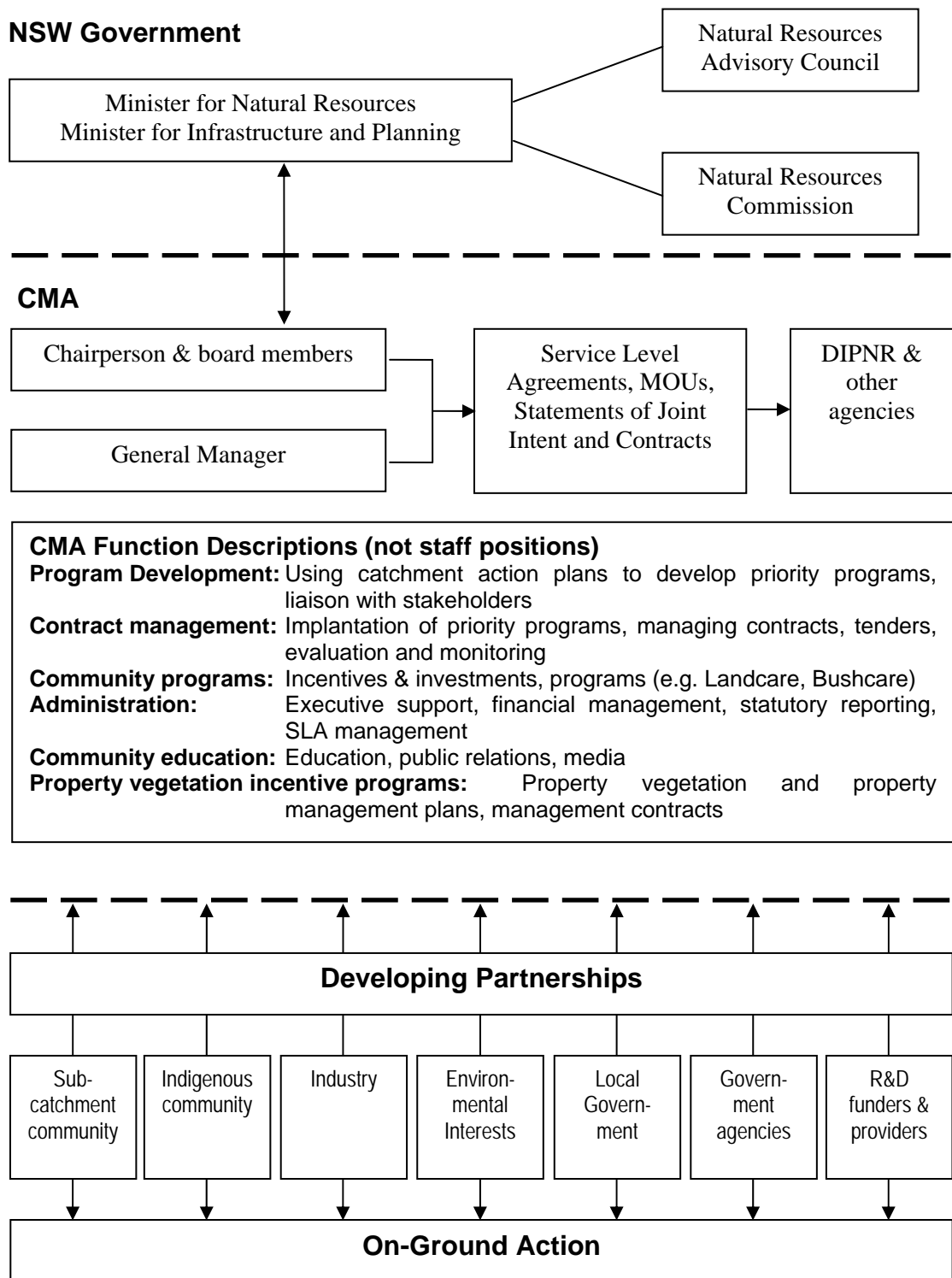


Figure 4-6: Key elements of the framework for NRM in NSW.

Source: Pannell et al. (2004).

The **Natural Resources Commission (NRC)** is a statutory authority established under the *Natural Resources Commission Act 2003* comprised of a commissioner and 4 assistant commissioners. The NRC is an independent entity that reports jointly to the Premier and the Minister for Natural Resources (NRC, 2005). The function of the NRC is to provide the state government with independent advice on NRM, which includes (NSW, 2003b):

- (a) recommending state-wide standards and targets for NRM issues;
- (b) recommending the approval of catchment action plans of catchment management authorities that are consistent with state-wide standards and targets adopted by the government for NRM issues;
- (c) auditing the effectiveness of the implementation of those plans in achieving compliance with those state-wide standards and targets as it considers appropriate; and
- (d) auditing of other natural resource management issues as required by the Minister.

The **Natural Resources Advisory Council (NRAC)** comprises representatives of key stakeholders involved in NRM, including primary industry (e.g., agriculture, fisheries, mining and forestry), peak environmental organisations, the scientific community, the Aboriginal communities and local government (DIPNR, 2004c), as shown in Table 4-8.

Table 4-8: Membership of the NRAC

<ul style="list-style-type: none"> • Aboriginal Land Council of NSW, • Birds Australia, • Catchment Management Authorities, • Country Women’s Association, • Fisheries resource management expertise, • Forest Products Association, • Labor Council of New South Wales, • Landcare community, • Local Government Association of NSW, • Native Title Services, 	<ul style="list-style-type: none"> • Nature Conservation Council, • NSW Farmers Association, • NSW Irrigators Council, • NSW Minerals Council, • Planning Institute of Australia, • Rural Lands Protection Board, • Scientific community, • Shires Association of NSW, • Total Environment Centre, and • WWF Australia.
--	---

Source: DIPNR (2004c)

The main role of the NRAC is to provide information, advice and feedback from stakeholder groups to the NSW government on issues affecting NRM. Specific functions include (DIPNR, 2004c):

- (a) providing forum for stakeholders to advise the NSW Premier and the Minister; and,
- (b) brokering – at the Minister’s request – agreements between the representative stakeholder groups on contentious NRM issues.

The **Catchment Management Authorities** (CMAs) are also independent authorities and are established under the *Catchment Management Authority Act 2003*. The creation of CMAs aimed primarily to (NSW, 2003a):

- (a) establish authorities for the purpose of devolving operational, investment and decision-making natural resource functions to catchment levels;
- (b) provide for proper natural resource planning at a catchment level;
- (c) ensure that decisions about natural resources take into account appropriate catchment issues;
- (d) require decisions taken at a catchment level to take into account state-wide standards and to involve the Natural Resources Commission in catchment planning where appropriate;
- (e) involve communities in each catchment in decision-making and to make best use of catchment knowledge and expertise;
- (f) ensure the proper management of natural resources in the social, economic and environmental interests of the state;
- (g) apply sound scientific knowledge to achieve a fully functioning and productive landscape; and,
- (h) provide a framework for financial assistance and incentives to landholders in connection with NRM.

CMAs are regional catchment management institutions comprising a board of non-ministerial office holders with expertise in relation to NRM. The CMAs have advisory, governing and operational roles, including the preparation and implementation of Catchment Action Plans (CAPs). The institutional arrangements governing the CMAs’ structure and process are examined in detail below.

The **Department of Infrastructure, Planning and Natural Resources** (DIPNR) – currently the Department of Natural Resources (DNR) – is responsible for providing corporate support services, such as financial management, corporate human resources, utilities, legal services, information technology and business support, fleet management etc. These services are to be provided under service level agreements (DIPNR, 2004a).

Also as part of the NRM reform, a number of institutions were abolished. The Catchment Management Authorities Act 2003 repealed the *Catchment Management Act 1989* and the *Catchment Management Regulation 1999*, terminating the State Catchment Management Coordinating Committee and the Catchment Management Boards. Under the *Natural Resources Commission Act 2003*, advisory NRM councils and committees were also abolished, namely the Resource and Conservation Assessment Council, Healthy Rivers Commission, Coastal Council, State Catchment Management Co-ordinating Committee, Native Vegetation Advisory Council, Water Advisory Council, State Wetland Advisory Committee, State Weir Review Committee, Advisory Council on Fisheries Conservation, and Fisheries Resource Conservation and Assessment Council (NSW, 2003b). The functions of these NRM institutions will be carried forward by the NRC, NRAC and DIPNR (DIPNR, 2004c).

4.4.4.2 Linking NSW Catchment Management to Other Action Arenas:

National NRM Initiatives

Before proceeding with the examination of the collective-choice level, it is important to address the fact that action arenas are linked to other action arenas (Ostrom, 2005), as discussed in Chapter 2. Therefore, the actions, outputs and outcomes discussed above do not result from the catchment management arena alone. Rather, they are affected by a number of NRM related programs and policies at different government levels.

In this regard, two national NRM initiatives deserve special attention: the **National Action Plan for Salinity and Water Quality** and the **Natural Heritage Trust**. These programs have, in recent years, significantly influenced the approaches to regional NRM adopted by state governments across Australia.

The National Action Plan for Salinity and Water Quality (NAP) and the Natural Heritage Trust (NHT) extension were established in the early 2000s and build upon

Australia's NRM experiences, such as Landcare, Integrated Catchment Management, and the first phase of the NHT (Moore, 2005). These past experiences comprised, in general, projects at the local level, involved local groups and were usually piece-meal in nature (Moore, 2005). The NHT, for instance, was created in 1997, and over a period of 4 years it invested A\$1.25 billion to help restore and conserve the environment and natural resources in Australia. Its delivery involved primarily funding voluntary local groups to undertake on-ground conservation works (Conacher and Conacher, 2000). A review of the program concluded that the multiple small projects funded under the NHT resulted in high administrative costs at the expense of on-ground activities (Curtis, 2003). Furthermore, the piece-meal nature of the projects had limited impact in NRM issues of regional and/or national significance (e.g., biodiversity), which require action at the landscape/regional scale. Within this context, regionalisation of NRM explicitly (re) emerges in the initiatives such as the NAP and the NHT extension, both designed to achieve national objectives through a regional approach (CoA, 2004c).

The NAP was established in 2000 and provides for the federal and state governments to jointly fund actions to manage salinity and improve water quality. NAP allocations involve A\$ 1.4 billion to be invested over a period of 7 years in priority regions across Australia (CoA, 2004c).

The NHT extension was announced in 2001 with the provision of an additional A\$ 1 billion, which extended the program to 2006-07. In 2004 the federal government committed an extra A\$ 300 million to further extend the program initiated in 1997 to 2007-08 (CoA, 2004c). NHT has 3 overarching objectives: (a) biodiversity conservation, (b) sustainable use of natural resources, and (c) community capacity building and institutional change (CoA, 2004c). The NHT extension has three levels of investments (a) Local Investments, comprising small and local projects funded through the federal government Envirofund; (b) National/State Investments, addressing activities of national, cross-jurisdictional, which may involve multiple states, and/or state-wide or within-state projects; and (c) Regional Investments, which form the principal mechanisms for NHT delivered through NRM plans – in which state governments match federal government investments agreed bilaterally (CoA, 2002, 2005b).

The NAP and the regional component of the NHT extension involve funding NRM actions on a regional basis (CoA, 2004c). *Bilateral Agreements* between the federal and state governments detail the arrangements for regional bodies,

accountability and administrative procedures. Under these agreements, *Regional NRM bodies*, mostly in the form of incorporated entities with broad membership, develop regional plans and investment strategies for their respective regions. The regional plans and strategies are then accredited in each state by a *Joint Steering Committee* formed by representatives of federal and state governments (CoA, 2004c).

As of June 2004, there were 57 NRM regions across Australia responsible for delivering NAP and the regional component of the NHT extension. Twenty five of these regions have had their NRM accredited in NSW, Victoria, South Australia and the Australian Capital Territory (CoA, 2004c). It is important to note that in many states, the NRM regions have been defined primarily on the basis of pre-existing regions, such as the area of catchment management boards and authorities (Head, 2005; Moore, 2005).

Bilateral agreements between the federal and state governments, as mentioned above, detail the arrangements for the delivery of NAP and NHT in each state. NSW signed the NAP Bilateral Agreement in May 2002 and the NHT extension Bilateral Agreement in August 2003 (CoA, 2004c).

As of 2004, 11 NAP regions and 13 NHT regions have been established in NSW (CoA, 2004c) and are currently administered by the Catchment Management Authorities (CMAs). Investments under the NAP and NHT programs will be guided by the Catchment Action Plans, which at the time of writing were being finalised by the CMAs. In the interim, the Catchment Blueprints, developed by the former Catchment Management Boards, have been used for the purpose of NAP and NHT investments. The blueprints were assessed by a Joint Steering Committee according to criteria agreed by the Australian governments at the Natural Resource Management Ministerial Council¹² meeting in 2002, and as described in the bilateral agreement between the federal and NSW governments (see CoA, 2003). These criteria determine that, among others: the plans are consistent with the NAP and NHT goals and objectives; identify strategic, prioritised and achievable actions that address the range of NRM issues; and involve key stakeholders in their preparation (CoA, 2003). All regional plans for NSW developed by the catchment bodies and the respective investment strategies were accredited/approved between July 2003 and March 2004 (CoA, 2004c).

¹² The Natural Resource Management Ministerial Council of Federal and State Ministers established by the Council of Australian Governments with responsibility of natural resource management issues in Australia.

In summary, the NAP and NHT are two major national programs that have shaped regional NRM in Australia. NRM initiatives in the states need to meet the requirements defined under these programs, which are bilaterally agreed. In the context of this study, such requirements affect catchment management institutional arrangements to a considerable extent. The scope and choices of catchment management institutions in NSW, for instance, need to be consistent with NAP and NHT objectives and goals, if their actions are to be funded under these programs. The implications of NHT for catchment management arrangements are examined in detail later in Chapter 5.

4.4.4.3 The Collective-Choice Level: Catchment Management Authorities

The CMBs, institutions established at T_2 , were terminated as a result of the NSW NRM reform. At T_3 , Catchment Management Authorities (CMAs) were set up as key parts of the new framework for NRM in the state. The CMAs can be regarded as reformed collective-choice institutions, which build to some extent upon the experience with the previous institutions (i.e., CMCs and CMBs). The CMAs comprise, however, institutional responses resulting from the NSW NRM reform and the National initiatives, rather than sole outcomes of institutional review of the NSW former Total Catchment Management initiative.

In this context, 13 CMAs were formally established in January 2004 when the Catchment Authorities Act 2003 came into force. A period of interim and transition arrangements followed until the CMAs were fully operational in 2005. The CMAs took over existing programs, contracts and funding arrangements initiated under the CMBs. At the time of writing, the CMAs were finalising the preparation of the Catchment Action Plans.

4.4.4.3.1 Institutional Rules: The Southern Rivers Catchment Management Authority

The Southern Rivers CMA, as other CMAs, presents well defined institutional rules, specified primarily by the Catchment Management Authorities Act 2003. Such rules established the overall structure and process of the CMAs across NSW. They are summarised in Table 4-9 and discussed below.

Table 4-9: Institutional rules for the Southern Rivers Catchment Management Authority

CATEGORY	INSTITUTIONAL RULES	
	DESCRIPTION	
Position	<ul style="list-style-type: none"> • 7 members (non-ministerial office holders) 	
Boundary	<ul style="list-style-type: none"> • Ministerial appointment on the basis of skills and knowledge related to NRM 	
Choice	<ul style="list-style-type: none"> • Advisory, operational and governing roles: <ul style="list-style-type: none"> – to develop and implement catchment action plans, – to provide financial assistance for the purposes of catchment activities, – to enter contracts or do any work for the purposes of catchment activities, – to assist landholders to further the objectives of its catchment action plan, – to provide educational and training courses and materials related to NRM, and – to carry other functions under other Acts, such as assess vegetation consents, manage community involvement in water plans, among others. 	
Aggregation	<p><i>Decisions</i></p> <ul style="list-style-type: none"> • Consensus decision-making <p><i>Aggregation Arrangements</i></p> <ul style="list-style-type: none"> • Include <i>ad hoc</i> committees, sub-committees and working parties, communication and interaction with catchment populations and stakeholders (as outlined in information rules below) 	
Information	<p><i>Communication & Interaction</i></p> <ul style="list-style-type: none"> • Regular meetings • Public and stakeholders forums • Public consultation • Duplicate membership with other NRM institutions • Personal and professional networks • Submissions to inquiries and surveys • Exchange of meeting minutes, newsletters, reports etc. <p><i>Reporting & Monitoring</i></p> <ul style="list-style-type: none"> • Annual Reports • Catchment Action Plans • Annual Implementation Programs • Investment Strategies • Financial and Performance Audits. 	
Payoff	<p><i>Staff & Support</i></p> <ul style="list-style-type: none"> • Team of about 40 staff members • DIPNR provides corporate support <p><i>Funding</i></p> <ul style="list-style-type: none"> • Considerable investments from federal and state government sources 	
Scope	<p><i>Functional Scope</i></p> <ul style="list-style-type: none"> • Coordination of Regional NRM • Multiple NRM issues • State and National priorities <p><i>Geographical Domain</i></p> <ul style="list-style-type: none"> • Regional area covering 29,000 km² and extending to 3 nautical miles off-shore. 	

Position Rules

Each CMA is headed by a responsible and accountable board of non-ministerial office-holders, which is comprised of between 5 and 7 members (NSW, 2003a). The Southern Rivers CMA comprises of 7 members with skills and knowledge on areas related to NRM. This CMA defines the background of its members as including natural resource management, Aboriginal liaison, primary production, policy development, senior management and planning (SRCMA, 2005), consisting of a relatively high profile board with considerable breadth of experience. These members have, for instance, been involved in a number of consultative and advisory committees, councils and boards. Others have held prominent position within the government, including those of Mayor and Federal Parliamentary Minister. Some of the board members have also served in senior management positions with government and non-government organisations. Several of these members run their own businesses (SRCMA, 2005), which add to the overall expertise on business/company administration required by the position of board member. In addition, members of the CMAs have been provided with company directors training from the Australian Institute for Company Directors to ensure that they have the necessary skills and knowledge to manage a CMA (DIPNR, 2004a).

Board members are not public servants, as Chapter 2 of the Public Sector Employment and Management Act 2002 does not apply to or in respect of the appointment of a board member. Nevertheless, they are entitled an annual remuneration (NSW, 2003a), which is AUD \$ 50,000 plus superannuation for the position of Chair and AUD \$20,000 for members (T. Grosskopf¹³, pers. comm.). The position of board member is occupied on a part-time basis (NSW, 2003a).

Boundary Rules

Members of the CMA board are appointed, by the responsible Minister, unlike CMCs and CMBs, on the basis of skills and knowledge on NRM rather than on representation/membership of stakeholder groups. The initial selection of CMA board members was undertaken with the assistance of an employment agency. However, the

¹³ Tom Grosskopf, NSW Department of Infrastructure, Planning and Natural Resources.

ultimate boundary rule, similar to CMCs and CMBs, consists of ministerial appointment.

As specified in the Catchment Management Authorities Act, board members are selected to have, as a group, in the Minister's opinion, skills and knowledge in areas such as (NSW, 2003a):

- (a) primary production,
- (b) environmental, social and economic analysis,
- (c) state and local government administration,
- (d) negotiation and consultation,
- (e) business administration,
- (f) community leadership,
- (g) biodiversity conservation,
- (h) cultural heritage, and
- (i) water quality.

Board members are also required to demonstrate the following (DIPNR, 2004a):

- (a) active community involvement and appreciation of the diverse range of community values and sensitivities;
- (b) understanding of key environmental and natural resource management issues, such as soils, water, vegetation and biodiversity;
- (c) working knowledge of land use systems and capacity to encourage sustainable developments within the catchment; and,
- (d) proven track record in building relationships and working collaboratively with others.

In addition, board members must demonstrate eligibility for membership of the Australian Institute of Company Directors (or similar entity) within 12 months of taking the position (DIPNR, 2004a). As far as practicable, the persons appointed as members of the board would live in the area of operations of the CMA (NSW, 2003a). A Board members are initially appointed for a term 3 years (NSW, 2003a), with half of the board being reappointed every 18 months. A board member shall not hold office for more than two consecutive terms (NSW, 2003a; DIPNR, 2004a).

Choice Rules

As mentioned previously, CMAs are responsible for delivering NRM at the regional level. This requires them, similarly to the former catchment management institutions, to perform a coordination role, particularly as the delivery of NRM involves, in general, coordinating the actions of multiple parties.

In their respective areas of operation, the functions of the CMAs include (NSW, 2003a):

- (a) to develop catchment action plans and to give effect to any such approved plans through annual implementation programs;
- (b) to provide loans, grants, subsidies or other financial assistance for the purposes of the catchment activities it is authorised to fund;
- (c) to enter contracts or do any work for the purposes of the catchment activities¹⁴ it is authorised to carry out;
- (d) to assist landholders to further the objectives of its catchment action plan (including providing information about native vegetation);
- (e) to provide educational and training courses and materials in connection with natural resource management;
- (f) to exercise any other function relating to natural resource management as is prescribed by the regulations.

Similarly to the former catchment management institutions, the Catchment Action Plans developed by CMAs are not legally binding. They are, like the CMBs' Blueprints, intended to guide investments in NRM on a regional basis. In contrast to CMCs and CMBs, CMAs have, however, not only legal authority to implement the plans, but resources to implement such plans.

In addition, other functions can be conferred or imposed on a CMA by or under the Catchment Management Authorities Act or other Acts (NSW, 2003a). CMAs' functions under other Acts include, for instance, the certification of Property Vegetation Plans and assessment of vegetation consents under the Native Vegetation Conservation

¹⁴ Catchment activities are defined in the Catchment Management Authorities Act as activities relating to NRM, such as the planting of trees, the removal of weeds or obstructions, the carrying out of works and education or training.

Act¹⁵; managing community involvement in preparation of water sharing and groundwater plans under section 389A of the Water Management Act 2000; and responsibility for projects/programs under section 10 of the Soil Conservation Act 1938 (DIPNR, 2004a). CMAs may in future have threatened species or other functions conferred under other Acts, and they may also be appointed as the consent authority for development under the Environmental Planning and Assessment Act 1979 (NSW, 2003a).

The CMAs, therefore, have advisory, governing and operational roles and, consequently, more power in terms of choice than the former catchment management institutions. In exercising their functions, CMAs are, however, subject to the control and direction of the Minister (NSW, 2003a).

A distinguishing feature of the CMAs is their *modus operandi*. This includes the use of procedures and practices of corporate governance from the private sector, as part of the “New Public Management” model that has been introduced in the public sector (Howard and Seth-Purdie, 2005). Corporate governance involves processes by which organisations are directed, controlled and held to account (ANAO, 1999 apud Howard and Seth-Purdie, 2005). Under the corporate governance model, the CMAs operate as serious government enterprises, with a board trained by the Australian Institute of Company Directors and a CEO (general manager). The jargon used in the Southern Rivers CMA board meetings is similar to those of the private sector, such as ‘clients’, ‘contracts’ and ‘marketing products’. Incentives provided by the CMAs for fencing, removal of weeds, and revegetation, for example, are referred to as *products*, which the *clients* (e.g., farmers, local groups) *buy*. The process is usually celebrated under a ‘partnership’ *contract* that specifies the funding, milestones, outcomes and reporting arrangements.

Aggregation Rules

The CMAs, like the former catchment management institutions, use some form of consensus-based procedures for collective decision-making. CMA board members, however, unlike CMCs and CMBs, do not represent, as such, the interests of any particular stakeholder group. This can be a major limitation in aggregating stakeholders’

¹⁵ Despite their consent role, CMAs will not have compliance responsibilities as breaches of legislation are to be referred to DIPNR to deal with (DIPNR, 2004).

preferences at the board level, as stakeholder interests no longer directly participate in decision-making, as discussed above in boundary rules.

Mechanisms that might allow for shared or joint decisions among different stakeholders, include arrangements such as *ad hoc* issue-oriented committees and working groups, as discussed for CMCs and CMBs. In addition, communication and interaction with stakeholders might also provide some degree of aggregation. For instance, public consultation on the Catchment Action Plans has aimed at providing opportunities for stakeholders' input into the Southern Rivers CMA planning process (DIPNR, 2004a).

Information Rules

Communication and Interaction

Similar to the former catchment management institutions, the CMAs have employed various arrangements for information exchange. Formal meetings comprise a key channel of communication between board members (DIPNR, 2004a). The Southern Rivers CMA has, for instance, held regular meetings in different parts of the CMA area since its first board meeting on 31 May 2004. Communication and interaction with other stakeholders involve public consultation and meetings, forums, conferences, personal and professional networks and submissions to inquiries. The Southern Rivers CMA has, for instance, been chairing the Shoalhaven Community Reference Group, which comprises a multi-stakeholder forum organised around the Shoalhaven water transfer proposal (SCRG, 2005).

The CMAs have also sought contributions from the broader public and key stakeholders on the preparation of their Catchment Action Plans (CAP) (Box 4-1). Furthermore, CMAs are required, as part of their functions, to consult with the public and stakeholders on the preparation of the Macro Water Sharing Plans (NSW, 2003a).

Technical information has been provided through the SRCMA staff with assistance of government agencies. During the preparation of the Catchment Action Plan, for example, working groups were formed to develop catchment and management targets for each of the program areas of the CAP. These working groups comprised Southern Rives CMA staff supported by representatives of state government agencies and professional institutions (DIPNR, 2004a).

Box 4-1: Southern Rivers CMA Catchment Action Plan – Aggregation Arrangements

In order to gain input from stakeholders (e.g., Aboriginal groups, industry groups, NGOs and local government) into the development of its CAP, the Southern Rivers CMA devised an engagement plan. Thirty four consultation meetings were held over a period of 6 weeks between August and November 2005. The public was informed about these meetings through media releases (e.g., local newspapers, radio), letter of invite, the CMA website and/or through the Southern Rivers CMA staff (e.g., Community Support Officers). These consultation meetings took place in different localities within the CMA area. They examined the draft targets for 6 themes (i.e., biodiversity, coast and marine, soils, sustainable land use, water and community), seeking the views from the public about those targets in terms of relevance, applicability and priorities. In addition to the consultation meetings, 25 impromptu consultations were undertaken across the region by the staff of the Southern Rivers CMA.

Source: SRCMA (2005)

Reporting and Monitoring

The CMAs are required to produce several plans and reports in relation to their policies, programs and procedures. They include Catchment Action Plans, Annual Implementation Programs, Investment Strategies and financial and performance reports (NSW, 2003a; DIPNR, 2004a).

The Catchment Action Plan (CAP) is a 10-year plan that identifies priority issues for the investment of public funding within the catchment (DIPNR, 2004a). The Annual Implementation Programs are required to give effect to the CAP (DIPNR, 2004a). The Annual Implementation Programs specify in detail the activities that the CMA proposes to undertake during the financial year (NSW, 2003a). Investment Strategies are 3-year rolling strategies required under the NSW and Federal Governments Bilateral Agreement. Such strategies guide NHT and NAP investments in groupings of coordinated activities at the sub-catchment and/or catchment scale (DIPNR, 2004a). In addition, the CMAs are required to submit a number of financial reports, such as: monthly accounting reports to the Treasury; annual reports that are subject to external audit of accounts; and quarterly financial reports, bi-annual progress reports on outputs and an annual report to the NAP/NHT Steering Committee (DIPNR, 2004a).

The arrangements related to reporting and approval of plans and reports produced by the CMAs entail mechanisms for monitoring and evaluating the CMAs, particularly by other institutions. In developing the CAPs, for example, CMAs are required to consider state-wide standards and targets recommended by the Natural Resource Commission (NRC). As seen earlier, the NRC will review and recommend to the Minister the approval of the CAPs in relation to such standards and targets (NSW, 2003b). The NRC is also to audit the CMAs' implementation of the CAPs and their effectiveness in achieving state-wide standards and targets (NRC, 2005). Under NHT and NAP Bilateral Agreements, monitoring and evaluation mechanisms consist of a series of financial and progress reports outlined above, which are subjected to review and approval by the NHT/NAP Joint Steering Committee.

Such reporting and monitoring arrangements entail systematic and stronger accountability of the CMAs to the NSW and federal governments than the previous catchment management institutions. Furthermore, a review of the CMA board and organisational process is to be undertaken annually to ensure adequate checks and balances within the organisation by third party accreditation/verification and spot audits (DIPNR, 2004a).

Payoff Rules

Staff and Support Arrangements

The CMAs have their own team of staff. Such team include a general manager, project managers and officers (Figure 4-7). The number of staff varies, depending on the expected demand for services for each CMA. Staff of the CMA is employed under Chapter 2 of the Public Sector Employment and Management Act 2002. In addition to the permanent staff, the CMAs may contract additional staff on a temporary projects/programs basis as well as engage consultants. The Southern Rivers CMA, for example, has a team of over 40 staff members, half being employed on recurrent basis and the other half engaged on a temporary or project basis.

As noted previously, key corporate support services, including financial management, human resources, accommodation, legal services, information technology

and fleet management, are provided by DIPNR under service level agreements¹⁶. This arrangement was designed to reduce the need for each CMA to establish a large support base and thus direct more resources to on-ground projects (DIPNR, 2004a). Service level agreements with the NSW government was to be developed so that other government entities provide services beyond those provided by DIPNR (e.g., information on environmental and resource conditions, land title, conditional information to support Property Vegetation Plans etc.) (DIPNR, 2004a).

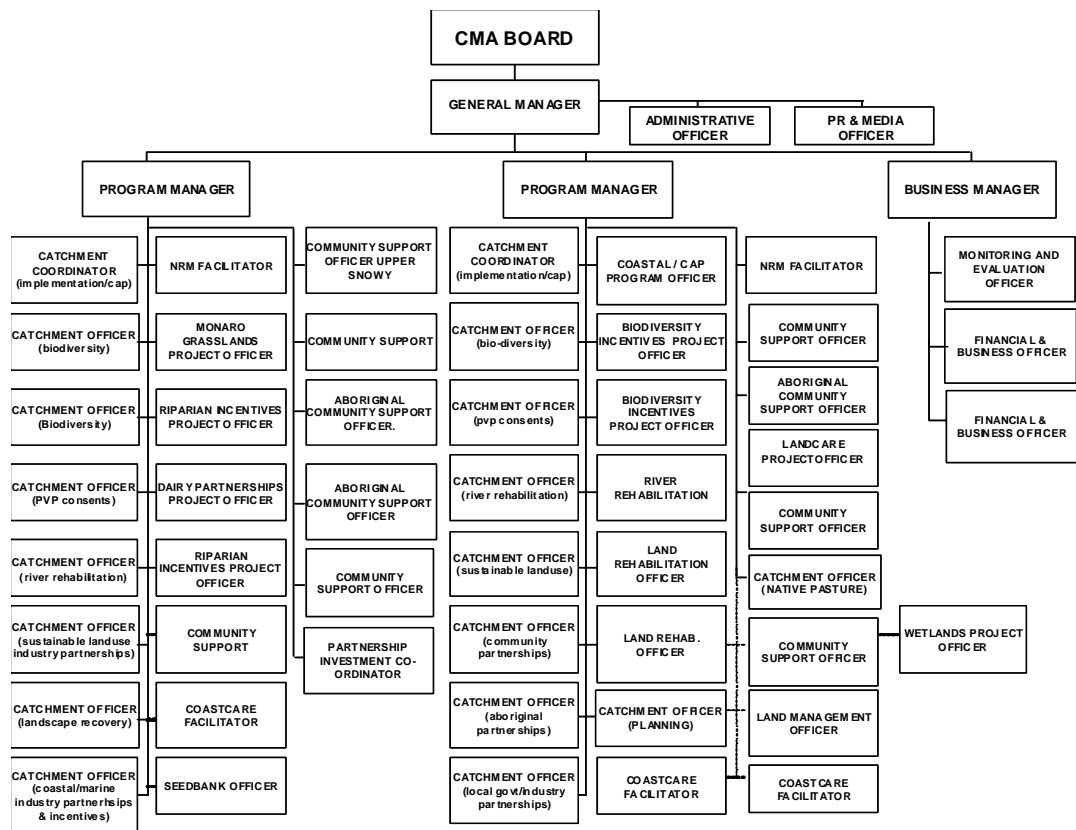


Figure 4-7: Organisation structure of the Southern Rivers CMA (as of 2005)

Funding Arrangements

The budget initially announced for CMAs across NSW was A\$ 436.5 million over the period of four years (DIPNR, 2004b); of this A\$ 120 million is committed to

¹⁶ Service Level Agreements defines the relationship between the provider and a customer and involves these two parties agreeing on suitable targets for particular services, via a commercial transaction (DIPNR, 2004).

native vegetation and targeted on-farm incentives (DIPNR, 2003b). These allocations have been provided jointly by the NSW and federal governments from the NHT, NAP, the NSW Sustainability Trust, and the NSW Land and Water Management Plan Program (DIPNR, 2004b).

In addition, A\$ 100 million would be transferred, over 4 years, in staff and resources from DIPNR to CMAs (DIPNR, 2004b). CMAs are advised to also seek investments from other sources, such as National Landcare Program and Envirofund from the federal government, NSW government agencies, local council and landholders contributions, and community and industry investment funding (DIPNR, 2004a).

Furthermore, under the Catchment Management Authorities Act, if specifically authorised by the regulations, CMAs may levy catchment management contributions to fund any shortfall in available funding for activities in their annual implementation programs (NSW, 2003a). Levying of catchment management contributions has been initially authorised to the Hunter-Central Rivers CMA in the catchment contribution area of the former Hunter Catchment Management Trust (NSW, 2005). This follows the tradition of the Trust, which had had rating authority since it was established as the then Hunter Valley Conservation Trust (Mitchell and Pigram, 1989). The Southern Rivers CMA does not have rating powers¹⁷.

State and federal government investments are primarily allocated on a 3-year cycle basis. The NSW and federal governments have agreed to indicative allocations, which provide for 3-year funding certainty (DIPNR, 2004a). The 3-year investments strategies developed by the CMAs should match the indicative allocations. Indicative allocations for CMAs were to be initially determined on the basis of assets, environmental pressures and prior commitments (DIPNR, 2004a).

The total investment estimated for the Southern Rivers CMA is approximately A\$ 42 million for the period 2004/05-2006/07, mostly for on-ground project works¹⁸. Most of this investment, approximately A\$ 35 million, would be provided by the NSW and the federal governments (Table 4-10 and 4-11). In addition, the CMA estimates a contribution of A\$ 9.8 million from other sources, which includes local government,

¹⁷ Chapter 5, Section 5.4.6, presents further discussion on levying of catchment management contributions.

¹⁸ On-ground works refer to works for the purposes of catchment activities, e.g. river rehabilitation, native vegetation management and salinity mitigation programs, which include planting of trees, the removal of weeds or obstructions, the carrying out of works etc. (NSW, 2003a).

community, NGOs and industry (SRCMA, 2005). Under the Bilateral Agreements, NSW and federal governments' investment priorities specify that at least 80% of the funding be allocated to on-ground activities, no more than 15% be directed to coordination and support and no more than 5% be allocated to monitoring, evaluation and reporting (CoA, 2003) (Table 4-12).

Table 4-10: Investment sought by the Southern Rivers CMA from the NHT for the period 2004/05-2006/07

PROGRAMS	YEAR 1	YEAR 2	YEAR 3	TOTAL
Biodiversity and Threatened Species	\$1,212,250	\$1,154,750	\$1,035,000	\$3,402,000
Rivers and Wetlands	\$1,406,250	\$1,253,750	\$1,100,000	\$3,760,000
Coastal Protection	\$917,250	\$724,750	\$796,000	\$2,438,000
Sustainable Landuse	\$1,396,250	\$1,387,750	\$1,316,000	\$4,100,000
TOTAL	\$4,932,000	\$4,521,000	\$4,247,000	\$13,700,000

Source: Southern Rivers CMA (n.d.)

Table 4-11: Investment anticipated from the NSW government (i.e., matching state contribution in cash and in-kind) for the period 2004/05-2006/07

PROGRAMS	YEAR 1	YEAR 2	YEAR 3	TOTAL
Biodiversity and Threatened Species	\$1,990,200	\$1,734,710	\$1,713,758	\$5,438,669
Rivers and Wetlands	\$1,569,001	\$2,146,601	\$2,065,081	\$5,780,683
Coastal Protection	\$1,101,149	\$1,091,545	\$1,113,247	\$3,305,942
Sustainable Landuse	\$1,718,575	\$1,445,804	\$1,209,394	\$4,373,772
TOTAL	\$6,378,925	\$6,418,660	\$6,101,480	\$18,899,066

Source: Southern Rivers CMA (n.d.)

Table 4-12: Distribution of NHT and NSW Sustainability Trust funds in the period
2004/05 – 2006/07

PROGRAMS	COORDINATION	ON-GROUND	M,E&R	TOTAL
Biodiversity and Threatened Species	\$324,000	\$4,383,000	\$195,000	\$4,902,000
Rivers and Wetlands	\$40,000	\$3,525,000	\$195,000	\$3,760,000
Coastal Protection	\$434,000	\$1,739,000	\$265,000	\$2,428,000
Sustainable Landuse	\$1,371,000	\$3,434,000	\$195,000	\$5,000,000
TOTAL	\$2,169,000	\$13,081,000	\$850,000	\$16,100,000
3 year totals expressed as a percentage	13.47%	81.25%	5.28%	100%

Note: M: monitoring, E: evaluation, R: reporting

Source: Southern Rivers CMA (n.d.)

It is important to note that the data on the funding arrangements presented here refer to the very core sources of funding for CMAs, at the time of writing of this thesis. They comprise the arrangements designed for these institutions to start operating. As the CMAs become more operational, other sources of funding may also become important – and, if so, should be investigated in future research.

Scope Rules

The functional scope of the CMAs is natural resource management (NRM), defined under the *Natural Resources Commission Act 2003* as matters relating to the management of natural resources, such as:

“...water, native vegetation, salinity, soil, biodiversity, coastal protection, marine environment (except a matter arising under the Fisheries Management Act 1994 or the Marine Parks Act 1997), forestry, and any other matter concerning natural resources prescribed by the regulations.” (NSW, 2003b)

The scope of the CMAs, as specified in the legislation, explicitly defines multiple NRM issues, including coastal and marine ones. This is also a requirement under the Bilateral Agreement, which requires regional organisations, such as the CMAs to address multiple NRM issues (CoA, 2003). Within this context, the Southern Rivers CMA has identified 5 program areas to be addressed in its area of operation: (1) biodiversity, (2) rivers, (3) soil and land capability, (4) community, and (5) coast and marine.

Furthermore, the Southern Rivers CMA broadly defines the envisaged outcomes for the region in its 25-year vision statement:

“By 2030, the Southern Rivers community will be recognised as leaders in the adoption of sustainable living initiatives that reduce the human impact on the natural environment and promote healthy and resilient ecosystem.” (SRCMA, 2005)

In terms of geographical domain, many of the CMAs east to the Great Dividing Range (GDR) have larger areas of operation than the CMBs (Figure 4-8). The boundaries of the CMAs also extend to 3 nautical miles offshore, encompassing the state waters.

The Southern Rivers CMA covers an area of 29,000 km² in the Southeast portion of NSW. The Southern Rivers CMA is limited on the north by Stanwell Park (Wollongong area), on the south by the state border with Victoria, on the west by the Great Dividing Range and on the east by the limit of 3 nautical miles offshore (SRCMA, 2004).

Please see print copy for image



Figure 4-8: Area covered by the CMAs

The Southern Rivers CMA region comprises NSW South Coast and Southern Tablelands and is characterised by a diverse landscape, which encompasses alpine and sub-alpine areas, rainforests, grasslands, and coastal plains including several estuaries and coastal lakes. The main rivers in the Southern Rivers CMA area include Minamurra, Kangaroo, Shoalhaven, Clyde, Deua, Tuross, Brogo, Bega, Bemboka, Towamba, Genoa and Snowy (SRCMA, 2004). About sixty five percent of the area comprise National Parks and State Forests (SRCMA, 2005). In addition, the region has extensive agricultural lands, and highly urbanised and urbanising areas (CMAs, 2005).

The region is home to approximately 500,000 people. Major urban centres include Wollongong, Shellharbour, Kiama, Nowra, Ulladulla, Braidwood, Batemans Bay, Moruya, Narooma, Bermagui, Bega, Merimbula, Bombala and Jindabyne (SRCMA, 2005). Socio-economic activities are also diverse and include manufacturing and heavy industry; port activities; primary industry, such as farming, commercial fisheries, aquaculture, forestry and mining; recreation and tourism; and urban activities.

Within this area, the Southern Rivers CMA recognises 6 sub-regions based on their particular characteristics and NRM issues. They are (a) the Illawarra, (b) Upper Shoalhaven, (c) Lower Shoalhaven, (d) Eurobodalla, (e) Bega/Eden and (f) Snowy-Monaro. These subregions are served with Southern Rivers CMA district offices located in Wollongong (head office), Braidwood, Nowra, Bateman's Bay, Bega and Cooma (SRCMA, 2005).

Numerous government and non-government entities affect, in various ways, the use and management of natural resources within the Southern Rivers CMA area. These include a number of state and federal government agencies (e.g., NSW Departments of Natural Resources, Planning, Lands, NSW Fisheries, Australia's Department of the Environment and Heritage etc.); 12 local government areas; authorities, boards and committees (e.g., estuary, floodplain and coastal management committees); various local environment action groups such as Landcare, Bushcare, Rivercare, Coastcare, and Dunecare; NGOs; and industry groups, such as the NSW farmers Association.

As demonstrated above, catchment management institutions have been characterised by institutional changes, at various levels. At the collective-choice level, the changes have affected the arrangements defining, particularly, the participants, the authority and powers, the functional scope and the geographic domain of catchment management institutions. Over time, the human capital of these institutions has been

increased, as a result of the selection of participants on the basis of skills and knowledge, rather than on the basis of representation of particular interest. Catchment management institutions have also been empowered as CMAs have assigned legal authority and resources to implement their Catchment Action Plans. With empowerment, systematic mechanisms for reporting and monitoring performance have also been put in place, enhancing thus responsibility and accountability. By adopting corporate governance procedures, catchment management institutions are expected to improve performance through increased efficiency. A more strategic and focused approach has been adopted, including the use of standards and targets, which in conjunction with the larger areas of operation, at the regional level, are believed to better address issues of regional, state and national significance.

The question on to what extent the institutional design and change have facilitated collaborative NRM remains to be discussed. Due to the configurational nature of institutional rules, changes in a particular set of rules can directly and/or indirectly affect other sets of rules, and result in unintended outcomes. For example, whereas a broader regional geographic domain (scope rules) allows for a better strategic approach, it may, on the other hand, pose challenges to participation (position rules), communication and interaction with catchment stakeholders and populations (information rules), and aggregating preferences of these stakeholders and populations. Likewise, whereas reporting and monitoring arrangements (information rules) entail accountability, they may decrease institutional flexibility and independence (choice rules). These “side effects”, may represent limitations to collaborative approaches, for which catchment management institutions have been designed and changed to facilitate.

4.5 Conclusions

This chapter addressed the questions on what institutional design and change have been tried in the context of the NSW catchment management initiative, as well as how and why institutional design and change have occurred. An institutional analysis of NSW initiative was, thus, undertaken by employing the IAD framework. The analysis covered the history of NSW catchment management (1980s-mid 00s). Ostrom’s 7 categories of institutional rules were used to systematically describe, analyse and compare catchment management institutions at periods characterised by institutional

change. By identifying hierarchical levels of decision-making and action, it was also possible to examine the institutional context (the constitutional-choice level) within which collective-choice catchment management institutions have been designed and changed. The analysis has clarified institutional design and change in the context of NSW catchment management initiative, i.e., how institutional design and change have occurred in an incremental and experimental way. Whether such changes have facilitated collaborative NRM, it is a question to be addressed in Chapter 5.

Chapter 5

From Collaboration to Deconcentration? Rhetoric and Practice of Catchment Management in New South Wales

5.1 Introduction

Chapter 4 provided an analysis of how NSW catchment management institutions have been designed and changed over time. In this chapter, institutional change is further examined by comparing and assessing institutional rules in relation to the literature on collaborative NRM. The main objectives of this chapter are: (1) to underscore the major institutional rules change so that possible trends can be identified, and (2) to assess how institutional design and change have helped facilitate collaborative NRM.

The following section develops an evaluative framework to assess collaborative NRM institutions. The third section addresses the methods used in the present analysis. Section 4 presents a comparative evaluation of NSW catchment management institutions. Section 5 discusses implications from the evaluation in terms of institutional design and change, tensions and paradoxes of collaborative NRM, and politics of decentralisation. The last section provides a brief conclusion.

5.2 A Framework of Collaborative NRM Institutions

While the IAD framework provided an integrated approach to describe and understand institutional change (Chapter 4), it does not itself presume that particular institutional rules are better than others (Imperial, 1999b). Understanding how institutional change has facilitated collaborative NRM requires the use of evaluative criteria. This section develops an evaluative framework based on the recent thinking on collaborative NRM.

There are various approaches, standards and methods for comparison and evaluation of NRM (e.g., Mitchell, 1987; Wallace et al., 1995; Bellamy et al., 1999; Margerum, 1999b; Bellamy et al., 2001; Leach et al., 2002; Conley and Moote, 2003; Connick and Innes, 2003; McDonald et al., 2004; Bellamy, 2005). Their use will depend on factors such as: why an evaluation is undertaken, who evaluates, what is evaluated, the criteria for evaluation, and the nature of the criteria selection (Conley and Moote, 2003).

In essence, evaluation consists of comparing reality to a set of criteria (Conley and Moote, 2003). In this study, a deductive approach is adopted by employing theory-based criteria from a review of the literature on collaborative approaches to NRM.

Following Conley and Moote (2001), several lines of thought have informed and commented on the development of collaborative NRM including common-pool resources management (Ostrom, 1990; Bromley, 1992; Ostrom et al., 1994); public participation in planning (Moote et al., 1997; Lane, 2005); democratic theory, such as participatory democracy (Moote et al., 1997) and social capital (Putnam, 2000; Ostrom and Ahn, 2003); theories of collaboration (Gray, 1989; Selin and Chavez, 1995); ecosystem management (Grumbine, 1994, 1997; Yaffe, 1998; Cortner and Moote, 1999; Yaffe and Wondolleck, 2003); watershed management (Imperial and Hennessey, 2000; Born and Genskow, 2001; Imperial, 2001; Sabatier et al., 2005b); integrated resource management (Lang, 1986; Mitchell, 1986; Born and Sonzogni, 1995; Margerum and Born, 1995); decentralisation of natural resources (Agrawal and Ribot, 1999; Ribot, 2002b). The present review focused on the key concepts and principles most common to this diverse literature related to collaborative NRM, many of which are believed to underpin the NSW catchment management initiative. These concepts and principles were then combined with the institutional aspects of the IAD framework, as conceptualised in Chapter 4. Specifically, the concepts and principles of collaborative NRM were categorised into the seven sets of institutional rules of the IAD framework (i.e., position, boundary, choice, aggregation, information, payoff and scope rules). The resulting evaluative framework is presented in Table 5-1 and discussed below.

As mentioned in Chapter 3, the current evaluation is explicitly concerned with the process of collaborative NRM, i.e., the way catchment management decision-making has been made rather than with the substantive nature of decision-making (i.e., what has been proposed by these institutions) and on-ground outcomes. It focuses on how catchment management institutions have evolved and functioned (Taylor-Powell et

al., 1998). This includes how these institutions should be structured and the processes that should be governing the way they operate. In this study, “success” is, therefore, defined in terms of procedures, the normative context encompassing the ideal of collaborative NRM (Trachtenberg and Focht, 2005).

Before describing the elements of the evaluative framework, it is important to note that there are caveats associated with the approach adopted in the present evaluation. By using theory-based criteria, it is assumed that if the qualities called for by the theory are present, the catchment management institutions will consequently be regarded as successful (Conley and Moote, 2003). However, it is not claimed in this study that collaborative institutions will necessarily result in improved catchment conditions. Links between theories related to collaborative NRM and outcomes are rarely proven and subject to controversy (Kenney, 2000; Conley and Moote, 2003).

Table 5-1: Evaluative framework of collaborative NRM institutions

RULES	EVALUATIVE CRITERIA
Position	Participation is representative of relevant stakeholders and catchment populations. Participation is thus inclusive in nature.
Boundary	Selection of participants allows for representative and accountable participation. Selection processes are deemed to be legitimate and democratic.
Choice	Meaningful authority to affect NRM outcomes is transferred to collaborative institutions. Such authority is exercised in an independent fashion.
Aggregation	Decision-making aggregates the preferences, values and needs of those who are affected by the exercise of authority. The concerns of a wide range of stakeholders are recognized and incorporated into decision-making.
Information	Communication and interaction with local populations, government and non-government stakeholders reinforce legitimate/accountable representation and entail mechanisms for reporting and monitoring performance and outcomes.
Payoff	Adequate resources are available to allow collaborative institutions to exercise their authority.
Scope	Collaborative institutions seek to address multiple NRM problems, usually an inter-related set of environmental and socio-economic problems. Collaborative NRM institutions are place-based, e.g., watersheds, sub-watersheds or bioregions comprise the geographical domain.

Nevertheless, this approach is required if NSW catchment management institutions are to be assessed on their own terms, i.e., as collaborative institutions. This

approach also allows for the examination of broader concepts and questions such as participation, accountability, decentralisation, regionalisation, etc. In addition, by establishing explicit linkages between theory and practice (Wallace et al., 1995), this approach also may contribute to a better understanding of the conditions necessary to improve institutional design for collaborative institutions. It may help identify those institutional rules that need to be reformed in the light of desired standards and premises. It may assist, therefore, in identifying appropriate forms of intervention to improve catchment management institutions.

Another important qualification is that collaborative NRM is inherently complex and presents a number of unresolved paradoxes and associated operational dilemmas and challenges (e.g., Cortner and Moote, 1999; Hooper et al., 1999; Lane et al., 2004b; Lane and McDonald, 2005). The present framework is initially presented, however, in a somewhat simplistic form, and does not attempt to address these paradoxes and dilemmas. Rather they are addressed later in this chapter, as tensions between the rhetoric and practice of collaborative NRM emerge from the evaluation of catchment management institutions.

It is also important to be cognisant that the evaluative framework is normative and prescriptive in nature. In this regard, a true collaborative institution is an ideal to be pursued, perhaps never fully reached. In the real world, one is unlikely to find institutions that meet all the necessary criteria. A more realistic situation is one where collaborative NRM institutions meet the evaluative criteria to varying degrees.

Bearing in mind these qualifications, the evaluative criteria are discussed below:

5.2.1 Position rules

Collaborative institutions feature inclusive participation (Lubell, 2004), where a broad range of private and public actors with any political or economic interest in NRM and/or those affected by decision-making are encouraged to participate (Moote et al., 1997; McGuinnis et al., 1999; Lubell, 2004; Trachtenberg and Focht, 2005). Therefore, participation includes diverse sets of citizens, private interest groups, local, state and/or federal government agencies, experts and non-experts (Born and Genskow, 2001; Leach et al., 2002; Sabatier et al., 2005a).

A participatory approach, by which representatives of all affected interests participate in the process, including members of the general, non-aligned public has

been increasingly advocated in NRM (Moote et al., 1997). However, it is not always practical or possible for everyone to directly participate, particularly, if there is a limit on the number of participants (Trachtenberg and Focht, 2005). In these situations, individuals serve as representatives of specific interests of their groups (Rockloff, 2004; Trachtenberg and Focht, 2005), e.g., farmers, industry, environmental interests, etc.

Inclusive participation entails a holistic view of the catchment and its problems and brings multiple perspectives together (Margerum and Born, 1995). Through the collaborative process, "...parties who see different aspects of a problem can constructively explore their differences and search for solutions beyond their own limited vision of what is possible" (Gray, 1989). This way, not only can consensus be developed (Margerum, 1996), but also differences among participants can be explored (Boxelaar et al., 2006). Inclusive participation can also foster learning about the range of participants' interests and concerns, potentially bringing about agreement and resolving conflicts (Wondolleck and Yaffe, 2000). Broad-based participation makes people more likely to develop a sense of ownership of decision-making (Ostrom, 1990), resulting in support and engagement in implementing, monitoring and enforcing collective decisions (Larson and Ribot, 2004). Inclusive participation helps integrating local knowledge into decision-making process, which is expected to result in better-targeted policies and reduced information and transaction costs (Larson and Ribot, 2004). It also has the potential to increase equity, as marginalised groups could have a say in decision-making (Ostrom, 1990).

Some authors emphasise the importance of accountable representation of participants to local populations (e.g., Ribot, 2002b; Larson and Ribot, 2004; Ribot, 2004). Such "downward accountability" (i.e., accountability to local populations and institutions) can broaden the participation of the catchment populations and enhances the responsiveness of those directly participating in collaborative institutions (Agrawal and Ribot, 1999). Through greater participation and responsiveness, the benefits of decentralisation (i.e., efficiency and equity) are realized (Agrawal and Ribot, 1999; Ribot, 2002b).

5.2.2 Boundary rules

The process by which participants are selected to take part in collaborative institutions needs to be deemed open, legitimate (Margerum, 1996, 1999b), democratic,

and accountable (Wondolleck and Yaffe, 2000; Ribot, 2004; Moore, 2005). The selection of participants may include procedures such as elections, self-nomination and/or appointment. Regardless of the procedure, the process needs to be open to any interested party (Margerum, 1999b; Trachtenberg and Focht, 2005), and must be seen by stakeholders and the public as fair and reasonable (Margerum, 1996).

Representation is a core democratic value associated with procedural legitimacy, which indicates whether all relevant ideas and interests are included in collective choice (Trachtenberg and Focht, 2005). The selection process, therefore, needs to include a full range of perspectives and opinions (Margerum, 1996). If there is a limit to the number of participants, no stakeholder group may be denied representation unfairly (Trachtenberg and Focht, 2005). Moore (2005), for example, comments that regional NRM groups in Australia should be inclusive of “demos” such as government agencies, local government, residents of rural towns, indigenous people, women, and environmental groups. Some of these demos (e.g., government agencies, local government and environmental groups) may also serve as proxies for interests not directly represented (Moore, 2005).

The selection process should be democratic for several reasons. The Australian context is illustrative (Moore, 2005). First, Australia has a democratic system of governance and governments are committed to the “third way” democracy, which emphasises civic society and making democracy more democratic. Second, investments in NRM derive largely from federal and state government sources. Tax-payers expect, therefore, to have some say in how these investments are allocated and spent. Last, the implementation of NRM plans have equity implications, as some groups of individuals in the associated regional communities, will have access to funding while others will miss out. These investment decisions need to be perceived as fair if they are to be accepted, particularly where private groups and individuals will benefit (or not gain) from public funding (Moore, 2005).

The literature on decentralisation of NRM also defends the selection of participants that are not only representative of, but accountable to local populations (e.g., Agrawal and Ribot, 1999; Ribot, 2002b, 2004). Accountability comprises sets of mechanism and sanctions that can be used to assure policy outcomes are consistent with local needs, aspirations and the best public interests (Ribot, 2004). One such mechanism is the influence in the selection process of those who are to be represented, for example, by nominating or electing their representatives. As noted previously, downward

accountability is believed to broaden participation in NRM, and enhance responsiveness of participants to their constituents (Agrawal and Ribot, 1999).

5.2.3 Choice rules

Collaborative institutions, as will be discussed in aggregation rules, feature decision-making processes that emphasise consensus. Consensus in the collaborative context means that stakeholders cannot be forced to act against their will. Participants cannot be prevented from carrying out their otherwise legally mandated activities (Leach et al., 2002). Implementation of actions agreed upon by participants is therefore voluntary, as opposed to the traditional command-and-control approach (Margerum, 1999b; Lubell, 2004; Sabatier et al., 2005a). Management plans, for example, are implemented under the existing programmatic authority, and this usually does not involve the creation of new legislation (Lubell, 2004). Enforcement will rely on peer pressure and moral authority of the collaborative institution and/or the existing statutory authority of related programs and policies (Mitchell, 2005).

Collaborative NRM institutions are usually assigned with the authority to *create rules* and modify old ones, *make decisions* about how a particular resource or opportunity is to be used, *implement and ensure compliance* to the new or altered rules, and/or *adjudicate* disputes that arise in the effort to create rules and assure their compliance (Agrawal and Ribot, 1999).

Assigning authority over NRM to collaborative institutions is important because (Ribot, 2002b): (1) natural resources are locally specific, diverse, have multiple uses, and therefore, require local knowledge in designing their management; (2) local institutions are better placed to recognise and respond to local needs and preferences, as they have better access to local information and are more easily held accountable to their constituents; (3) the management and use of natural resources normally involves multiple and overlapping responsibilities and jurisdictions, which can result in conflicts requiring local mediation. Furthermore, bringing decision-making closer to those most affected by the exercise of power is believed to lead to increased equity and efficiency in NRM (Agrawal and Ribot, 1999; Ribot, 2002a; Larson and Ribot, 2004). Equity and effectiveness are achieved by increasing retention and fair distribution of benefits from local activities, taking into account costs in decision-making, increasing accountability,

reducing transaction costs, matching services to needs, mobilising local knowledge, improving coordination and providing resources (Ribot, 2002a).

The key to realising equity and efficiency in NRM is assigning collaborative institutions with *meaningful* and *autonomous* authority over the management of natural resources that are relevant to local populations (Agrawal and Ribot, 1999; Ribot, 2002b). Accordingly, the NSW NRM reform established the CMAs, referred to as “locally-driven organizations responsible for making decisions about NRM” under the heading of “local people with real money, making real decisions”. A stronger role for local communities would be achieved by allowing for decisions to be made at the local level by people from within the region (DIPNR, 2003b).

Meaningful discretionary powers enable collaborative institutions to respond flexibly to the population’s and stakeholder’s preferences and needs. Autonomous authority also encourages people to engage in the collaborative effort, by demanding that decisions conform to their preferences and needs (Ribot, 2002b).

5.2.4 Aggregation rules

In collaborative decision-making, aggregation rules are symmetric, i.e., multiple participants have joint control over the decision-making process (Ostrom, 2005), which is shared and collaborative (Sabatier et al., 2005a). Collaborative institutions employ decision processes that emphasise consensus, or at least some agreed upon collective decision rule (Lubell, 2004). Decision-making is, in general, a long term process (Sabatier et al., 2005a) characterised by face-to-face negotiation between participants, which seeks to find win-win solutions to problems facing different stakeholders (Innes, 1996; Innes and Booher, 1999; Sabatier et al., 2005a).

Consensus is regarded as an important feature in collaborative efforts (Gray, 1989; Innes, 1996; Innes and Booher, 1999). Decisions made by consensus are believed to be effective decision rules, as they help build long term support and unanimity among participants (Margerum, 1999b). Consensus is also important because implementation depends, to a large extent, on the support of stakeholders (Margerum, 1996).

Accordingly, the guidelines prepared by the NSW Department and Water and Conservation strongly encouraged the Catchment Management Boards to use consensus as a decision rule (DLWC, 2000). Consensus-based decisions would help the CMB to: (1) explore, understand and respect a diverse range of views leading to creative

solutions; (2) be well informed and make fair, high quality decisions; (3) find common ground, some basic values and principles, objectives and targets, with its decisions being consistent with these values and principles; (4) demonstrate that the views of relevant groups and individuals in the board area were canvassed into decision-making; and, (5) own its decisions (DLWC, 2000).

Aggregation rules, in the context of this study, also refer to arrangements to aggregate the preferences, needs and values of actors beyond those directly represented in the collaborative effort. These involve interaction and communication (information rules) between participants and actors, which may include community and stakeholder fora or other mechanisms in which the actors are able to express their concerns. By collecting and considering stakeholders views so that decisions reflect the views, values and interests of many individuals, these decisions will achieve broader support and legitimacy (Trachtenberg and Focht, 2005).

Other arrangements may also include the establishment of committees and working groups organised around specific issues, which bring actors together to solve shared problems, and allow for joint decision-making at the network level (Kauneckis and Imperial, 2005). Such arrangements provide opportunities for actors to find ways to work together, generate ideas, share knowledge, and solve problems (Imperial, 2006). Furthermore, they may be yet another way to broaden participation (Margerum, 1996).

Last, aggregating the preferences, needs and values of those affected by decisions has implications for legitimacy, fairness and equity similar to those noted above for participation and representation. It also strengthens accountability of participants to catchment populations and stakeholders.

5.2.5 Information rules

Margerum (1996) asserts that communication is the core of a collaborative approach. This includes communication and interaction among participants, between participants and those they represent, other institutions, and the general public (Margerum, 1996, 1999b). Communication is critical to the process as collaborative NRM depends on information exchange, through which participants share perspectives, preferences, values, resources and goals (Margerum, 1996). As participants inform the interest groups they represent about the process and solicit and respond to their views, their representative function is enhanced (Trachtenberg and Focht, 2005).

Communication and interaction with other institutions and organisations can provide a forum for building relationships and trust. Channels of information exchange can improve decision-making and promote policy oriented learning. Furthermore, as information is exchanged, it becomes owned by all participants in the process (Imperial, 2006). Communication with the general public is believed to provide an ongoing process by which participants verify information, goals and actions (Margerum, 1996). In this context, in addition to information collection and education, public involvement requires continuous exchange and feed back. The public needs to learn what is going on in the collaborative effort and participants must know if their views are shared by the public (Margerum, 1996).

In this context, the Catchment Management Boards in NSW, for example, were required to develop and use a communication strategy to inform, consult and educate groups involved in NRM and the broader community about the board's work (DLWC, 2000). The NSW government also expected the board members to:

- (a) Keep the interest groups informed on the deliberations of the board and provide regular feedback to the board from these groups;
- (b) Represent the interests of the board on other community, industry and government committees; and,
- (c) Provide other groups with accurate information and advice on the board and its work program.

Another important aspect of information exchange is providing the means for monitoring performance and outcomes, which is an important element of collaborative NRM (Ostrom, 1990). Through reporting and auditing arrangements, for instance, it is possible to monitor progress towards collaborative goals. Monitoring can also be a mechanism to hold the institution accountable (Ostrom, 1990; Ostrom et al., 1994).

5.2.6 Payoff rules

There appears to be little doubt on the importance of resources (e.g., staff and funding) to implementing collaborative NRM (Margerum, 1996). The collaborative process require resources to support a range of activities, e.g., participants meetings, public and stakeholder consultations, administrative and planning activities, information exchange, implementation of programs and projects, monitoring and reporting, etc.

Funding is, therefore, necessary to support: organisational development and maintenance; planning and program development; program execution, implementation and evaluation (Born and Genskow, 2001). Funding is indeed one of the most frequently identified factors to success in collaborative approaches (Leach and Pelkey, 2001). Human resources are also important for staff functions, such as organisation operation/administration and projects and activities (Born and Genskow, 2001).

In this context, resources are critical and directly linked to accomplishments (Margerum, 1999b; Born and Genskow, 2001; Bellamy et al., 2002). Resources provide incentives to improve decision-making (Margerum, 1996), strengthen the legitimacy of the process (Mitchell, 1990a), and reduce the transaction costs associated with decision-making and action.

5.2.7 Scope rules

Collaborative institutions seek to address multiple and interrelated NRM and socioeconomic problems within a defined geographical domain (Born and Genskow, 2001), such as a catchment, a sub-catchment or a bioregion. By adopting a place-based management unit, such as the catchment, collaborative approaches are believed to call for a systemic and holistic approach to NRM, recognising the complexity, interrelationships and connections among critical ecological processes and components (e.g., soil, vegetation, water, etc.), multiple resource uses and jurisdictions (Burton, 1985; Mitchell, 1986; Born and Sonzogni, 1995).

This approach contrasts with the sectoral approach of the government line agencies specialised in single issue or media such as water, soil, vegetation, fisheries, wildlife, etc., where the different resources within a particular region or catchment are addressed independently (Sabatier et al., 2005a). Furthermore, transferring decision-making to lower level in a territorial and political administrative hierarchy brings the process closer to those affected by NRM decisions (Agrawal and Ribot, 1999). It also allows the design of arrangements (e.g., programs and policies) that are tailored to the particular nature of the area under consideration and its problems (Lubell, 2004), as discussed above, in choice rules.

There appears not to be consensus in the literature regarding which geographic domain is most appropriate for collaborative NRM (Leach and Pelkey, 2001). Some authors argue that the boundaries should be inclusive enough in relation to natural,

socio-economic and political realities (e.g., Born and Sonzogni, 1995; Margerum and Born, 1995). Others suggest that smaller domains are important to cooperation and sense of place (McGuinnis et al., 1999). There is no precise agreement on how to define a catchment approach (McGuinnis et al., 1999). It is proposed, however, that other factors such as social and cultural characteristics are considered when defining the geographic domain (Brunckhorst and Reeve, 2006).

5.3 Methods

The evaluative framework developed in the previous section was used to assess institutional change in the context of NSW catchment management initiative. The focus of the evaluation was on the collective-choice only, and included the CMCs, CMBs and CMAs. The same periods characterised by institutional change, as investigated in Chapter 4, were evaluated (Table 5-2).

Table 5-2: Institutional change in the NSW Catchment Management initiative.

Institutional levels	YEAR/TIME (T)			
	< 1980s (T_0)	1989 (T_1)	1999 (T_2)	2003 (T_3)
Constitutional-choice	Sectoral and fragmented NRM institutions (at all levels)	Catchment Management Act	Catchment Management Regulation	Catchment Management Authorities Act
Collective-choice		Catchment Management Committees	Catchment Management Boards	Catchment Management Authorities
Operational-choice		Local groups, resource users, government agencies, catchment management bodies, local government, etc.		

Institutional change was systematically evaluated by assessing the changes for each set of institutional rules (i.e., position rules change, boundary rules change, choice rules change, and so on), that occurred between T_n and the next point in time (T_{n+1}), against the criteria of the evaluative framework. Changes across institutions were also evaluated by assessing the changes that took place between the time intervals examined ($T_0 - T_1$, $T_1 - T_2$, $T_2 - T_3$).

Accordingly, institutional change was evaluated in terms of:

- (1) participants;
- (2) process for selecting participants;

- (3) institution's authority and power;
- (4) decision-making and aggregation arrangements;
- (5) arrangements for communication, interaction, reporting and monitoring;
- (6) human and financial resources; and,
- (7) functional scope and geographic domain.

It was thus possible to underscore the major institutional changes and identify the main trends, such as in, participation, authority and power devolved, level of resources available to institutions, etc., over the period analysed. By assessing institutional rules against criteria based on the theorising on collaborative NRM, it was possible to examine how these rules have facilitated (or otherwise) collaborative NRM.

The three case studies analysed in Chapter 4 (i.e., the Illawarra CMC, Southern CMB and the Southern Rivers CMA) were also used here. In addition, other Australian and NSW cases available in the literature were considered.

As discussed in Chapter 3, multiple sources of information and data have been used in this analysis including documentation, archival records, interviews and observations. The data were collected and analysed using qualitative research methods (e.g., Weber, 1985; Miles and Huberman, 1994; Patton, 2002; Yin, 2003).

5.4 Evaluating Institutional Change

In this section, institutional change at the collective-choice level is further examined by comparing, in a more explicit manner, CMCs, CMBs and CMAs. Institutional change is summarised in Table 5-3 and discussed below.

Table 5-3: Main institutional changes in the NSW Catchment Management Initiative.

RULES	CATCHMENT MANAGEMENT INSTITUTIONS		
	CATCHMENT MANAGEMENT COMMITTEES (T_1)	CATCHMENT MANAGEMENT BOARDS (T_2)	CATCHMENT MANAGEMENT AUTHORITIES (T_3)
Position	<ul style="list-style-type: none"> • 20 members (average). 	<ul style="list-style-type: none"> • 17 members (approx.). 	<ul style="list-style-type: none"> • 5-7 members.
Boundary	<ul style="list-style-type: none"> • Ministerial appointment of representatives from resource users or land holders, environmental interest, local government, officers of state government departments or authorities. 	<ul style="list-style-type: none"> • Representation from the Aboriginal community was introduced. 	<ul style="list-style-type: none"> • Ministerial appointment on the basis of skills and knowledge related to NRM
Choice	<ul style="list-style-type: none"> • Mostly advisory roles: <ul style="list-style-type: none"> • to promote and coordinate the implementation of total catchment management policies and programs, • to advise on and coordinate the natural resource management activities of authorities, groups and individuals, • to identify catchment needs and prepare strategies for implementation, • to coordinate the preparation of programs for funding, • to monitor, evaluate and report on progress and performance of total catchment management strategies and programs, • to provide a forum for resolving natural resource conflicts and issues, and • to facilitate research into the cause, effect and resolution of natural resource issues. 	<p>-- no major change --</p> <ul style="list-style-type: none"> • to identify opportunities, problems and threats associated with the use of natural resources, • to identify first order objectives and targets for the management of natural resources, • to develop management options, strategies and actions to address the identified objectives and targets, • to assist in developing a greater understanding within the community of the issues identified and action required, and • to initiate proposals for projects to achieve those functions and assess projects submitted for funding having regard to targets identified by the Board. 	<ul style="list-style-type: none"> • Advisory, operational and governing roles: <ul style="list-style-type: none"> • to develop and implements catchment action plans, • to provide financial assistance for the purposes of the catchment activities, • to enter contracts or do any work for the purposes of the catchment activities, • to assist landholders to further the objectives of its catchment action plan, • to provide educational and training courses and materials in connection with natural resource management, and • to carry other functions under other Acts, such as assess vegetation consents, manage community involvement in water plans among others.

Table 5-3: Continued.

RULES	CATCHMENT MANAGEMENT COMMITTEES (T_1)	CATCHMENT MANAGEMENT BOARDS (T_2)	CATCHMENT MANAGEMENT AUTHORITIES (T_3)
Aggregation			
<i>Decisions</i>	<ul style="list-style-type: none"> • Consensus decision-making. 	-- no major change --	-- no major change --
<i>Aggregation Arrangements</i>	<ul style="list-style-type: none"> • Through direct participation of selected actors • Aggregation mechanisms such as <i>ad hoc</i> forums, working groups and sub-committees. 	-- no major change --	<ul style="list-style-type: none"> • Aggregation mechanisms such as <i>ad hoc</i> forums, working groups and sub-committees.
Information			
<i>Communication & Interaction</i>	<ul style="list-style-type: none"> • Regular meetings • Public and stakeholders forums • Duplicate membership in other NRM institutions • Personal and professional networks • Submissions • Exchange of meeting minutes, newsletters, reports etc. 	-- no major change --	-- no major change --
<i>Reporting & Monitoring</i>	<ul style="list-style-type: none"> • Annual Reports • Catchment strategies. 	<ul style="list-style-type: none"> • Annual Reports • Catchment Blueprints • Corporate Plans. 	<ul style="list-style-type: none"> • Annual Reports • Catchment Action Plans • Annual Implementation Programs • Investment Strategies • Financial and Performance Audits.

Table 5-3: Continued.

RULES	CATCHMENT MANAGEMENT COMMITTEES	CATCHMENT MANAGEMENT BOARDS	CATCHMENT MANAGEMENT AUTHORITIES
Payoff			
<i>Staff & Support</i>	<ul style="list-style-type: none"> • NSW DLWC provided limited staff (usually a full- or part-time coordinator) and other support. 	-- no major change --	<ul style="list-style-type: none"> • Own team of staff • DIPNR to provide corporate services support
<i>Funding</i>	<ul style="list-style-type: none"> • Limited investments from local, state and federal government sources 	<ul style="list-style-type: none"> • Limited investments from State and federal sources 	<ul style="list-style-type: none"> • Considerable investments from State and federal sources
Scope			
<i>Geographic Domain*</i>	<ul style="list-style-type: none"> • Mostly discrete catchments or sub-catchments. 	<ul style="list-style-type: none"> • Regional catchments areas. 	<ul style="list-style-type: none"> • Large regional catchment areas.
<i>Functional Scope</i>	<ul style="list-style-type: none"> • The coordinated and sustainable use and management of land, water, vegetation and other natural resources on a water catchment basis so as to balance resource utilisation and conservation. 	-- no major change --	<ul style="list-style-type: none"> • NRM defined as matters relating to the management of natural resources, such as water, salinity, soil, biodiversity, coastal protection, marine environment, forestry, and particularly native vegetation.

* East to the Great Dividing Range (GDR); no major change for inland catchments west to the GDR.

5.4.1 Position Rules

Over time, participants in catchment management institutions have changed from being representatives of certain interest groups to comprise a small group of individuals with expertise in areas related to NRM. At T_1 and T_2 , participants in the CMCs and CMCs were representatives of selected stakeholder groups, both government and non-government. At T_3 , members of the boards of the CMAs comprised collective expertise on diverse aspects of NRM, and skills on business administration and company direction. Participation has been limited in terms of inclusiveness and representation, at the different time periods analysed.

Despite the relatively large number of participants and the somewhat diverse background of these participants, the Illawarra CMC and the Southern CMB were not perceived as largely inclusive. The Illawarra CMC, for example, lacked participation of Aboriginal groups and people of non-English speaking background. The business community, tourism and development industries, which comprise major sectors in the Illawarra, also were not represented in the committee (J. Caldwell, per. comm.). Furthermore, representatives from relevant government agencies were not always included in the catchment management institutions analysed. The Department of Mineral Resources, for instance, did not have (as of 1996) representation in the Illawarra CMC, despite the importance of the mining industry in the Illawarra region (AACM, 1996). From the review of the meeting minutes of the Southern CMB, it was noted that participants expressed concerns about the absence of a representative from the NSW Department of Urban Affairs and Planning, given the importance of major issues related to urban planning in the catchment.

Landholders and/or resource users were, in contrast, over-represented in institutions such as the CMCs and CMBs, as they generally comprised the majority in the committees and boards (AACM, 1996). Having a majority of landholders and resource users as participants in catchment management institutions represented an imbalance in participation (AACM and CWPR, 1995; AACM, 1996; Margerum, 1996). Farming tends to be, in general, an interest well represented in NRM institutions in Australia (Rockloff, 2004).

This was not perceived to be necessarily the case with the Illawarra CMC, an urban coastal CMC, where the membership category of landholders/resource users was occupied by a varied group of citizens, including university students, school teachers

and NRM consultants (J. Caldwell, per. comm.). This diversity of participants was, in general, perceived by participants to be a positive aspect, as it allowed public involvement and the incorporation of different views, perspectives and information into decision-making (ICMC, n.d.).

It is important to note that within a catchment or region the populations (or community as it is usually referred to) comprise a heterogeneous entity, with considerable inequalities, particularly, in terms of wealth and power (see e.g., Lane and McDonald, 2005). The sectors of society well represented in NRM institutions are usually those actively involved in NRM, such as farming (Rockloff, 2004). They are perceived to comprise “high profile” individuals with their own political interests and agenda (Martin et al., 1992), and who enjoy political power (Moore and Rockloff, 2006). The NSW Farmers’ Association, for example, was responsible for the requirement that CMCs comprised a majority of representatives from landholders (CoA, 1999b). Under these circumstances, where decision-making is framed by local elites, representation of the less advantaged is often difficult, if possible at all (Jennings and Moore, 2000; Ribot, 2002b; Moore and Rockloff, 2006).

Limited authority and, in some cases, unwillingness of some participants to engage in the catchment management process presented further challenges to representation. Representatives from government agencies were, in many cases, “low-profile” officials within their organisation hierarchy, and, therefore, had limited authority to negotiate and commit to catchment management actions and activities on behalf of their organisations. In other cases, these participants were perceived not to have the time or be willing to participate, as noted the Illawarra CMC (ICMC, n.d.):

“Agency and local government members (participating in the committee) are not always committed to the process, seize the opportunity or have sufficient time to devote to committee business.”

Margerum (1999b) asserts that willingness of major stakeholders to participate in a collaborative effort, is one of the critical elements to success of collaborative NRM. In this case, participation includes not only formal involvement but also significant contributions once involved (Margerum, 1999b).

At T_3 , participation was less inclusive than T_1 and T_2 , as the CMAs comprised boards of non-ministerial office holders with expertise in areas related to NRM rather

than representatives of particular interest groups. Board members may come from diverse backgrounds – the board of the Southern Rivers CMA, for example, had members from Aboriginal and farmer backgrounds, among others. They, however, were not to represent the stakeholder group they came from, rather, they were expected to provide knowledge and expertise derived from their background.

On the other hand, opportunities for direct participation of stakeholder representatives, particularly state and local government representatives, as observed at T_1 and T_2 , were thus absent at T_3 . In contrast to the Illawarra CMC and the Southern CMB, the board of the Southern Rivers CMA lacked participation of officials from state agencies and elected members of local government. The lack of participation from state government agencies and local government defeats one of the main purposes of collaborative efforts, which is bringing together different levels of government and agencies (and other non-government stakeholders) with overlapping jurisdictions to develop more coherent policies, by providing a more comprehensive understanding of the catchment and improving collaboration among those governments and agencies (Trachtenberg and Focht, 2005).

In addition, local government in Australia has a significant role in NRM, as they are, for example, involved in statutory NRM planning and management. They also work directly with environments and communities (Wild-River, 2003). Furthermore, the participation of democratically elected local authorities in decentralised forms of NRM has have been usually promoted, as these authorities may be more easily held accountable to local populations (e.g., Ribot, 2002b; 2004). The participation of local authorities is considered to be a systematic means of broad-based inclusion (Larson and Ribot, 2004).

Changes in position rules, in terms of numbers of participants, from over 20 members in the CMCs to between 5 and 7 members in the board of the CMAs have limited the number of actors that can directly take part in decision-making, and, consequently, further decreased the opportunities for inclusive participation. The following remark regarding a proposition to reduce the number of participants in catchment management institutions is illustrative (HCMC, n.d.):

“It would seem that while the smaller number of around 9 [CMC members] is robust for rapid decision-making, there is a risk of reduced public involvement and transparency”.

It is important to note that this decrease in the number (from over 20 to 5-7) of participants in catchment management institutions has occurred despite the greater need for providing representation to potentially more diverse interests encompassed in the larger areas of operation of the CMAs (see scope rules below).

In terms of accountability of participants to catchment populations, this will be discussed below in boundary, aggregation and information rules, as downwardly accountable representation involves arrangements by which the representatives are selected, interact and communicate with, and aggregate the preferences of those they represent.

Participation in catchment management institutions has presented major limitations in terms of inclusiveness and representation. Participation has become less inclusive and representative as institutional changes occurred over time. Other key challenges affecting inclusiveness and representation are related to the procedures used to select participants (i.e., boundary rules), and how these participants communicate and interact with their constituents, and consider the preferences and needs of such constituents into decision-making (information and aggregation rules). These are, accordingly, examined below in boundary, information and aggregation rules.

5.4.2 Boundary Rules

The limitations in terms of inclusive and representative participation, discussed above, are related to the criteria and processes used for selecting participants to catchment management institutions. The criteria determining the eligibility to hold a position in these institutions have changed from conditions based on membership at T_1 and T_2 , to acquired attributes at T_3 . Eligibility to participate as a member of the CMCs and CMBs was determined in terms of representation of certain interest groups. At T_3 , only individuals with skills and knowledge in relevant areas of NRM were eligible to be a board member in a CMA. Boundary rules have not been conducive of inclusive, representative and downwardly accountable participation, at the different periods analysed.

Determining participation on the basis of representation of selected interest groups alone did not account for the cultural, socio-economic and political diversity of the catchments. Participation is context dependent, e.g., it will be dependent on the

context, the cultural, socio-economic, and decision-making contexts (Lane, 2005; Samuelson et al., 2005; Trachtenberg and Focht, 2005). For example, urban catchments feature very different contexts to rural catchments, including differences in conceived, perceived, and lived space for their populations (Macpherson, 1997; O'Neil, 2005). In addition, as noted previously, the populations within a particular catchment comprise a heterogeneous entity (Lane and McDonald, 2005; Samuelson et al., 2005). They can be differentiated, for instance, in terms of social capital (e.g., trust in government and other people), political beliefs and ideology, and attitudes (e.g., local or national concerns, pro-environment or pro-development etc.) (Samuelson et al., 2005).

Achieving representation in NRM institutions involves, therefore, taking into account several dimensions, including demographics, general political beliefs and ideology towards policy issues, environmental attitudes, and perception of the problem (Samuelson et al., 2005). Boundary rules, as specified in the legislation, applied to all catchment management institutions across NSW, regardless of their particular contexts and were, therefore, limited in catering for the different and diverse realities of the institutions analysed.

The requirement of a majority of landholders/resource users in the CMCs and CMBs, specified in the Catchment Management Act (NSW, 1989), represented an institutionalised reference to exclusion. Consequently, it contributed to maintaining the *status quo* in terms of representational and power inequalities in NRM, where interests key to economic production are favoured (e.g., farming), whereas less powerful interest groups are not given voice (Moore and Rockloff, 2006).

Furthermore, it is important to acknowledge that the representative model may not suit all catchment actors. Bellamy et al. (2002) argued that not all stakeholder groups are equally familiar and comfortable (or uncomfortable) with the representative approach. For example, whereas members of peak industry bodies and government agencies may be reasonably well organised to work on a representative environment, indigenous groups, on the other hand, have no customary basis for representative governance (Bellamy et al., 2002).

In this context, the preferences of the different actors about the forms of participation also need to be considered when designing boundary rules for collaborative institutions. Effective participatory processes should be flexible and context-specific, i.e., be customised to their particular circumstances. Various

approaches to participation (see, e.g., Ross et al., 2002) could be employed in combination to increase inclusiveness.

At T_3 , the selection of participants on the basis of skills and knowledge can be argued on the grounds of efficiency (AACM, 1996). The review of NSW catchment management asserted that the selection of participants to CMCs based on representation, or training the existing representative, would be less efficient than membership based on skills (AACM, 1996). Selecting participants on the basis of skills and knowledge alone contravenes inclusiveness, as the process is open only to those with the required knowledge and skills. It reduces the pool of eligible individuals who can potentially participate in catchment management institutions. Boundary rules have, therefore, become more exclusive.

Achieving representation in NRM institutions is not easy either conceptually or in practice (Samuelson et al., 2005; Trachtenberg and Focht, 2005). It involves significant challenges, as indicated by the Australian experience (e.g., Jennings and Moore, 2000; Bellamy et al., 2002; Moore, 2005; Moore and Rockloff, 2006). Challenges to inclusive and representative participation in NRM institutions may include (un)willingness to participate (AACM, 1996), cultural sensitiveness (Lane, 1997), preferred forms of participation (Moote et al., 1997), transaction costs involved in participation (Bellamy et al., 2002), civic disengagement (Putnam, 1993) and “burnout” (Woodhill, 1996). In the context of this study, in addition to these challenges, respondents have pointed to the frequent changes in catchment management institutions as a disincentive to participation.

Ministerial appointment of participants to catchment management institutions is not a democratic process, as the minister is ultimately responsible for selecting the participants through a process where the broader population have a very limited (if any) voice in the selection of participants (Martin et al., 1992). This centralised process conflicts with the logic of participation in collaborative NRM. It is interesting to note that appointments could, however, be used in a positive way to obtain proper balance of representatives by purposefully including members of under-represented groups (Trachtenberg and Focht, 2005; Moore and Rockloff, 2006). That appears not to have been the case of NSW, as discussed below.

In addition, the legitimacy of the selection process has been undermined by interference of elected officials in the selection of members of the CMCs, in order to fit

political interests (AACM, 1996; Margerum, 1996). The following remarks illustrate the case well (Margerum, 1996):

“In several cases in New South Wales, the minister went against a local government council’s nominee and chose an alternate representative... In one case, nearly the entire committee was ignored by the minister.”

Some respondents have also raised questions about the potential political influence in the selection process of CMBs and CMAs. For these respondents, politics still play a part in the selection of participants to catchment management institutions.

Appointed boards, as part of the corporate governance arrangements currently used in the Australian public sector, have also been questioned in terms of accountability, formal authority and safeguards to protect the public interest (see, e.g., Howard and Seth-Purdie, 2005). In this context, it has been argued that ministers can influence the behaviour of board members and reduce autonomy of the boards by controlling the appointment of members to a board (Howard and Seth-Purdie, 2005).

Another important feature of boundary rules is their capacity to affect accountability of the participants in an institution. The selection process currently used in the NSW case allows for stronger accountability to the government. This is important and desirable as the bulk of the investments available to catchment management institutions in NSW are from public funding. These institutions need to be accountable not only to state and federal government, but also to the catchment populations (Curtis and Lockwood, 2000).

Boundary rules, however, are not conducive of downward accountability, as there are limited mechanisms for local populations to, for example, displace/replace participants if they feel their preferences and needs are not being considered in the decision-making process (Agrawal and Ribot, 1999). A primary legitimate means of formalising downward accountability is by allowing local populations to elect their own representatives or build on existing local, representative and accountable authorities and institutions (Ribot, 2002b, 2004), e.g., local governments. Curtis and Lockwood (2000) recommend the election of participants to catchment management institutions, as part of the devolution of greater power to regional communities in Australia. By allowing the population to choose their own representatives, electoral processes create formal accountability between representatives and the populations they represent. Moore and Rockloff (2006) suggest that, as voters can also displace perceived poor performers,

there can be greater incentives for elected participants to interact and communicate with their constituents, and respond to their choices. Woodhill (1996) suggests that an electoral approach is unlikely to be practical and may not necessarily be more effective. Even when the electoral system is well crafted, many elected officials are not necessarily accountable to their constituents (Agrawal and Ribot, 1999). In this context, it is more adequate to have also in place diverse mechanisms for downward accountability. The reality is that there is no easy solution to making the process more democratic and accountable (Woodhill, 1996), as it may depend on the particular political context of the catchment.

Boundary rules have been characterised by major constraints to inclusive, representative and accountable representation in NSW catchment management institutions. The criteria for selecting participants to those institutions have become more exclusive. The selection process of participants has not been seen as democratic and conducive to downward accountability.

5.4.3 Choice Rules

Over time, catchment management institutions have been empowered in terms of authority and powers. At T_1 and T_2 , CMCs and CMBs had mainly advisory roles, whereas, at T_3 , CMAs have been assigned with governing and operational roles. Such empowerment has, however, been accompanied by increased levels of direction and control, which may constrain institutional autonomy and flexibility. Authority and powers transferred to catchment management institutions have not been truly meaningful and/or independent, in the different periods analysed.

The authority assigned to CMCs and CMBs, in particular, was very limited, as their roles were primarily advisory in nature. The committees and boards had, for instance, the “authority” to coordinate NRM activities of catchment actors, but were not authorised to control or direct the actions and activities of those actors (NSW, 1989). In addition, they lacked authority and powers to implement the plans they were required to develop under the catchment management legislation (NSW, 1989, 1999). Accordingly, the Illawarra CMC, for example, prepared integrated plans and strategies (e.g., ICMC, 1997b, 1999a) but did not have powers to ensure the implementation of such plans and strategies. Similarly, the Southern CMB, despite being required to identifying entities (usually government agencies) responsible for implementing the programs developed in

its plan (SCMB, 2003b), did not have the authority to require those entities to implement such programs.

There were no clear mechanisms in place to require that catchment management plans and strategies were considered in the activities of other NRM institutions and organisations or in the statutory planning system. These plans and strategies lacked connection with related policies and legislation, particularly with the Environmental Planning and Assessment Act and its statutory plans, such as the Regional Environmental Plans (REPs) and Local Environmental Plans (LEPs). Implementation of catchment management plans and strategies under related policies, legislation and the mandates of government agencies, as initially proposed (see e.g., Hannam et al., 1986), did not happen.

For catchment management plans and strategies to be effective, they need to be linked to and endorsed by other legislative planning processes (Bellamy et al., 2002). Burton (1986) advised about the importance of formally promulgating the catchment management plans – possibly as a planning instrument under the Environmental Planning and Assessment Act – if they were to be of “any real value”. The NSW Catchment Management Review suggested that under the Environmental Planning and Assessment Act there would be an appropriate means to establish the statutory basis by which catchment management plans and strategies might have been incorporated into the NSW planning framework, and thus implemented by local and state government (AACM, 1996). The position of NSW government was that the roles of catchment management institutions could be achieved using non-statutory means (Anonymous, 1997). It was also argued that assigning legislative power to catchment management institutions would duplicate the then existing roles and confuse existing legislative accountability (Anonymous, 1997).

Mitchell (2005) contends that without legal basis, plans have low legitimacy and their recommendations are perceived by other entities as someone else’s responsibility. If implemented they are scheduled to fit into the priorities of each agency, rather than with regard to an integrated initiative. Consequently, the outcomes are low effectiveness and efficiency (Mitchell, 2005).

It is important to note that catchment management plans were part of a myriad of NRM plans and strategies concurrently developed, in an independent fashion, by the various agencies and entities responsible for NRM (AACM, 1996) (Table 5-4).

Table 5-4: Examples of NSW plans and strategies at state, regional and local levels (as of 2003).

LEVEL	PLANS AND STRATEGIES
State	<ul style="list-style-type: none"> • Salinity Strategy (various legislation relevant) • Biodiversity Strategies (Threatened Species Conservation Act 1995) • Native Vegetation Conservation Strategy (Native Vegetation Conservation Act 1997) • State Environmental Planning Policies (Environmental Planning and Assessment Act 1979) • State Water Management Outcomes Plan (Water Management Act 2000) • Policy for Sustainable Agriculture (mainly non-statutory)
Catchment/ Regional	<ul style="list-style-type: none"> • Catchment Blueprints (Catchment Management Act 1989) • Regional Vegetation Management Plans (Native Vegetation Conservation Act 1997) • Water Management Plans (Water Management Act 2000) • Water Sharing Plans (Water Management Act 2000) • Regional Environmental Plans (Environmental Planning and Assessment Act 1979) • NSW Forest Agreements (Forestry and National Parks Estate Act 1998)
Local Area Plans	<ul style="list-style-type: none"> • Local Environmental Plans (Environmental Planning and Assessment Act 1979) • Development Control Plans (Environmental Planning and Assessment Act 1979) • Road Management Plans (non-statutory) • Bushfire Management Plans (Rural Fires Act 1997) • Forestry Management Plans (Forestry Act 1916) • Threat Abatement and Species Recovery Plans (Threatened Species Conservation Act 1995, Fisheries Management Act 1994)
Site Management	<ul style="list-style-type: none"> • National Parks Plans of Management (National Parks and Wildlife Act 1974) • Habitat Protection Plans (Fisheries Management Act 1994) • Crown Lands Plans of Management (Crown Land Act 1989) • Community Land Planning (Local Government Act 1993) • Property Management Plans (mainly non-statutory)

Source: CoA (2003)

In this context, catchment management institutions, such as the Illawarra CMC, for instance, attempted to influence actors to implement its catchment plans and strategies by negotiation and persuasion. Given the different levels of commitment to catchment management from organisations and authorities, negotiations were reported to be time consuming, particularly, where projects extended over multiple jurisdictions (ICMC, n.d.). Respondents noted, for example, that Kiama and Shellharbour Councils were applying catchment management principles to their Local Environmental Plans, while Wollongong Council, on the other hand, was perceived as not keen to engage in

catchment management processes, despite being an important contributor of funding and office space to the Illawarra CMC.

Respondents also reported that government agencies often resisted being truly engaged in catchment management. Mitchell (2005) states that a “silo effect” describes the fragmentation of agencies and their inability or unwillingness to consider their mandates relative to other organisations. The fact that catchment management was hosted, in the past, at a state government agency, was suggested as a potential constraint to engaging government agencies in the process, due to turf protection and rivalry (AACM, 1996; Arcioni, 2001; Bellamy et al., 2002). With regard to the current arrangements, adding to the silo effect, respondents suggested that the fact that the CMAs have, for instance, taken over part of the Department of Infrastructure Planning and Natural Resources (DIPNR) roles (e.g., certification of property vegetation plans and assessment of vegetation consent) and resources (some A\$ 100 million in staff and resources), could be seen as a threat by other agencies.

Lacking meaningful authority and powers, the mandate of catchment management institutions was, in general, naturally ignored by other organisations and institutions (AACM, 1996). The inability to ensure effective implementation of plans and strategies resulted in frustration and “burnout” of participants in catchment management institutions, as well as discouraging other stakeholders to take part in a process they regarded as ineffective (AACM, 1996).

Without meaningful authority and powers, CMCs normally focused their actions and activities on more specific and local issues, by which they achieved some degree of success, as discussed below in scope rules. The CMC, for example, was perceived to be relatively successful in coordinating, in particular, actions and activities related to research, information, awareness and education. The Illawarra CMC was also believed to have achieved some level of success working with local groups and local governments.

T_3 changes gave the CMAs considerably more authority and power, in relation to CMCs and CMBs, as they have, for instance, the authority to give effect to catchment plans, enter contracts and carry out any work relating to catchment activities (NSW, 2003a). The ability to fund catchment management activities by providing loans, grants, subsidies and other financial assistance (NSW, 2003a), may provide the means to influence certain NRM use and management of individuals and organizations.

In addition, CMAs have, as mentioned above, responsibilities over the certification of property vegetation plans and assessment of vegetation consent. This consent role is seen by some respondents as somewhat conflicting with the collaborative approach of the CMAs. Many believe that decisions on vegetation consents will be naturally challenged in the courts by farmers and environmental groups alike, which will undermine the capacity of the CMAs to work collaboratively with these stakeholders.

The relative empowerment of catchment management institutions, where CMAs have increased capacity to affect implementation of NRM actions and activities, may have been accompanied by somewhat limited autonomy and flexibility to exercise such authority and powers. Despite being established as independent authorities, respondents suggested that the CMAs are subject to considerable government control. The following remark from a respondent is illustrative:

“I think it is fair to say that the state government is wondering what they have created. [The state government] set up the CMAs to have some autonomy and yet they want some way of controlling the CMAs at the same time. It is difficult [to grant autonomy to CMAs], they [the government] don't like it particularly. I don't think they can see another way”.

In this context, NSW and federal governments have had a major role in directing the strategic directions of catchment management institutions, such as CMBs and CMAs. The planning process of these institutions, for instance, have been influenced by government requirements and directives (e.g., DLWC, 2000; CoA, 2003; DIPNR, 2004a). On the other hand, as discussed above and noted by respondents, catchment management institutions have had very limited (if any) opportunity to influence broader government priorities, directives and policies.¹⁹

The decision-making, actions and activities of catchment management institutions may have been constrained by government requirements and priorities, in particular, under the bilateral agreement between NSW and the federal governments. The catchment management plans and strategies, such as the Blueprints, developed by the CMBs, and Catchment Action Plans, developed by CMAs, for example, should be consistent with government policy directions, if they were/are to be funded under

¹⁹ Some respondents suggested though that CMA chairs have had some influence in the recent policy developments on native vegetation management.

government programs, such as the NHT and NAP. In this context, autonomy may also be constrained by the over-dependence of catchment management institutions on government funding, which favour, largely, investments of prioritised broad scale projects. Furthermore, aligning national and state priorities with catchment/regional priorities – that may arise from the preferences and needs of catchment populations and stakeholders – may prove, in some cases, challenging, as noted one respondent:

“Some times it is hard to roll what local people want underneath the broader (state and national) targets, because people are often interested in only dealing with their own local issues...”

This suggests that CMAs are not always able to respond to the interests of local populations and stakeholders, particularly if local interests are not consistent with state and national requirements and priorities.

The *modus operandi* of the catchment management institutions may also pose constraints to the autonomy and flexibility of these institutions. At T_3 , a major change in choice rules was how the CMAs undertake their activities, by using procedures and practices of corporate governance from the private sector. As noted in Chapter 4, corporate governance involves processes by which organisations are directed, controlled and held to account (ANAO, 1999 apud Howard and Seth-Purdie, 2005), which may result in processes that are overly prescriptive (Howard and Seth-Purdie, 2005; Boxelaar et al., 2006).

Government control and direction, under the new public management model, are manifest, for example, in the increased requirements in terms of reporting and auditing of organisation performance and finances, and, consequently, the establishment of strong accountability of CMAs to the government. The emphasis on rationalization under a project management framework, where activities are planned, organised, coordinated and controlled may result in processes that are overly driven and controlled by the government (Boxelaar et al., 2006). Boxelaar et al (2006) argue that the tools and practices of the new public management approach to public administration (e.g., project management and evaluation) “...are constitutive and subversive of emerging forms of co-operative approaches to public administration”.

The bureaucratic and standardised way in which catchment management institutions, namely CMAs, are required to operate might not be flexible or sensitive enough to accommodate the particular realities of each of these authorities (Howard and

Seth-Purdie, 2005), and to allow them to achieve local identity in their catchment areas (Martin et al., 1992).

Respondents noted that during the preparation of the catchment management plans by the Southern CMB, for example, it was challenging to tailor the prescribed target-based “SMART” (Specific, Measurable, Achievable, Relevant and Time bound) approach, where targets and indicators should be expressed in biophysical terms, to some of the catchment problems. Such an approach was not easily applicable (if applicable at all) to issues involving cultural and behavioural change of the catchment populations and stakeholders. Furthermore, the restrictive timeframes required for catchment management institutions to undertake activities, such as planning, were not conducive to genuine collaborative processes. From the analysis of the meetings minutes of the Southern CMB, the short timeframe for the preparation of its management plan raised concerns of the board about whether they should (could) get involved in activities outside their then primary planning role, and address issues being raised by local groups and stakeholders.

Jennings and Moore (2000) comment that strategic planning depends perhaps on some degree of government guidance to assist in developing collective benefits and facilitating the planning process that make strategic planning and its outcomes possible. While the development and oversight of a standard framework by the central government might provide guidance and facilitation, and represent a solution to problems of inconsistency, this may, on the other hand, be counterproductive if the specific context of catchment institutions is not taken into account (Howard and Seth-Purdie, 2005), as appears to be the case of NSW catchment management initiative. This tension confronting the improvement of governance, will require a balance between standardisation and flexibility (Howard and Seth-Purdie, 2005).

Autonomy and flexibility of catchment management institutions have occurred within the rules set by the government for the periods analysed. At T_1 , however, CMCs were perceived to have had more freedom in determining their own operational structures and processes. Respondents suggested that the Illawarra CMC, for example, enjoyed reasonable levels of autonomy and flexibility. The CMC could “push the envelop”, if necessary, in order to persuade individuals and organisations to engage in improved NRM. The following comment provides further insights:

“The CMCs could be quite feral... we could do all those things because no one was really reviewing us... all we had to do was publish an annual report every 3 years...”

This contrasts with the current arrangements, which require CMAs to comply with procedures that are aligned with and reinforce government powers.

The transfer of powers to catchment management institutions, as demonstrated above, has been characterised as constrained throughout the history of the NSW initiative. The CMCs were constrained by the lack of meaningful authority and powers, whereas the current CMAs may be constrained by government control, direction, priorities, requirements and traditional practices. This suggests that there has been resistance to assign catchment management institutions with meaningful and independent authority and powers. Catchment management institutions will, however, not be effective unless they have appropriate authority and powers, and are seen as legitimate by the public and stakeholders (Bellamy et al., 2002)²⁰.

5.4.4 Aggregation Rules

Whereas consensus-based decision-making has been a common feature of the catchment management institutions examined, aggregation rules in terms of arrangements for aggregating the preferences of catchment actors, particularly across different institutions, have changed over time. At T_1 and T_2 , aggregating such preferences was primarily achieved by direct participation of representatives from different stakeholder groups in the CMCs and CMBs. At T_3 , such possibilities did not exist as the boards of the CMAs did not represent stakeholder groups. Aggregation of the preferences of catchment actors has become limited over the period analysed.

At T_1 and T_2 , direct interaction and communication of CMC and CMB participants with their sectional interests or geographical areas would entail diverse input from those interests into decision-making, as well as ownership of the plans and implementation responsibilities (Bellamy et al., 2002). In the case of CMBs, for example, participants were expected to act as channels between the board and their broad interest groups (DLWC, 2000).

²⁰ It is important to recognise, however, that some powers will necessarily remain with governments as they have responsibilities and accountabilities that cannot be transferred (Jennings and Moore, 2000).

However, aggregating the preferences and needs of the various potentially relevant interests in the catchment, based on direct participation of interest groups alone might have been limited due to the lack of inclusiveness of CMCs and CMBs. Assuming the existence of constituencies, interaction and communication of participants with their constituents would also be problematic, as participation was not truly representative of, and accountable to, the catchment populations and stakeholders, as discussed in boundary rules. As seen in position rules, participants, in general, did not have the time, the resources and/or the opportunity to adequately interact and communicate with the groups they were to represent, particularly, between meetings, as noted by a respondent:

“They [the participants] were busy people sitting in the committee on a voluntary basis... It was somewhat unrealistic to expect them to engage in this additional effort [of communicating and interacting with their ‘constituents’].”

Furthermore, as also noted in position rules, some participants – particularly those representing government interests – lacked authority to act on behalf of the organisations they were to represent. In this context, Bellamy et al. (2002) contend that participants in catchment management institutions would possibly bring the experience of their interest group and its perspective on certain issues, but did not have the capacity to serve in a truly representative manner. Consequently, the capacity to aggregate the preferences of their constituents was very limited, as adequate aggregation of stakeholders preferences depends primarily on adequate representation (Trachtenberg and Focht, 2005).

At T_3 , the situation was more limited, as the boards of the CMAs did not have direct participation of representatives from stakeholder groups. Without participants who are representatives of a range of interests with different stakes in a problem, it is not possible to have face-to-face discussion, negotiation, agreement and commitment between catchment actors (at the board level).

Alternatively, CMAs may use *ad hoc* mechanisms, such as stakeholders’ fora, sub-committees and working groups to aggregate diverse preferences across their area of operation. The establishment of working groups and sub-committees may allow for joint decisions among diverse organisations in the catchment (Kauneckis and Imperial, 2005), and broaden participation by including those interests not directly represented (Margerum, 1996). Participants in the working groups and sub-committees of the

institutions analysed, comprised, in many cases, mostly technical expertise. These mechanisms were, in general, perceived to be limited in providing aggregation of the broader catchment stakeholders and populations, in the cases analysed.

From the review of the meeting minutes of the Illawarra CMC, it was noted that the committee expressed concerns about making participation in sub-committees and working groups open to the broader public. In the case of the Southern Rivers CMA, for example, both the identification of issues and development of actions for the Catchment Action Plan were undertaken by working groups formed largely by the CMA staff (SRCMA, 2005). Likewise, the workgroups formed to identify objectives, targets and actions for the Catchment Blueprints developed by the Southern CMB, comprised primarily technical expertise such as members from local and state government agencies and universities.

Furthermore, government practices, priorities and requirements, similar to the discussion in choice rules above, do not always provide adequate opportunities to effectively aggregate stakeholders and public preferences (Boxelaar et al., 2006). The short timeframes in which CMBs and CMAs were required to develop their plans, for example, resulted in limited opportunities for the participation of the public and broader stakeholder interests, beyond the traditional and centralised methods of consultation. The consultations undertaken by the Southern Rivers CMA, for instance, consisted of asking the public to prioritise issues for the Catchment Action Plan, with no public involvement in the identification of the issues.

Challenges to aggregate stakeholders' and the public preferences into decision-making have thus increased as catchment management institutions were changed over time. Several respondents stated that the connection with the catchment populations enjoyed by the CMCs was lost when they were replaced with CMBs. This was also the case when the Southern CMB was established to replace the Illawarra CMC (Arcioni, 2001). Such challenges are even more prominent when scope rules changes are taken into account, e.g., as the geographic domain of the catchment management institutions has increased over time, so has the diversity of issues and actors potentially affected, which should be aggregated into decision-making (see scope rules below). In this regard, a respondent commented:

“...achieving actual community ownership of the CMAs' Catchment Action Plans would take some ten years...”

Aggregating the preferences, needs and values of catchment populations in decision-making has been challenging over the period analysed. Aggregation has been limited due to shortcomings in participation (i.e., limited inclusiveness and representation), constraints to communicating and interacting with populations and stakeholders, and large geographic domains.

5.4.5 Information Rules

Tools for communication and interaction among participants and between participants and stakeholders, the general public and other institutions have, overall, been similar across the institutions analysed. Similar to aggregation rules, challenges to communication and interaction have increased. Information rules in terms of arrangements for reporting and monitoring outcomes and performance have become more systematic over time.

The institutions analysed presented similar arrangements for communication and interaction between participants and with catchment stakeholders and populations. At T_1 , however, the Illawarra CMC was perceived as being relatively more active in communicating and interacting with actors, e.g., members represented the committee in a number of other committees, panels, groups and councils; the committee organised a several seminars, fora and workshops; produced and distributed a number of publications; prepared articles to newspapers and magazines, and at one stage had a monthly segment on catchment management on the radio. This was perhaps because, as discussed earlier in choice rules, many of the CMCs lacking adequate authority and resources, concentrated their efforts on activities such as information and local (rather than regional) issues. The more localised nature of the Illawarra CMC, including its small geographic domain placed the committee closer to the catchment population. Respondents commented, as mentioned above, that the connection of the CMCs with the community was lost when they were replaced with the CMBs.

Despite using many of the same mechanisms for communication and interaction, as did the CMCs, changes in rules such as choice and scope, may have limited the capacity of CMBs and CMAs, to establish effective information rules. The CMBs for, example, were required to produce an integrated management plan within a restricted timeframe, so their efforts and time were concentrated primarily on the planning

activities. Likewise, the CMAs have complex and demanding tasks in meeting the priorities, targets and requirements of the current regional NRM model.

Furthermore, the larger areas of operation for the CMBs and CMAs may have made it challenging to communicate and interact with catchment actors across a large geographic domain. For example, both the Southern CMB and the Southern Rivers CMA were required to consult and engage stakeholders and the broader population when developing their management plans. Despite the efforts, these consultations have been perceived to be similar to traditional approaches undertaken in less participatory initiatives, where consultations have, in many cases, figured primarily as a single centralised mechanism. As the Wentworth Group puts it, “*Despite the rhetoric, communities continue to be consulted rather than engaged*” (TWG, 2002). From the review of meeting minutes, it was noted, for example, that participants considered the consultations undertaken by the Southern CMB as time consuming and ineffective. Furthermore, some respondents demonstrated some degree of “burnout” and cynicism in relation to consultation and engagement processes due to somewhat frequent changes in NRM institutions, and the existing plethora of community and stakeholder consultations. When asked what he would like to see realised in terms of NRM, a respondent said:

“I’d like to say the trust of the community, but I don’t think that it can happen because government change things too often. When the community is just starting to get used to something, it all changes again.”

The consultations during the development of the Catchment Action Plan for the Southern Rivers CMA, which had a total attendance of only 374 people (SRCMA, 2005) (i.e., 0.07 % of the 500,000 people in the region) might have been a reflection of such burnout.

Like the aggregation of stakeholders’ preferences – which ultimately is achieved by information rules – effective communication and interaction with potentially more diverse stakeholder interests has become more challenging. In undertaking consultations, for example, the Southern Rivers CMA needs to consider the public and stakeholders within a much larger area than the Illawarra CMC or the Southern CMB did.

Information rules in terms of reporting and monitoring institution activities and performance have become more systematic over time. At T_1 , CMCs lacked clear and

systematic reporting and monitoring arrangements, particularly in relation to government funding (AACM, 1996). Nevertheless, CMCs were regarded, in general, as able to manage and account for the funding received (AACM, 1996). Respondents believed the Illawarra CMC, for example, was accountable to the members through mechanisms, such as peer monitoring and pressure. A respondent argued that if the committee was not accountable, it would not have received sustained financial support from local governments for so long.

T_2 and, in particular, T_3 changes introduced systematic reporting and auditing arrangements to CMBs and CMAs. CMAs, for example, are required to produce a number of reports and plans in relation to their policies, programs and procedures. These reports and plans are subject to recommendation and/or approval by other entities. CMAs are also subject to external financial and performance audits. These reporting, monitoring and auditing processes aim to ensure that state and federal government priorities are met, and that stronger accountability within the organisation, and to central governments, is in place.

The emphasis on upward accountability of CMAs has not been matched, however, by mechanisms to ensure downward accountability. Though reports and information on catchment management institutions are, in general, made public through the internet, for example, there have been limited mechanisms (if any) for catchment populations to sanction participants in these institutions if they perceive their choices are not being considered in decision-making. Systematic mechanisms to hold these institutions accountable to catchment populations have been overlooked.

In addition, these reporting, monitoring and auditing processes have resulted in higher transaction costs associated with bureaucratic work required, which can be at the expense of other activities. A respondent commented:

“If they want us to put more on the ground, we need more people... because [of] all [the] restrictions we have to operate under, we need a lot of people to manage all reporting, accountability, and all that”.

These monitoring and reporting processes can also result in constraints to institutional autonomy and flexibility, similar to those discussed in choice rules. In fact, the current reporting, monitoring and auditing arrangements are further instances of the New Public Management model the CMAs are required to operate under. Such processes focus largely on corporate governance and more immediate outcomes. The

prevailing government understanding of efficiency does not, however, conform to the nature of collaborative institutions (Darbas, 2004).

Lovecraft (2005) argues that NRM institutions need to be monitored also in terms of intermediate outcomes that foment and sustain what she and Rosenberg define as socio-ecological capital (i.e., ecological and social contributions) (Lovecraft and Rosenberg, 2004). These outcomes may not lead directly to quick fixes, but are believed to lead to positive externalities that foster long term behavioural changes (Lovecraft, 2005). Such outcomes may include the institutional ability to facilitate the creation and engagement of civic relationships, dissemination of knowledge and skills, information loci for key players, stakeholders, and the public, and, provision of spaces for discourse (Lovecraft, 2005). In reality, monitoring and evaluating collaborative institutions require measures of multiple dimensions (e.g., social-capacity development, institutional changes, etc.), which are sensitive to various types of accomplishments and various stages of maturity for collaborative efforts (Born and Genskow, 2001).

It is essential to have some form of mechanism to hold catchment management institutions accountable, especially when they are managing and expending public money. Again, the challenge is to find a balance so that the autonomy and flexibility of the institutions are not compromised. It is also important to devise and employ mechanisms that allow for monitoring the institution in terms of its ability to facilitate collaborative processes and outcomes, rather than its ability to produce immediate on-ground outcomes only.

Information rules in terms of communication and interaction have been challenged by traditional government practices, which are not conducive of collaborative process, and the large areas of operation of catchment management institutions. Reporting and monitoring have become more systematic and entailed strengthened upward accountability. Downward accountability has, on the other hand, been given much lower priority.

5.4.6 Payoff Rules

Over time, catchment management institutions have been provided with increased levels of resources, both in terms of staff and funding. At T_1 and T_2 , CMBs and CMCs were, in general, constrained by limited resources. T_3 changes provided

CMAs with relatively far more resources. CMAs, however, may be constrained by over-dependence on government funding and the priorities and requirements related to the use of such funding.

At T_1 and T_2 , catchment management institutions were characterised by limited staff and funding. The level of financial resources was perceived as inadequate to support the activities and projects of CMCs and CMBs (AACM and CWPR, 1995; AACM, 1996; ICMC, 1998c; SCMB, 2003a). The following remarks from a main champion of catchment management in Australia are illustrative (CoA, 1999b):

“The biggest single reason for the lack of progress with the implementation of integrated catchment management in eastern Australia is that state governments have... reduced, rather than increased, the manpower resources available for catchment management activities. There is a lot more... than expecting the community at large to pick it [catchment management] up and run with it, with the help of ‘funny money’ from federal government to keep everybody enthusiastic. It is going to cost, and it is going to hurt, if we are ever going to make any progress with it.”

Accordingly, Martin et al. (1992) commented that the state government wished to shift responsibility for NRM to regional populations but seemed to be unwilling to supply the resources needed. In the national context, Bellamy et al. (2002) stated that communities have shown long term commitment to catchment management, but funding support has invariably been only for 1-3 years short term political cycles.

The lack of adequate funding for CMCs to implement their plans and strategies, added to the frustration and burnout of participants with the limited authority and powers of the committees (AACM, 1996). Securing funding for CMCs and CMBs through the regional assessment process, was once perceived as lacking autonomy and inefficient (AACM, 1996). In some cases, these processes were reported to be somewhat overwhelming and frustrating for participants (AACM, 1996; SCMB, 2003a). The Southern CMB, for example, commented (SCMB, 2003a):

“Far too much of our effort has had to go into meeting administrative requirements for this money [federal and state government funding], as we are not as well advanced in our goal of getting business, community and local government into partnership with state agencies, to do significant projects in the region.”

Changes at T_3 , involved the increase in resources from state and federal government allocated to catchment management institutions. In contrast to CMCs and CMBs, the CMAs employ their own team of staff and may receive triennial investments

of the order of tens of millions dollars (e.g., SRCMA, n.d.). Furthermore, CMAs have, to some extent, more funding certainty as they are provided with 3-year indicative allocations to plan activities accordingly (i.e., to match the indicative allocations) (DIPNR, 2004a). Nevertheless, some respondents commented that the current level of funding is still not ideal, as CMAs have large areas of operation and the demand from government for on-ground outcomes is high.

T_2 and, in particular, T_3 changes resulted also in more targeted and strategic approach to investments. Under the NHT Bilateral Agreement, for example, CMBs and CMAs were required to develop ranked investment strategies, as well as comply with expenditure requirements, such as commitment limits (CoA, 2003; DIPNR, 2004a).

Government funds are, therefore, to be used for activities that are in conformity with the objectives of the corresponding funding program (DIPNR, 2004a), which have a critical influence on the level and type of activities undertaken in a catchment (Bellamy et al., 2002). The political nature of the funding has, therefore, influenced the power relations within a catchment, as it has shifted the focus from local projects to a more strategic regional approach, with emphasis upon on-ground outcomes (Bellamy et al., 2002).

Over-dependence by catchment management institutions on government funding, and the attached requirements and priorities for expenditures, has obvious implications for the autonomy, flexibility and sustainability of the CMAs. Without alternative sources, there is a risk that their activities will be largely limited by the political nature of government funding.

Whereas, there has been more funding certainty, at least over the 3-year short term, uncertainty remains over the future of funding under national programs such as NHT and NAP, and, consequently, over the future of catchment management institutions.

Some commentators (e.g., AACM, 1996; CoA, 1999b) have argued that catchment management institutions should have rating powers within their areas of operation. As noted in Chapter 4, under the Catchment Management Authorities Act, if specifically authorised by the regulations, CMAs may levy contributions (NSW, 2003a). This potential alternative would perhaps give catchment management institutions more independence. Furthermore, as the contributions levied would remain in the catchment, this would have the potential to raise population awareness and engender a sense of ownership (Bellamy et al., 2002). As direct contributors, catchment populations might

feel compelled to demand that their needs be considered in decision-making. This may also lead to mechanisms to hold catchment management institutions accountable to these populations.

Authorising catchment management institutions to levy of contributions is, however, a sensitive political issue. According to Professor John Burton, when the Catchment Management Act was being drafted, the NSW Farmers Association “bitterly and ideologically” opposed to the setting up of catchment management institutions with rating powers, and continues to hold that view (CoA, 1999b).

5.4.7 Scope Rules

The primary functional scope of catchment management has been similar over time. The geographic domain has, as part of the move towards a more strategic focus to NRM, shifted from CMCs operating over small catchment areas at T_1 , to increasingly larger regional areas of operation of the CMBs and CMAs at T_2 and T_3 , respectively. The shift from local to regional scales may have significant implications to other institutional rules such as position, boundary, choice, aggregation, information, and payoff rules.

The functional scope of catchment management has been defined broadly as coordination of NRM on a catchment/regional basis. Catchment management institutions, and in particular CMCs, were very limited in affecting coordination of NRM programs and policies, due to the constraints to authority and power discussed above. As noted in Chapter 4, the outcomes affected by these institutions were narrower than their stated functional scope. Likewise, the scope of the CMBs was, for most of their short history, the preparation of a management plan. As for the CMAs, it is too early to offer any assessment to what degree they will be able to affect the coordination of NRM programs and policy.

The nature of the issues catchment management institutions are required to address has been widened to include coastal protection and marine environments, among others (e.g., CoA, 2003; NSW, 2003b), whereas catchment management has been known as having, traditionally, a rural focus (Macpherson, 1997; Bellamy et al., 2002). As discussed earlier (e.g., in choice rules above), catchment management institutions such as CMBs and CMAs have also adopted a more strategic focus, concentrating in priority and targeted issues.

Before discussing changes in the geographic domains of the institutions analysed, it is important to understand that, despite being a logical geographical unit, particularly to water-related problems, catchment boundaries hardly ever coincide with ecological regions, administrative jurisdictions, or cultural and social units of organisation (Kauffman, 2002; Lane et al., 2004b; O'Neil, 2005; Brunckhorst and Reeve, 2006). This poses significant problems to collaborative governance, e.g., whereas the catchment may encompass hydrological causes and effects, socio-economic or other causes and effects may not be included (e.g., Blomquist and Schlager, 2005).

The geographical domain of the institutions analysed has shifted from more localised to regional scales. At T_1 , the area of operation of many CMCs covered mostly discrete catchment areas. The NSW catchment management review concluded that the scale of those CMCs was too small to benefit from economies of scale or to achieve strategic focus (AACM, 1996; Anonymous, n.d.). In addition, operating primarily on a small-project basis, CMCs were, in many cases, said to address the symptoms rather than the causes of NRM issues. Consequently, the CMCs were not able to address issues of regional, state or national significance (AACM, 1996). The area of catchment management institutions has, accordingly, been enlarged, at T_2 and T_3 , to encompass large regional areas (Figure 5-1). The Southern Rivers CMA, for example, encompasses an area which was once the responsibility of 6 CMCs (Figure 5-2). Changes in the geographical domain have, therefore, sought to achieve a more regional and strategic focus. With many CMBs and, subsequently, CMAs operating over larger areas, issues and government priorities, such as biodiversity and vegetation management would be addressed at a more appropriate scale.

Please see print copy for image

Figure 5-1: Change in the geographical domain of catchment management institutions in New South Wales (east to the Great Dividing Range).

Please see print copy for image

Figure 5-2: The area of the Southern Rivers CMA and the areas of the former CMCs and CMBs

As a consequence of the larger area of operation of catchment management institutions, the number of catchment management institutions in NSW was reduced from over 40 CMCs, in the 1990s, to the current 13 CMAs. The amalgamation of the CMCs areas into larger catchment entities was perceived by some participants as a challenge to the sense of local identity, which recognised the particular circumstances of the catchment. The comment of a participant on the proposition to enlarge the areas of the CMCs is illustrative (HCMC, n.d.):

“... [We] must think carefully about joining Georges and Cooks Committees... Their manifest problems would condemn us to never achieving a thing until our catchment was as bad as theirs.”

Likewise, questions were raised on the capacity of the broader and strategic focus of the Southern CMB to consider the management of local resources, as opposed to the detailed and locally focused work of the Illawarra CMC (Arcioni, 2001). Enlarging the geographic domain raises naturally the chances of overlooking local problems, as the potential complexity that large areas encompass may mean that not all issues and interactions can be taken into account (Blomquist and Schlager, 2005).

Change in the geographic domain also affects the distribution of power (Ribot, 2004; Lebel et al., 2005). Scale choices can be used as a means of inclusion or exclusion, as they alter the access to resources and decision-making, and, consequently,

determining the relevant actors to be part of the process (Lebel et al., 2005). In this context, the enlargement of the geographic domain of the institutions analysed suggests that powers have been moved away from local arenas. While the principle of “subsidiarity” calls for decisions over NRM to be made at the lowest possible political-administrative level – the level closer to those affected by decision-making –, such principle is, in general, not followed in NRM decentralisations (Ribot, 2004).

The scope rules change, in terms of functional scope and geographical domain, can affect other institutional rules, such as choice, aggregation, information and payoff rules. As discussed above, a broader geographic domain entails choices available to catchment management institutions to apply to larger spatial areas, and affect outcomes of regional, state and local significance. On the other hand, larger areas of operation can pose challenges to: achieving accountable and representative participation of potentially more diverse populations and stakeholders; communicating and interacting with these populations and stakeholders; and, aggregating their preferences into decision-making. In terms of accountability, representation and participation, some political or administrative jurisdictions may be too large to be considered local (Ribot, 2004). Likewise, a larger geographical domain and functional scope for catchment management institutions increases the demand for human and financial resources to carry out actions and activities, affecting thus payoff rules.

5.5 Understanding Institutional Change: From Constrained Collaboration towards Deconcentration

The evaluation of the NSW catchment management initiative has shown how institutional arrangements have been limited in facilitating collaborative NRM and how institutional change has, in many cases, reinforced the constraints to collaborative processes. These institutional changes also suggest an emerging trend from collaboration towards deconcentration of NRM, a significant issue arising from the analysis.

Despite the constrained arrangements, the CMCs were the institutions that best reflected the principles of collaborative NRM, whereas the CMAs largely conform to those of deconcentration. Deconcentration is a form of administrative decentralisation by which responsibilities are transferred to local/regional branches of the central government, such as regional offices of state government agencies (Agrawal and Ribot,

1999; Ribot, 2002b, a). These entities are local/regional administrative extensions of the central state, which may have some downward accountability built into their functions, but the primary responsibility is to central government (Ribot, 2002b).

In this regard, deconcentration to regional branches of government departments and agencies is not very different from decentralisation to statutory authorities whose members are “hand-picked” by, and upwardly accountable to the Minister. Deconcentration is a weak form of decentralisation, as deconcentrated institutions lack some of the local accountability that theorists believe is key to make decentralisation work (Ribot, 2004). As demonstrated in other NRM initiatives (e.g., Ribot, 2002b, 2004), if CMAs are not downwardly accountable to catchment populations, as they seem to be to the Minister of the government of the day, decentralisation will not result in more effective, equal and democratic NRM. Whereas the CMAs, as agents of the NSW and federal governments, may have the capability to deliver more, particularly in terms of on-ground outcomes (to certain individuals, groups and sectors), the current arrangements are, however, unlikely to produce the presumed benefits of decentralisation and public participation.

Several issues may account for the constrained process observed and the move towards deconcentration. Some possibilities related to institutional design and change, paradoxes of collaborative NRM, and the politics of decentralisation are examined below.

5.5.1 Institutional Design and Change

The constraints to collaborative NRM examined in the NSW initiative can be related to poor design and the configural nature of institutional rules. For example, changes in boundary rules aimed to increase the level of skills and knowledge among participants of catchment management institutions; on other hand, they excluded the participation of diverse interests, key to collaborative processes. If inclusiveness were to be pursued, building the capacity of the participants (i.e., empowering the participants to participate effectively in decision-making) would have been a more logical choice.

The institutional rules affecting the catchment management action situation, as noted earlier, work together in a configural manner rather than independently. One set of rules may, through its direct impact on one of the components of the action situation, affect other components of the situation (Ostrom and Crawford, 2005). For example, as

discussed previously, increasing the geographic scope of catchment management institutions (scope rules) in order to achieve more strategic focus, may result in significant challenges in communicating, interacting and aggregating the preferences of potentially more diverse catchment stakeholders and populations (information and aggregation rules), as well as affecting the capacity of the institutions to take action to address local problems (as opposed to regional ones) (choice rules). Likewise, putting in place more stringent reporting and auditing arrangements (information rules), may affect the autonomy and flexibility (choice rules) of these institutions. In this sense, rules change in response to a particular problem or set of problems created “side effects”, i.e., created unintended outcomes (e.g., a new problem or sets of problems) (Ostrom, 1986a; Gregg et al., 1991; Ostrom and Crawford, 2005).

It is also important to recognise that some problems cannot be resolved by changing institutional rules only (Gregg et al., 1991). Mitchell (2005) asserts that “edge problems”, resulting from the fragmentation of responsibilities among authorities and entities, for example, can be reduced, but not eliminated by redesigning institutional arrangements. It is, therefore, unrealistic to think that by establishing a catchment committee, comprising the different parties responsible for NRM, this will automatically entail collaboration among these parties. It will also be necessary to, among other things, nurture organisational cultures and individuals attitudes to encourage collaboration (Mitchell, 2005).

Connor and Dovers (2002), in addressing sustainable development, argue that new types of organisation, on their own, are an approach likely to prove inadequate. Following these authors, in the context of this study, the collaborative rationality, principles and goals must be elaborated within the broader institutional system first. Changing the cultures of existing organisations to employ the new logic is, however, a difficult task, as it involves mainly normative changes, i.e., changes in informal rules, such as cultural norms and social and policy discourses (Connor and Dovers, 2002).

5.5.2 Collaborative NRM Paradoxes

Many of the constraints examined in this study, have arisen as the NSW initiative seemed to be seeking simultaneously disparate, even contradictory goals, which might be, nevertheless, equally important to the resolution of problems in the context of collaborative NRM (Cortner and Moote, 1999). These include, for example,

operating on a large geographic domain that allows for issues of regional importance to be addressed more effectively and, on the other hand, establishing a process that is relevant to local populations; achieving policy consistency in terms of targets, standards and evaluation of outcomes and ensuring autonomy and flexibility, so that catchment management institutions can respond and adapt to new circumstances.

Contradictory elements such as goals of inclusiveness and accountability, expert and open decision-making, bureaucracy and responsiveness, centralisation and decentralisation, and collaborative and political timeframes are regarded as inherent to collaborative NRM (Cortner and Moote, 1999). According to Cortner and Moote (1999) several of these paradoxes concern how to balance collaborative NRM principles with the requirements of decision-making that is politically responsive and publicly accountable.

In order to move towards the resolution of these paradoxes, advocates of collaborative NRM need to recognise and acknowledge them. Following Cortner and Moote (1999), paradoxes can be approached as trade-offs or tensions. In the first case, the paradox is constructed as goals that are competing and mutually exclusive. Trying to approach the paradox in this way will necessarily lead to the dominance of one idea, goal or set of interests over the other, i.e., the problem is not resolved. An alternative is to construct paradoxes in terms of tensions to be balanced, where apparently contradictory elements can be reconciled and achieved simultaneously (Cortner and Moote, 1999).

So far, in the Australian NRM arena, paradoxes appear to have, in many cases, been constructed in terms of trade-offs, where traditional approaches to governance have prevailed at the expense of collaborative processes (see e.g., Darbas, 2004; Boxelaar et al., 2006). Confronting the many paradoxes of NSW catchment management in terms of tensions will require not only a good deal of innovation, but significant change in the prevailing government rationality and practices (which, in turn, may involve intractable paradoxes).

5.5.3 Politics of Decentralisation

Blomquist and Schlager (2005) define politics as the process of allocating and exercising decision-making power. Politics and/or lack of political will are sometimes pointed to as the reasons for failure of collaborative approaches. However, political

challenges such as those concerning the choices about who participates and how, how and to whom participants should be accountable, and the geographic domain of institutions are inherent to catchment management (Blomquist and Schlager, 2005). Rather than simply blaming politics, a more constructive approach is attempting to recognise the nature of politics and how it may prevent success.

Agrawal and Ostrom (2001) state that “the politics of decentralisation” is the most important element in understanding decentralisation, as this determines whether and when it is likely to happen. In this context, it is important to try to understand why central political actors should be willing to give up control over authority, power and resources to local or regional institutions in some instances but not in others (Agrawal and Ostrom, 2001)

This evaluation suggests that despite the rhetoric, NSW and the federal governments still resist genuine collaborative processes, particularly when it implies transfer of adequate authority and powers to regional NRM institutions. As many respondents commented, the government is not capable or willing to “let it go”.

“What would I like to see happening in NSW NRM? Real devolution of power... I don't think they [the government] are willing to devolve power to NRM bodies”.

“...That's because there are factions within the government who don't want to loose their control...”

Research elsewhere has shown that governments usually resist actual decentralised approaches (Agrawal and Ribot, 1999; Agrawal and Ostrom, 2001; Ribot, 2002b; Larson and Ribot, 2004; Ribot, 2004). In the NRM arena, such resistance is reflected in the government's (1) choice of non-representative local institutions, where authority and power are transferred to institutions that are not accountable to local populations, but to the central government; and, (2) the devolution of limited and/or highly controlled authority and power, for example, through excessive oversight and management planning requirements (Ribot, 2004).

The [current] auditing and reporting [for the CMAs] is not about accountability... It's about [government] control”.

In this context, an intriguing question can be raised on why the NSW and federal governments seem to resist genuine transfer of authority and power to NRM

institutions, when, on the other, there appears to be an increasing and strong commitment to decentralisation in Australia, which is reflected in the levels of government funding and the institutionalisation of the process through legislation.

Agrawal and Ostrom (2001) state that governments need to be understood in terms of a set of actors who have different and, perhaps, conflicting objectives as they pursue a diversity of goals, including gaining power. In this regard, decentralisation of NRM is not always the only purpose of governments when they decide on decentralised approaches (Ribot, 2004). Decentralisation can also serve as one of the means for political actors at the central level to gain a greater share of available resources (Agrawal and Ostrom, 2001), as central authorities depend on local institutions for implementation of central agendas, legitimising state projects, incorporating break-away groups and regions, gaining popular support, obtaining an electoral base, cultivating patronage works and so forth (Ribot, 2004). Transfer of authority and power is, therefore, more likely to be expected when the central government find that decentralisation makes it possible to pursue their own goals more effectively (Agrawal and Ostrom, 2001).

Examining the political reasons of decentralisation, beyond the rhetoric, in Australia was outside the scope of this research. However, this may be a subject for considerable conjecture. The regional arrangements could be regarded as means for the federal government to meet their international commitments, in terms of biodiversity and sustainable development (Dale and Bellamy, 1998). Or, as some commentators suggest, the new regional NRM institutional arrangements would have the potential advantage for state and federal governments to shift responsibility for resolving intractable public policy problems from government to a broader range of stakeholders (Head, 2005). In this regard, Lane et al. (2004a) propose that the recent support for decentralised approaches in Australia disguises a retreat from government regulation and intervention on large, multi-scalar, cross-jurisdictional and wicked problems. Agrawal and Ostrom (2001) comment that, in a federal system, central political actors may wish to transfer resources towards lowest levels of administration in an effort to undermine the importance of state level political actors, particularly if a different political party is in power at the state level (Agrawal and Ostrom, 2001). Indeed, many respondents suggested that the regional NRM arrangements in Australia were a strategy used by the federal government to bypass the authority of the state government, as the arrangements allow them to negotiate and fund regional NRM organisations directly. As

for the NSW government, the regional arrangements could be a way to gain support and electoral base from particular stakeholders or sectors. The Southern CMA, for example, is attentive to keeping a record of its outcomes and the corresponding electorate benefited for media release purposes, and that such releases would become increasingly important as the elections approach.

Beyond the conjecture, the politics of NRM decentralisation in Australia presents, on its own, an interesting and important topic for empirical research. Following Agrawal and Ostrom (2001), the trick for advocates of decentralisation will be to align the interests of the federal and NSW governments with efforts to facilitate genuine collaborative approaches, so that local and regional residents are actually involved in NRM decision-making. Understanding such interests is, therefore, important in devising strategies to sustain the current government levels of support to decentralised NRM.

Constraints to collaborative NRM in the NSW catchment management initiative can be related to several issues. Improving institutional design, resolving paradoxes, and understanding the politics of decentralisation, are some of these issues that need to be confronted if collaborative approaches to NRM are to be developed and implemented more effectively.

5.6 Conclusions

In this chapter the question on how institutional design and change have facilitated collaborative NRM, in the context of NSW catchment management initiative, was addressed. The institutional arrangements experimented with in the NSW initiative was, therefore, assessed by using an evaluative framework developed by combining the IAD framework with concepts and principles from the literature on collaborative NRM.

The evaluation demonstrated that the NSW initiative has been characterised by significant institutional limitations. Recent changes, which aimed to improve institutional performance and outcomes have, in many cases, constrained key features of collaborative approaches. Participation, for example, has become limited in terms of inclusiveness and representation; the selection of participants has become more exclusive; authority and power of catchment management institutions have not been truly meaningful and/or independent; aggregating the preferences of catchment actors has become challenging over time, so has communication and interaction with

stakeholders, the general public and other institutions; despite increased levels of resources, institutions may have become constrained by an overdependence on government funding, and the priorities and requirements related to the use of those resources; and the geographical domain has moved from localised to regional scales, which may result in moving decision-making away from local arenas.

The current institutional arrangements used in NSW catchment management conform more to the notion of deconcentration rather than to that of collaboration. This chapter has demonstrated that these arrangements have, therefore, moved away from a collaborative model towards one of deconcentration. Issues related to institutional constraints and the move towards deconcentration were discussed in terms of institutional design, paradoxes of collaborative NRM and politics of decentralisation. In this context, the chapter has also contributed with valuable insights into the challenges and complexities surrounding the development and implementation of collaborative NRM.

Chapter 6

Summary and Conclusions

6.1 Introduction

This chapter provides a summary of the present research and discussion of the limitations of the study, the implications of the findings for policy and practice, as well as recommendations for future research.

6.2 Collaborative Institutions: Rhetoric and Practice

Institutional arrangements for NRM have been changing frequently and rapidly in Australia, particularly in recent years. Changes in these arrangements can be seen as responses to institutional barriers, which prevent the implementation of collaborative NRM policies, programs and practices. These changes – which strive to improve NRM performance and outcomes – have, however, taken place in a context where the precise requirements for institutional change are not well known.

This thesis endeavoured to undertake a critical systematic analysis of the NSW catchment management initiative, the institutional arrangements experimented with over time, and how they have evolved and influenced collaborative processes. The study showed that institutional arrangements, in terms of who participate in NRM decision-making and how they are selected, authority, powers and resources devolved, decision-making and aggregation arrangements, arrangements for communication, interaction, reporting and monitoring, functional scope and geographic domain, varied considerably throughout the history of the NSW catchment management initiative (Chapter 4, Section 4.4).

Despite the variations, institutional arrangements were characterised by significant constraints and have, therefore, been limited in facilitating collaborative NRM. It has been shown that, in many cases, institutional change actually reinforced the constraints to collaborative processes, such as those associated with stakeholder and

citizen engagement, levels of authority and power devolved, and autonomy and flexibility of catchment management institutions (Chapter 5, Section 5.4).

The analysis also provided insights into the challenges and complexities surrounding the development and implementation of collaborative NRM, which are sometimes conceptualised in a simplistic and ambiguous fashion (e.g., Chapter 5, Section 5.5). Another key issue demonstrated in this study was an emerging trend in terms of institutional arrangements in NSW, where the current arrangements have evolved away from a collaborative model towards one of deconcentration (Chapter 5, Sections 5.4 and 5.5).

6.3 Implications for Theory, Policy and Practice

Several implications of this study can be identified for the theory, policy and practice of collaborative NRM. In order to summarise these implications, it is useful to return to the research questions posed in Chapter 3.

What institutional design and change have been tried in the context of NSW catchment management initiative? How and why have institutional design and change occurred?

Addressing the questions above allowed this study to contribute to the development of theoretical approaches to the analysis of NRM. Building on the IAD and related frameworks (e.g., Gregg et al., 1991; Margerum and Born, 2000), this study proposes an integrated approach to systematically describe, analyse and compare institutions, at multiple levels of decision-making and action, over a historical timeframe (Chapter 4, Section 4.2). It contributes, therefore, to the analysis of institutional design and change in evolving policy settings.

The proposed analytical approach offers a useful method for stakeholders, managers, policy-makers and researchers to understand the arrangements governing the structure and process of NRM institutions, which may also be useful when crafting institutions. By “teasing out” the institutional arrangements employed in the NSW initiative (Chapter 4, Section 4.4), this analysis provided insights into the importance for stakeholders and managers to understand how institutions have evolved within a complex and changing policy landscape, which – similar to NSW case – very often takes place in a rather incremental and experimental way.

The use of the analytical framework in combination with sets of criteria derived from the literature (Chapter 5, Section 5.2) proved to be a useful approach to evaluate collaborative NRM institutions (Chapter 5, Section 5.4). This ultimately entails the analyst – be they stakeholders, managers, policy-makers or researchers – to identify forms of interventions to improve institutional arrangements.

Further implications from the examination of the questions above, that are common to the following research question, are discussed below.

How have institutional design and change, in the context of NSW catchment management initiative, facilitated collaborative NRM?

Investigating how institutional design and change have helped facilitate collaborative NRM, entailed this study to provide insights into some of the simplifications and ambiguities of the literature on collaborative NRM (e.g., achieving broad-based inclusion and accountable representation, devolution of meaningful power and authority, and defining appropriate focus and scales for NRM). Several concepts and principles of collaborative NRM need to be reframed in the light of the complexities, unresolved paradoxes and operational dilemmas, poorly understood institutional constraints, as well as the context-dependent policy landscape in which institutional design and change occurs, as discussed below.

An interesting contribution of this study to the common-pool resources literature relates to the criteria for evaluating collaborative NRM developed in Chapter 5. Such criteria can also be seen in terms of “design principles” for *complex* collaborative NRM institutions, such as catchment management.

Following Ostrom (1990), design principles refer, in this study, to essential conditions that help account for institutional success in moving towards more collaborative forms of decision-making and action. Complex NRM institutions – or complex environmental commons, as referred to by Kauneckis and Imperial (2005) – are institutions that feature, among other characteristics, a complexity of organisational networks responsible for rule making. In these institutions, rules design is the responsibility of a number of formal political organisations, courts, regulatory agencies, and civil society actors, as opposed to individual users, as observed in the local simple-use commons much examined in the Common-Pool Resource literature (Kauneckis and Imperial, 2005).

The governance of complex NRM institutions requires, therefore, the development of broad sets of rules, which entail collaborative decision-making and action among multiple organisations with different mandates, jurisdictions and policy goals (Kauneckis and Imperial, 2005). The design principles based on Ostrom's categories of institutional rules proposed below (Table 6-1), may prove useful in guiding stakeholders, managers and policy-makers in crafting institutional arrangements for complex collaborative NRM institutions, such as those analysed in this thesis.

Table 6-1: Design principles for complex collaborative NRM institutions

<p>1. Representative and inclusive participation (position rules)</p>	<p>Participants (individuals and/or organisations) in complex collaborative NRM institutions comprise representatives of relevant government and non-government stakeholders and local populations most likely to be affected by the exercise of decision-making authority.</p>
<p>2. Open, legitimate and democratic processes for selecting participants (boundary rules)</p>	<p>The selection of participants for complex collaborative NRM institutions is deemed to be open, legitimate and democratic. The selection of participants must also allow for representative and accountable participation.</p>
<p>3. Transfer of meaningful and independent authority (choice rules)</p>	<p>Complex collaborative NRM institutions are assigned with meaningful and independent authority to affect NRM outcomes. Such authority includes the authority to create and modify rules, make decisions, implement and ensure compliance of rules, and adjudicate disputes.</p>
<p>4. Aggregation of actors' preferences, values and needs (aggregation rules)</p>	<p>Decision-making arrangements in complex NRM institutions strive to aggregate the preferences, values and needs of those most likely to be affected by the exercise of authority. The concerns of a wide range of stakeholders are, therefore, recognized and incorporated into decision-making.</p>
<p>5. Communication, interaction, reporting and monitoring (information rules)</p>	<p>Complex collaborative NRM institutions present arrangements for communicating and interacting with government and non-government stakeholders and local populations, which reinforce legitimate representation and accountability (both upwardly and downwardly), and entail mechanisms for reporting and monitoring performance and outcomes.</p>
<p>6. Adequate support and resources (payoff rules)</p>	<p>Adequate resources (e.g., funding and staff arrangements) and support (e.g., administrative, technical etc.) are available to allow complex collaborative institutions to exercise their authority.</p>
<p>7. Well defined functional and geographic scopes (scope rules)</p>	<p>Complex collaborative NRM institutions seek to address NRM problems comprising, in general, inter-related sets of environmental and socio-economic problems. Complex collaborative NRM institutions have clearly defined geographic boundaries, e.g., watersheds, sub-watersheds or bioregions comprising the geographical domain.</p>

Specific rules will vary from institution to institution, as institutions are context-dependent, and there are multiple possibilities in terms of rules (and their configuration) to achieve a given outcome. For instance, there are a number of possible boundary rules that can be used to select participants, e.g., election, self-nomination, appointment etc. These design principles offer, nevertheless, guidance when crafting such rules. Whatever the rules chosen, it is important that they are seen as open and legitimate, and that the selected participants be representatives of, and accountable to, those most likely to be affected by the exercise of the institution's authority. Given the configurational nature of the rule categories, institutional design and change must be considered in the context of the relationship between the rule categories.

In using the design principles, it is important to be cognisant of the challenges surrounding the design of collaborative institutional rules, as demonstrated in Chapter 5. Complex NRM institutions feature nested in multifaceted and – in many cases uncertain – environmental, socio-economic and political contexts, where institutional design and change occur in a rather experimental and incremental form, as observed for catchment management in NSW.

It is also important to recognise that this list of principles is somewhat speculative in nature – though many of them constitute lessons learned from empirical studies (see Chapter 5, Section 5.2). Future research must test, reformulate and refine these principles in the context of other NRM initiatives. It is still not well understood how collaboration is more likely to occur where complex NRM institutions feature these principles. This is basically because the institutional reforms in the area of NRM, in general, are failing to establish the conditions believed to make collaboration happen (e.g., Larson and Ribot, 2004). In this context, how complex collaborative NRM institutions may result in on-ground outcomes (i.e., improved socio-economic and environmental conditions), remains one of the most challenging issue requiring attention in the field of NRM.

Other implications of this study for policy and practice have been addressed in Chapter 5, such as those related to the deconcentrated mode of NRM emerging in NSW, and the paradoxes and “politics” of collaborative NRM. They are recapped below:

- (1) The emerging deconcentrated approach in the NSW catchment management experiment is unlikely to deliver the “goods” of democratic decentralisation and public participation. In addition to accountability to federal and NSW

governments, downward accountability needs to be established. This will, among other things, involve achieving representative participation and transferring adequate authority and powers to catchment management institutions (i.e., CMAs).

- (2) The prevailing government procedures and practices do not fit the collaborative rationality. In addition to (re)designing more appropriate collaborative arrangements, normative changes, i.e., changes in informal rules, such as cultural norms and policy discourses within the broader institutional system, will accordingly be necessary.
- (3) The paradoxes identified in the NSW experience, which are inherent to collaborative NRM, will need to be acknowledged and, where possible, confronted in the form of tensions (rather than trade-offs), in order to seek to balance those apparently contradictory elements (e.g., policy consistency and autonomy/flexibility, expert decision-making and inclusiveness, etc.).
- (4) The alternative and multiple political reasons behind decentralised, collaborative NRM need to be understood in order to devise strategies to sustain and/or increase government support to decentralised NRM. Aligning NSW and federal government interests with efforts to facilitate genuine collaborative approaches will be a difficult task.

Moving beyond the prescriptive nature of the implications outlined above, each of which involves significant complexities and (some of them, perhaps intractable) challenges, it is important to seriously consider the adequacy and appropriateness of collaborative approaches. As discussed in Chapter 5, defining who should participate and how, the criteria for selecting participants, how and to whom they should be accountable, the level of authority, powers and resources that should be devolved, the focus and the geographic domain of a collaborative effort warrant substantial theoretical, practical and, in particular, political consideration. The development and implementation of collaborative NRM are also influenced by factors external to the “model”, the multiple and alternative political reasons behind decentralisation, and the

larger political economy in which institutional design and change is embedded (Larson and Ribot, 2004).

The limitations of the NSW institutional arrangements in facilitating collaborative approaches are partly due to the failure to appreciate and address these complexities. Again, elsewhere many policy reforms in the name of decentralised, collaborative efforts are taking place, similar to the NSW experience, in a manner that does not establish the conditions that theorists believe will deliver positive outcomes (Ribot, 2004). Ribot (2002b) argues that implementation of actual decentralised approaches is not happening.

In this context, the adequacy and appropriateness of developing and implementing collaborative policies and programs indiscriminately across NSW as well as nation-wide (e.g., the NHT), is questionable. This study corroborates the view that collaborative approaches are only appropriate under certain conditions, they are complex and involve high transaction costs, and therefore should not be assumed as always necessary or desirable. It is unlikely that all regions across NSW or Australia will equally have the necessary conditions to engage in a collaborative effort (Jennings and Moore, 2000; Lane et al., 2004b). Indeed, similar issues examined in this study have been encountered in other parts of Australia (e.g., Jennings and Moore, 2000; Paton et al., 2004; Farrelly, 2005; Moore and Rockloff, 2006).

Without a strategy to address the complexities and thorny issues surrounding collaborative NRM, efforts aimed at improving the system are unlikely to succeed. Collaborative NRM must be based on a careful analysis of its need and adequacy in a particular context (Hooper et al., 1999). It is, therefore, very difficult to construct “hard” formulae for successful collaborative efforts (e.g., Leach and Pelkey, 2001). Collaborative approaches need to be prescribed and applied selectively (McCloskey, 2001).

6.4 Limits of the Study

In order to put the study’s findings into context, some clarification on the limited frame of the study is warranted. Some of the limitations and excluded areas of research were pointed earlier in Chapter 3. Others were realised in the course of the research.

The research explicitly focused on challenges to collaborative processes, whereas the factors facilitating such processes were given limited attention. For

example, catchment management/NRM, despite the constrained institutional context, is believed to have accomplished positive outcomes, such as (e.g., AACM and CWPR, 1995; AACM, 1996; Bellamy and Johnson, 2000; Paton et al., 2004):

- enhanced integration across state agencies and between state and federal governments;
- establishment of partnerships and capacity building among regional stakeholders;
- promotion of communication across sectoral and community interests;
- provision of structures that foster cooperation among community and industry groups and government organisations;
- facilitation of efforts across government, industry, and community organisations;
- integration of collaborative NRM principles into local government planning;
- provision of effective community fora for discussing and progressing catchment issues;
- achievement of on-ground outcomes at a significant discount to costs incurred by public sector project managers;
- promotion of environmental awareness and education; and,
- increased area of influence of stakeholders with government and the community.

Future studies that examine simultaneously how institutional arrangements facilitate and constrain collaborative NRM would be useful. In this way, insights into the advantages and disadvantages of particular sets of institutional arrangements can be gained.

Another qualification was the emphasis on the institutional rules subject to government domain. Factors such as the social context have been widely acknowledged as critical in determining decision-making processes and collective action (e.g., Lubell, 2003; Leach and Sabatier, 2005). Such contexts include networks of civic engagement, norms of reciprocity, and trust, which define social capital (Putnam, 1993, 2000; Ostrom and Ahn, 2003), as well as values, preferences, and beliefs of the actors (Sabatier and Jenkins-Smith, 1999). Future research on the influence of the informal

social rules, the social context and the actor's behaviour, particularly, in a constrained institutional context such as the one investigated in this thesis, would be beneficial.

The regional NRM policy environment in Australia comprises a complex system, which includes a number of nested planning activities being undertaken concurrently across a range of functional scales (e.g., federal, state, regional, local) and across several dimensions (e.g., social, economic, environmental, institutional) (Bellamy and McDonald, 2005). In terms of institutional analysis, as noted in Chapter 2, NRM action arenas/situations are connected not only hierarchically, but simultaneously and sequentially to other action arenas/situations. Future studies that examine the relationships between catchment management and these other arenas would be helpful.

6.5 Recommendations for Further Research

In terms of the IAD framework, this study focused on the collective-choice level. Future studies would complement the current research if they examined the constitutional-choice level, i.e., the policy level where the arrangements analysed here were designed and changed, and the operational-choice level, which operates under the institutional rules designed and changed by the collective-choice level.

At the policy level (i.e., constitutional-choice level), it would be important to examine, as mentioned in Chapter 5, what rationalities, political reasons and interests are behind the current "push" for decentralised regional NRM, and how the regional arrangements serve to advance the NSW and federal governments' interests. What are the actual political drivers for decentralised NRM at the state and federal level? This would provide further insights into the way the current arrangements have been designed.

Assuming that the current arrangements will not change in the near future (e.g., after the 2007 March NSW State elections), it would be very interesting to see how the institutional arrangements devised by the CMAs affect the operational level. More specifically, how will such arrangements determine who participates and how in the implementation of plans and programs, what resources are transferred to these participants, accountability mechanisms used, and so forth, and, most importantly, how will these arrangements facilitate or constrain collaborative approaches on the ground? For example, plans, programs and activities are usually implemented through "partnerships" between the CMAs and local groups, industry and local and state

authorities. Who is getting involved in these partnerships, those who have the required resources to become a partner, or any party willing to participate? Implementation of programs also involves competitive tendering processes. Under such processes, where are investments being allocated, in areas needing action or in those areas that have the partners ready to participate? In general, partnerships are celebrated under contracts. Under those contracts what levels of decision-making and action are transferred to local actors? The current arrangements also emphasise the delivery of on-ground outcomes. How do such outcomes assist in addressing complex NRM problems, requiring attitudinal and behavioural change?

Last, as suggested above, it would be useful if future research tested, reformulated and refined the “design principles” proposed in Section 6.3. Research should also focus on how (and if) collaboration are more likely to occur when complex NRM institutions present such principles, and, eventually, how collaborative NRM institutions result in improved on-ground outcomes.

6.6 Concluding Remarks

The present study undertook an institutional analysis of collaborative NRM in the context of the NSW catchment management initiative. It provides an important contribution towards a better understanding of how institutional arrangements may constrain collaborative processes, the institutional requirements for implementing collaborative NRM, and the direction where NRM management is progressing in terms of institutional arrangements in NSW. Given that collaborative approaches may involve significant complexities and challenges, and may be appropriate only under certain conditions, the question on the adequacy and appropriateness of indiscriminately pursuing collaborative NRM has been considered.

References

- AACM, 1996. Review of Catchment Management in New South Wales. Final Report, Department of Land and Water Conservation, Sydney.
- AACM and CWPR, 1995. Enhancing the Effectiveness of Catchment Management Planning. Final Report for the Department of Primary Industries and Energy, AACM and Centre for Water Policy and Research.
- Agrawal, A. and Ostrom, E., 2001. Collective Action, Property Rights, and Devolution of Forest and Protected Area Management. In: R. Meinzen-Dick, A. Knox and M.D. Gregorio (Editors), *Collective Action, Property Rights, and Devolution of Natural Resource Management: Exchange of Knowledge and Implications for Policy*, Proceedings of the International Conference, Puerto Azul, The Philippines. 21-25 June 1999. Published by DSE/ZEL, Feldanfang, Germany, pp. 75-109.
- Agrawal, A. and Ribot, J., 1999. Accountability in Decentralization: A Framework with South Asian and West African Cases. *The Journal of Developing Areas*, 33: 473-502.
- Anonymous, 1997. Outcomes of the Review of Total Catchment Management in NSW, New South Wales State Government.
- Anonymous, n.d. Total Catchment Management Review - Questions and Answers.
- Arcioni, E., 2001. Can Catchment Management Deliver Coordination of Natural Resource Management in New South Wales? A Study of the Regulatory Regimes Applicable to the Management of the Lake Illawarra Catchment and the Operation of the Catchment Management Regime in that Area. *The Australasian Journal of Natural Resources Law and Policy*, 7(2): 169-195.
- Armitage, D., 2005. Adaptive Capacity and Community-Based Natural Resource Management. *Environmental Management*, 35(6): 703-715.
- Bellamy, J. (Editor), 1999. Evaluation of Integrated Catchment Management in a Wet Tropical Environment: Collected Papers of LWRRDC R&D Project CTC7. CSIRO, Brisbane.
- Bellamy, J. (Editor), 2005. Regional Natural Resource Management Planning: The Challenges of Evaluation as Seen Through Different Lenses. The State of Queensland, Department of Natural Resources and Mines, Brisbane, 68 pp.
- Bellamy, J. and Johnson, A.K.L., 2000. Integrated Resource Management: Moving from Rhetoric to Practice in Australian Agriculture. *Environmental Management*, 25(3): 265-280.

- Bellamy, J. and McDonald, G.T., 2005. Through Multi-Scaled Lenses: A Systems Approach to Evaluating Natural Resource Management Policy and Planning. In: J. Bellamy (Editor), *Regional Natural Resource Management Planning: The Challenges of Evaluation as Seen Through Different Lenses*. The State of Queensland, Department of Natural Resources and Mines, Brisbane, pp. 3-26.
- Bellamy, J., McDonald, G.T., Syme, G.T. and Butterworth, J.E., 1999. Evaluating Integrated Resource Management. *Society and Natural Resources*, 12: 337-353.
- Bellamy, J., Ross, H., Ewing, S. and Meppem, T., 2002. *Integrated Catchment Management: Learnings from the Australian Experience for the Murray-Darlin Basin*. Overview Report, CSIRO Sustainable Ecosystems, Canberra.
- Bellamy, J., Walker, D.H., McDonald, G.T. and Syme, G.T., 2001. A System Approach to the Evaluation of Natural Resource Management Initiatives. *Journal of Environmental Management*, 63: 407-423.
- Blomquist, W. and Schlager, E., 2005. Political Pitfalls of Integrated Watershed Management. *Society and Natural Resources*, 18: 101-117.
- Born, S.M. and Genskow, K.D., 2001. *Toward Understanding New Watershed Initiatives. A Report from the Madison Watershed Workshop July 20-21, 2000*, University of Wisconsin-Madison, Madison, Wisconsin.
- Born, S.M. and Sonzogni, W.C., 1995. Integrated Environmental Management: Strengthening the Conceptualization. *Environmental Management*, 19(2): 167-181.
- Boxelaar, L., Paine, M. and Beilin, R., 2006. Community Engagement and Public Administration: Of Silos, Overlays and Technologies of Government. *Australian Journal of Public Administration*, 65(1): 113-126.
- Bromley, D.W. (Editor), 1992. *Making the Commons Work: Theory, Practice and Policy*. Institute for Contemporary Studies, San Francisco, 339 pp.
- Brunckhorst, D. and Reeve, I., 2006. A Geography of Place: Principles and Application for Defining 'Eco-Civic' Resource Governance Regions. *Australian Geographer*, 37(2): 147-166.
- Buck, S., 1999. Contextual Factors in the Development of State Wildlife Management Regimes in the United States of America. *Journal of Environmental Policy and Planning*, 1: 247-259.
- Burton, J.R., 1985. *Development and Implementation of Total Catchment Management Policy in New South Wales - A Background Paper*, NSW Soil Conservation Service, Sydney.
- Burton, J.R., 1986. *The Total Catchment Management Concept and its Application in New South Wales*, Hydrology and Water Resources Symposium. Griffith University, Brisbane, pp. 307-311.

- Burton, J.R., 1992. Catchment Management in Australia - A Historical Review, Catchments of Green - a National Conference on Vegetation and Water Management. Greening Australia, Adelaide, pp. 1-8.
- Cairns, J. and Crawford, T.V. (Editors), 1991. Integrated Environmental Management. Lewis Publishers, Chelsea, 214 pp.
- Carlsson, L. and Berkes, F., 2005. Co-Management: Concepts and Methodological Implications. *Journal of Environmental Management*, 75: 65-76.
- Cicin-Sain, B. and Knecht, R.W., 1998. Integrated Coastal and Ocean Management - Concepts and Practice. Island Press, Washington, DC, 517 pp.
- CMAs, 2005. Catchment Management Authority Annual Report 2004/05, Catchment Management Authorities, Sydney.
- CoA, 1999a. Illawarra Catchment Management Committee's Submission to the Inquiry into Catchment Management, House of Representatives Standing Committee on the Environment and Heritage, Canberra.
- CoA, 1999b. Prof. John R. Button's Submission to the Inquiry into Catchment Management, House of Representatives Standing Committee on the Environment and Heritage, Canberra.
- CoA, 2000. Co-ordinating Catchment Management - Report of the Inquiry into Catchment Management, House of Representatives Standing Committee on Environment and Heritage, Canberra.
- CoA, 2002. Framework for the Extension of the Natural Heritage Trust, [online] <www.nht.gov.au>, accessed 2005.
- CoA, 2003. NHT Bilateral Agreement Between the Commonwealth of Australia and the State of New South Wales, Commonwealth of Australia.
- CoA, 2004a. National Action Plan for Salinity and Water Quality Annual Report 2002-2003, [online] <<http://www.napswq.gov.au>>, accessed 2006.
- CoA, 2004b. Natural Heritage Trust Annual Report 2002-03, [online] <<http://www.nht.gov.au>>, accessed 2005.
- CoA, 2004c. Regional Programs Report 2003-2004, Commonwealth of Australia, Canberra.
- CoA, 2005a. 2002-2003 Australian Government Envirofund Projects, [online] <<http://www.nht.gov.au/envirofund/2002-2003/index.html>>, accessed 2006.
- CoA, 2005b. Natural Resource Management Funding: Governments and Communities Investing Wisely in the Management of Our Natural Resources, [online] <www.nrm.gov.au>, accessed 2005.

- CoA, 2006. Report on Operations of the National Landcare Programme 2002-2003 and 2003-2004, Department of Agriculture, Fisheries and Forestry, Canberra.
<http://www.daffa.gov.au>
- Conacher, A. and Conacher, J., 2000. Environmental Planning and Management in Australia. Oxford University Press, Melbourne, 460 pp.
- Conley, A. and Moote, A., 2001. Collaborative Conservation: A Literature Review, Udall Center for Studies in Public Policy, The University of Arizona, Tucson.
- Conley, A. and Moote, M.A., 2003. Evaluating Collaborative Natural Resource Management. *Society and Natural Resources*, 16: 371-386.
- Connick, S. and Innes, J.E., 2003. Outcomes of Water Policy Making: Applying Complexity Thinking to Evaluation. *Journal of Environmental Planning and Management*, 46(2): 177-197.
- Connor, R. and Dovers, S., 2002. Institutional Change and Learning for Sustainable Development. Working Paper 2002/1, Centre for Resource and Environmental Studies, The Australian National University, Canberra.
- Connor, R. and Dovers, S., 2004. Institutional Change for Sustainable Development. Edward Elgar Publishing, Cheltenham, 251 pp.
- Cortner, H.J. and Moote, M.A., 1999. The Politics of Ecosystem Management. Island Press, Washington, 179 pp.
- Cortner, H.J., Wallace, M.G., Burke, S. and Moote, M.A., 1998. Institutions Matter: The Need to Address the Institutional Challenges of Ecosystem Management. *Landscape and Urban Planning*, 40: 159-166.
- Crawford, S.E.S. and Ostrom, E., 1995. A Grammar of Institutions. *American Political Science Review*, 89(3): 582-600.
- Cullen, P., 2004. Turning the Tide: How Does Science Change Public Policy?, [online] <www.thinkers.sa.gov.au/images/Cullen_World_Water_Day.pdf>, accessed 2005.
- Curtis, A., 2003. The Landcare Experience. In: S. Dovers and S. Wild-River (Editors), *Managing Australia's Environment*. Federation Press, Leichhardt, pp. 442-460.
- Curtis, A. and Lockwood, 2000. Landcare and Catchment Management in Australia: Lessons for State-Sponsored Community Participation. *Society and Natural Resources*, 13: 61-73.
- Dale, A. and Bellamy, J., 1998. Regional Resource Use Planning in Rangelands: An Australian Review. Occasional Paper 06/98, CSIRO Tropical Agriculture, Brisbane.

- Darbas, T., 2004. Reflexive Governance of Urban Catchments: A Case of Deliberative Truncation. Research Paper 1, Urban Policy Program, Griffith University, Brisbane.
- Denzin, N.K. and Lincoln, Y.S. (Editors), 2000. The Handbook of Qualitative Research. Sage, Thousand Oaks, 1065 pp.
- DIPNR, 2003a. Native Vegetation Reform Implementation Group. Final Report, Department of Infrastructure, Planning and Natural Resources, Sydney.
- DIPNR, 2003b. Natural Resource Management Reform: A New Approach to Natural Resource Management, Department of Infrastructure, Planning and Natural Resources, Sydney. <http://dipnr.nsw.gov.au/>
- DIPNR, 2004a. Catchment Management Authorities Information Kit. NSW Department of Infrastructure, Planning and Natural Resources.
- DIPNR, 2004b. Natural Resource Management \$436.5 Million Boost, Media Release - Ministers Office, Sydney.
- DIPNR, 2004c. Natural Resource Management Reform: Natural Resource Commission and Natural Resources Advisory Council, Department of Infrastructure, Planning and Natural Resources, Sydney.
- DLWC, 1999. Strengthening Catchment Management in New South Wales, Department of Land and Water Conservation, Sydney.
- DLWC, 2000. Draft Catchment Management Board Support Package. NSW Department of Land and Water Conservation.
- DLWC, 2002. New Catchment Management Boards, [online] <<http://www.dlwc.nsw.gov.au/care/cmb/index.html>>, accessed 2002.
- Edwards, V.M. and Steins, N.A., 1999. A Framework for Analysing Contextual Factors in Common Pool Resources. *Journal of Environmental Policy and Planning*, 1: 205-221.
- Evans, T.P., Ostrom, E. and Gibson, C., 2002. Scaling Issues with Social Data in Integrated Assessment Modeling. *Integrated Assessment*, 3(2-3): 135-150.
- Ewing, S., 2003. Catchment Management Arrangements. In: S. Dovers and W.-R. Sue (Editors), *Managing Australia's Environment*. The Federation Press, Sydney, pp. 393-409.
- Farrelly, M., 2005. Regionalisation of Environmental Management: A Case Study of the Natural Heritage Trust, South Australia. *Geographical Research*, 43(4): 393-405.
- Farrier, D., 2002. Fragmented Law in Fragmented Landscapes: The Slow Evolution of Integrated Natural Resource Management Legislation in NSW. *Environmental and Planning Law Journal*, 19(2): 89-108.

- Farrier, D., Kelly, A.H.H., Comino, M. and Bond, M., 1998. Integrated Land and Water Management in New South Wales: Plans, Problems and Possibilities. *The Australasian Journal of Natural Resources Law and Policy*, 5(2): 153-185.
- Fidelman, P., Morrison, R.J. and West, R.J., 2005. Development of Watershed Management in New South Wales, Australia: A Coastal Perspective, Coastal Zone 05' Proceedings of the 14th Biennial Coastal Zone Conference, New Orleans, USA.
- Fidelman, P.I.J., Morrison, R.J. and West, R.J., 2004a. Catchment Management Planning in Coastal Areas: Some Preliminary Insights from New South Wales, Australia, Coastal Zone Asia Pacific, Brisbane, Australia, pp. 221-226.
- Fidelman, P.I.J., Morrison, R.J. and West, R.J., 2004b. Coastal Issues in Regional Natural Resource Management Plans: The Case of the New South Wales Catchment Blueprints, Coast to Coast '04, Hobart, Australia.
- Gardner, A., 1999. The Administrative Framework of Land and Water Management in Australia. *Environmental and Planning Law Journal*, 16(3): 212-257.
- Gibson, C., McKean, M. and Ostrom, E. (Editors), 1998. Forest Resources and Institutions. Forests, Trees and People Programme- Forestry Department, Food and Agriculture Organization, Rome.
- Goodin, R.E., 1996. Institutions and their Design. In: R.E. Goodin (Editor), *The Theory of Institutional Design*. Cambridge University Press, New York, pp. 2-53.
- Gray, B., 1989. *Collaborating: Finding Common Ground for Multiparty Problems*. Jossey-Bass, San Francisco, 358 pp.
- Gregg, F., Born, S.M., Lord, W.B. and Waterstone, M., 1991. Institutional Response to a Changing Water Policy Environment, University of Arizona, Water Resources Research Center, Tucson.
- Grumbine, R.E., 1994. What is Ecosystem Management. *Conservation Biology*, 8(1): 27-38.
- Grumbine, R.E., 1997. Reflections on "What is Ecosystem Management". *Conservation Biology*, 11(1): 41-47.
- Gunton, T.I. and Day, J.C., 2003. The Theory and Practice of Collaborative Planning in Resource and Environmental Management. *Environments*, 31(2): 5-19.
- Hannam, I.D., Davis, J.R. and Cocks, K.D., 1986. Implementing Catchment Management Strategies. *Journal of Soil Conservation*, 42(1): 80-82.
- HCMC, n.d. Response from the Hacking Catchment Management Committee to the Total Catchment Management Review.

- Head, B., 2005. Participation or Co-Governance? Challenges for Regional Natural Resource Management. In: R. Eversole and J. Martin (Editors), *Participation and Governance In Regional Development*. Ashgate, Hampshire, pp. 137-154.
- Heathcote, I.W., 1998. *Integrated Watershed Management: Principles and Practices*. John Wiley & Sons, New York, 414 pp.
- Hollingsworth, J.R., 2000. Doing Institutional Analysis: Implications for the Study of Innovations. *Review of International Political Economy*, 7(4): 595-644.
- Hooper, B.P., McDonald, G.T. and Mitchell, B., 1999. Facilitating Integrated Resource and Environmental Management: Australian and Canadian Perspective. *Journal of Environmental Planning and Management*, 42(5): 747-766.
- Howard, C. and Seth-Purdie, R., 2005. Governance Issues for Public Sector Boards. *Australian Journal of Public Administration*, 64(3): 56-68.
- ICLARM and NSC, 1996. *Analysis of Fisheries Co-Management Arrangements: A Research Framework*, International Center for Living Aquatic Resources Management, North Sea Center.
- ICMC, 1997a. *Annual Report 1996/97*, Illawarra Catchment Management Committee, Wollongong.
- ICMC, 1997b. *Illawarra CMC Strategy*, Illawarra Catchment Management Committee, Wollongong.
- ICMC, 1998a. *Annual Report 1997/98*, Illawarra Catchment Management Committee, Wollongong.
- ICMC, 1998b. *Illawarra Catchment Management Committee Annual Report 1997/98*, Illawarra Catchment Management Committee, Wollongong.
- ICMC, 1998c. *Triennial Report 1995/98*, Illawarra Catchment Management Committee, Wollongong.
- ICMC, 1999a. *ICMC Strategy*, Illawarra Catchment Management Committee, Wollongong.
- ICMC, 1999b. *Illawarra CMC Strategy*, Illawarra Catchment Management Committee, Wollongong.
- ICMC, 2000. *Annual Report 1999/2000*, Illawarra Catchment Management Committee, Wollongong.
- ICMC, n.d. *ICMC Background Information*, Illawarra Catchment Management Committee, Wollongong.
- ICMC, undated-a. *ICMC Background Information*, Illawarra Catchment Management Committee, Wollongong.

- ICMC, undated-b. ICMC Policy Register. Illawarra Catchment Management Committee, Wollongong.
- Imperial, M.T., 1999a. Analyzing Institutional Arrangements for Ecosystem-Based Management: lessons from the Rhode Island Salt Ponds SAM Plan. *Coastal Management*, 27: 31-56.
- Imperial, M.T., 1999b. Institutional Analysis and Ecosystem-Based Management: The Institutional Analysis and Development Framework. *Environmental Management*, 24(4): 449-465.
- Imperial, M.T., 2001. Collaboration as an Implementation Strategy: An Assessment of Six Watershed Management Programs. PhD Thesis, Indiana University, 355 pp.
- Imperial, M.T., 2006. Intergovernmental Challenges of Watershed Management: Strategies for Improving Watershed Governance. In: V.I. Grover (Editor), *Water: Global Common and Global Problems*. Science Publishers Inc, Enfield, pp. 297-323.
- Imperial, M.T. and Hennessey, T., 2000. Environmental Governance in Watersheds - The Importance of Collaboration to Institutional Performance. Research Paper Number 18, National Academy of Public Administration, Washington, DC.
- Imperial, M.T. and Yandle, T., 2005. Taking Institutions Seriously: Using the IAD Framework to Analyze Fisheries Policy. *Society and Natural Resources*, 18(6): 493-509.
- Ingram, H.M., Mann, D.E., Weatherford, G.D. and Cortner, H.J., 1984. Guidelines for Improved Institutional Analysis in Water Resources Planning. *Water Resources Research*, 20(3): 323-334.
- Innes, J.E., 1996. Planning Through Consensus Building: A New View of the Comprehensive Planning Ideal. *Journal of the American Planning Association*, 62(4): 460-472.
- Innes, J.E. and Booher, D.E., 1999. Consensus Building and Complex Adaptive Systems: A Framework for Evaluating Collaborative Planning. *Journal of the American Planning Association*, 65(4): 412-423.
- Jennings, S.F. and Moore, S.A., 2000. The Rhetoric Behind Regionalisation in Australian Natural Resource Management. *Journal of Environmental Policy and Planning*, 2: 177-191.
- Jentoft, S., 2004. Institutions in Fisheries: What They Are, What They Do, and How They Change. *Marine Policy*, 28: 137-149.
- Johnson, A.K.L., Shrubsole, D. and Merrin, M., 1996. Integrated Catchment Management in Northern Australia: From Concept to Implementation. *Land Use Policy*, 13(4): 303-316.

- Jønch-Clausen, T. and Fugl, J., 2001. Firming Up the Conceptual Basis of Integrated Water Resources Management. *Water Resources Development*, 17(4): 501-510.
- Kauffman, G.J., 2002. What if... the United States of America Were Based on Watersheds? *Water Policy*, 4: 57-68.
- Kauneckis, D. and Imperial, M.T., 2005. An Institutional Analysis of Collaborative Watershed Management: The Lake Tahoe Case, *Institutional Analysis for Environmental Decision Making: A Workshop*. Fort Collins Science Center, US Geological Survey, Fort Collins, CO, USA.
- Kenney, D.S., 2000. Arguing About Consensus: Examining the Case Against Western Watershed Initiatives and other Collaborative Groups Active in Natural Resources Management, *Natural Resources Law Center, University of Colorado School of Law, Boulder*.
- Kenney, D.S. and Lord, W.B., 1999. Analysis of Institution Innovation in the Natural Resources and Environmental Realm: The Emergence of Alternative Problem-Solving Strategies in the American West. *Research Report, Natural Resources Law Center, University of Colorado School of Law*.
- Kenney, D.S., McAllister, S.T., Caile, W.H. and Peckham, J., 2000. *The New Watershed Source Book: A Directory and Review of Watershed Initiatives in the Western United States*, Natural Resources Law Center, University of Colorado School of Law, Boulder.
- Koontz, T.M., 2005. We Finished the Plan, So Now What? Impacts of Collaborative Stakeholder Participation on Land Use Policy. *The Policy Studies Journal*, 33(3): 459-481.
- Lane, M.B., 1997. Aboriginal Participation in Environmental Planning. *Australian Geographical Studies*, 35(3): 308-323.
- Lane, M.B., 2003. Decentralization or Privatization of Environmental Governance? Forest Conflict and Bioregional Assessment in Australia. *Journal of Rural Studies*, 19: 283-294.
- Lane, M.B., 2005. Public Participation in Planning: An Intellectual History. *Australian Geographer*, 36(3): 283-299.
- Lane, M.B., Cheers, B. and Morrison, T.H., 2005. Regionalised Natural Resource Management in South Australia: Prospects and Challenges of the New Regime. *South Australian Geographical Journal*, 104: 11-25.
- Lane, M.B. and McDonald, G.T., 2005. Community-based Environmental Planning. Operational Dilemmas and Possible Remedies. *Journal of Environmental Planning and Management*, 48(5): 709-731.

- Lane, M.B., McDonald, G.T. and Morrison, T.H., 2004a. An Agonistic View on Regionalism, Decentralisation and Other Silver Bullets: A Response to Thom. *Australian Geographical Studies*, 42(3): 398-403.
- Lane, M.B., McDonald, G.T. and Morrison, T.H., 2004b. Decentralisation and Environmental Management in Australia: a Comment on the Prescriptions of the Wentworth Group. *Australian Geographical Studies*, 42(1): 103-115.
- Lang, R., 1986. Achieving Integration in Resource Planning. In: R. Lang (Editor), *Integrated Approaches to Resource Planning and Management*. The Banff Centre School of Management, Calgary, pp. 27-50.
- Larson, A.M. and Ribot, J.C., 2004. Democratic Decentralization through a Natural Resource Lens: An Introduction. *The European Journal of Development Research*, 16(1): 1-25.
- Leach, W. and Sabatier, P., 2005. Are Trust and Social Capital the Keys to Success? Watershed Partnerships in California and Washington. In: P. Sabatier et al. (Editors), *Swimming Upstream: Collaborative Approaches to Watershed Management*. MIT Press, Cambridge, MA, pp. 233-258.
- Leach, W.D., 2002. Surveying Diverse Stakeholder Groups. *Society and Natural Resources*, 15: 641-649.
- Leach, W.D. and Pelkey, N., 2001. Making Watershed Partnerships Work: A Review of the Empirical Literature. *Journal of Water Resources Planning and Management*, 127(6): 378-385.
- Leach, W.D., Pelkey, N. and Sabatier, P., 2002. Stakeholder Partnership as Collaborative Policy Making: Evaluation Criteria Applied to Watershed Management in California and Washington. *Journal of Policy Analysis and Management*, 21(4): 645-670.
- Lebel, L., Garden, P. and Imamura, M., 2005. The Politics of Scale, Position, and Place in the Governance of Water Resources in the Mekong Region. *Ecology and Society*, 10(2): 18.
- Lovecraft, A., 2005. Water Conflict, Institutions, and the Development of Socio-ecological Capital, IDGECnews. *Institutional Dimensions of Global Environmental Change, International Human Dimensions Programme on Global Environmental Change*, pp. 5-7.
- Lovecraft, A. and Rosenberg, J., 2004. Reevaluating the Effects of Common Pool Resource Institutions: Socioecological Capital, 10th Biennial Conference of the International Association for the Study of Common Property, Oaxaca, Mexico.
- Lubell, M., 2003. Collaborative Institutions, Belief Systems, and Perceived Policy Effectiveness. *Political Research Quarterly*, 56(3): 309-323.

- Lubell, M., 2004. Resolving Conflict and Building Cooperation in the National Estuary Program. *Environmental Management*, 33(5): 677-691.
- Lubell, M., Schneider, M., Scholz, J.T. and Mete, M., 2002. Watershed Partnerships and the Emergence of Collective Action Institutions. *American Journal of Political Science*, 46(1): 148-163.
- Lubell, M.N., 1999. Cooperation and Institution Innovation: The Case of Watershed Partnerships. PhD Thesis, State University of New York, Stony Brook, 194 pp.
- Lunney, D., 2003. A Way Forward, Yes; a Blueprint for a Living Continent, No: A Critical Look at the Wentworht Gropu's Report of November 2002. *Australian Zoologist*, 32(3): 345-350.
- Macpherson, D., 1997. Taking Urban ICM Seriously, 2nd National Workshop on Integrated Catchment Management, Australian National University, Canberra.
- Margerum, R.D., 1995. Examining the Practice of Integrated Environmental Management: Towards a Conceptual Model. PhD Thesis, University of Wisconsin-Madison, 288 pp.
- Margerum, R.D., 1996. Integrated Environmental Management: A Framework for Practice. Occasional Paper No. 9, Centre for Water Policy Research/University of New England, Armidale.
- Margerum, R.D., 1999a. Integrated Environmental Management: Lessons from the Trinity Inlet Management Program. *Land Use Policy*, 16: 179-190.
- Margerum, R.D., 1999b. Integrated Environmental Management: The Foundations for Successful Practice. *Environmental Management*, 24(2): 151-166.
- Margerum, R.D. and Born, S.M., 1995. Integrated Environmental Management: Moving from Theory to Practice. *Journal of Environmental Planning and Management*, 38(3): 371-391.
- Margerum, R.D. and Born, S.M., 2000. A Co-ordination Diagnostic for Improving Integrated Environmental Management. *Journal of Environmental Planning and Management*, 43(1): 5-21.
- Marshall, G.R., 2001. Crafting Cooperation in the Commons: An Economic Analysis of Prospects for Collaborative Environmental Governance. PhD Thesis, University of New England, Armidale, 390 pp.
- Martin, P., Tarr, S. and Lockie, S., 1992. Participatory Environmental Management in New South Wales: Policy and Practice. In: G. Lawrence, F. Vanclay and B. Furze (Editors), *Agriculture, Environment and Society*. MacMillan, Melbourne, pp. 184-207.

- McCloskey, M., 2001. Is This the Course You Want to Be On?: Comments from the Closing Session of the 8th International Symposium on Society and Resource Management. *Society and Natural Resources*, 14: 627-634.
- McDonald, G.T., McAlpine, C.A., Taylor, B.M. and Vagg, A.R., 2004. Criteria and Methods for Evaluating Regional Plans in Tropical Savannas. Stage 1 Report for Project 3.2.1, Bioregional Planning in Tropical Savannas, CSIRO, Brisbane.
- McGuinnis, M.V., Woolley, J. and Gamman, J., 1999. Bioregional Conflict Resolution: Rebuilding Community in Watershed Planning and Organizing. *Environmental Management*, 24(1): 1-12.
- Miles, M.B. and Huberman, A.M., 1994. *Qualitative Data Analysis: An Expanded Source Book*. Sage Publications, Thousand Oaks, CA, 338 pp.
- Mitchell, B., 1986. The Evolution of Integrated Resource Management. In: R. Lang (Editor), *Integrated Approaches to Resource Planning and Management*. The Banff Centre School of Management, Calgary, pp. 13-26.
- Mitchell, B., 1987. A Comprehensive-Integrated Approach for Water and Land Management. Occasional Paper No. 1, Centre for Water Policy Research, University of New England, Armidale.
- Mitchell, B., 1990a. Integrated Water Management. In: B. Mitchell (Editor), *Integrated Water Management: International Experiences and Perspectives*. Belhaven Press, London, pp. 1-21.
- Mitchell, B. (Editor), 1990b. *Integrated Water Management: International Experiences and Perspectives*. Belhaven Press, London, 225 pp.
- Mitchell, B., 2005. Integrated Water Resource Management, Institutional Arrangements, and Land-Use Planning. *Environment and Planning A*, 37: 1335-1352.
- Mitchell, B. and Hollick, M., 1993. Integrated Catchment Management in Western Australia: Transition from Concept to Implementation. *Environmental Management*, 17(6): 735-743.
- Mitchell, B. and Pigram, J.J., 1989. Integrated Resource Management and the Hunter Valley Conservation Trust, NSW, Australia. *Applied Geography*, 9: 196-211.
- Moore, S.A., 2005. Regional Delivery of Natural Resource Management in Australia: Is It Democratic and Does It Matter? In: R. Eversole and J. Martin (Editors), *Participation and Governance in Regional Development*. Ashgate, Hampshire, pp. 121-136.
- Moore, S.A. and Rockloff, S.F., 2006. Organizing Regionally for Natural Resource Management in Australia: Reflections on Agency and Government. *Journal of Environmental Policy and Planning*, 8(3): 259-277.

- Moote, M.A., McClaran, M.P. and Chickering, D.K., 1997. Theory in Practice: Applying Participatory Democracy Theory to Public Land Management. *Environmental Management*, 21(6): 877-889.
- Morrison, T.H., McDonald, G.T. and Lane, M.B., 2004. Integrating Natural Resource Management for Better Environmental Outcomes. *Australian Geographer*, 35(3): 243-258.
- NRC, 2005. Natural Resource Commission Website, [online] <www.nrc.nsw.gov.au>, accessed 2006.
- NSW, 1989. Catchment Management Act, New South Wales, Australia.
- NSW, 1997. Outcomes of the Review of Total Catchment Management in NSW, New South Wales State Government.
- NSW, 1999. Catchment Management Regulation, New South Wales, Australia.
- NSW, 2003a. Catchment Management Authorities Act, New South Wales, Australia.
- NSW, 2003b. Natural Resources Commission Act, New South Wales, Australia.
- NSW, 2003c. Premier Carr Announces \$ 120 million plan to Help Farmers Protect Native Vegetation, News Release, Premier of New South Wales, Australia, Sydney.
- NSW, 2005. Hunter-Central Rivers Catchment Management Authority Regulation, New South Wales, Australia.
- NSWPD, 1999. Government Boards and Committees Guidelines. NSW Premier's Department, Sydney.
- NSWSCS, 1987. Total Catchment Management: A State Policy, NSW Soil Conservation Service, Sydney.
- Oakerson, R., 1990. Analysing the Commons: A Framework, Workshop in Political Theory and Policy Analysis, University of Indiana, Bloomington, IN.
- Oliver, P., 2003. Literature Review: Regional Natural Resource Governance, Collaboration and Partnerships. Technical Report 45, Cooperative Research Centre for Coastal Zone, Estuary and Waterway Management, Brisbane.
- O'Neil, K.M., 2005. Can Watershed Management Unite Town and Country? *Society and Natural Resources*, 18: 241-253.
- Ostrom, E., 1986a. An Agenda for the Study of Institutions. *Public Choice*, 48(1): 3-25.
- Ostrom, E., 1986b. A Method of Institutional Analysis. In: F.-X. Kauffmann, G. Majone and V. Ostrom (Editors), *Guidance, Control, and Evaluation in the Public Sector*. de Gruyter, Berlin, pp. 459-475.

- Ostrom, E., 1990. *Governing the Commons: The Evaluation of Institutions for Collective Action*. Cambridge University Press, New York, 280 pp.
- Ostrom, E., 1999. An Assessment of the Institutional Analysis and Development Framework. In: P. Sabatier (Editor), *Theories of the Policy Process (Theoretical Lenses on Public Policy)*. Westview Press, Boulder, pp. 35-71.
- Ostrom, E., 2005. *Understanding Institutional Diversity*. Princeton University Press, Princeton, 355 pp.
- Ostrom, E. and Ahn, T.K. (Editors), 2003. *Foundations of Social Capital*. Edward Elgar, Cheltenham, 590 pp.
- Ostrom, E. and Crawford, S., 2005. Classifying Rules. In: E. Ostrom (Editor), *Understanding Institutional Diversity*. Princeton University Press, Princeton, pp. 187-215.
- Ostrom, E., Gardner, R. and Walker, J., 1994. *Rules, Games, and Common-Pool Resources*. The University of Michigan Press, Ann Arbor, 369 pp.
- Pannell, D.J., Ridley, A., Regan, P. and Gale, G., 2004. Catchment Management Bodies in Four Australian States: Structures, Legislation, and Relationships to Government Agencies. *CRC for Plant-Based Management of Dryland Salinity*, UWA, Perth, pp. 9.
- Paton, S., Curtis, A., McDonald, G.T. and Woods, M., 2004. Natural Resource Management: Is It Sustainable? *Australian Journal of Environmental Management*, 11: 259-267.
- Patton, M.Q., 2002. *Qualitative Research and Evaluation Methods*. Sage Publications, Thousand Oaks, 598 pp.
- Putnam, R., 1993. *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton University Press, Princeton, NJ, 280 pp.
- Putnam, R., 2000. *Bowling Alone: The Collapse and Revival of American Community*. Simon & Schuster, New York, 544 pp.
- Reeve, I., Marshall, G.R. and Musgrave, W., 2002. *Resource Governance and Integrated Catchment Management*. Issue Paper No. 2, Institute for Rural Futures, University of New England, Armidale.
- Ribot, J.C., 2002a. African Decentralization: Local Actors, Powers and Accountability. Paper No. 8, United Nations Research Institute on Social Development (UNRISD) Programme on Democracy, Governance, and Human Rights, Geneva.
- Ribot, J.C., 2002b. *Democratic Decentralization of Natural Resources: Institutionalizing Popular Participation*, World Resources Institute.

- Ribot, J.C., 2004. Choosing Representation: Institutions and Powers for Decentralized Natural Resource Management, UN Forestry Forum Decentralization Meeting, Interlaken, Switzerland,.
- Rockloff, S.F., 2004. Organising for Sustainable Natural Resource Management: Representation, Leadership and Partnerships at Four Spatial Scales. PhD Thesis, Murdoch University, Perth, 481 pp.
- Rockloff, S.F. and Lockie, S., 2006. Democratization of Coastal Zone Decision Making for Indigenous Australians: Insights from Stakeholder Analysis. *Coastal Management*, 34(3): 251-266.
- Ross, H., Buchy, M. and Proctor, W., 2002. Laying Down the Ladder: A Typology of Public Participation in Australian Natural Resource Management. *Australian Journal of Environmental Management*, 9(4): 205-218.
- Rudd, M.A., 2003. Institutional Analysis of Marine Reserves and Fisheries Governance Policy Experiments - A Case Study of Nassau Grouper Conservation in the Turks and Caicos Islands. PhD Thesis, Wageningen University, The Netherlands, 276 pp.
- Rudd, M.A., 2004. An Institutional Framework for Designing and Monitoring Ecosystem-based Fisheries Management Policy Experiments. *Ecological Economics*, 48(1): 109-124.
- Rudd, M.A., 2005. Assessing the Management Performance of Biodiversity Conservation Initiatives and Investments: An Institutional Approach, Focus on Ecology Research. Nova Science (forthcoming).
- Sabatier, P. (Editor), 1999. *Theories of the Policy Process*. Westview Press, Boulder, CO, 289 pp.
- Sabatier, P. et al., 2005a. Collaborative Approaches to Watershed Management. In: P. Sabatier et al. (Editors), *Swimming Upstream: Collaborative Approaches to Watershed Management*. MIT Press, Cambridge, MA, pp. 3-22.
- Sabatier, P. et al. (Editors), 2005b. *Swimming Upstream: Collaborative Approaches to Watershed Management*. MIT Press, Cambridge, MA, 327 pp.
- Sabatier, P. and Jenkins-Smith, 1999. The Advocacy Coalition Framework: An Assessment. In: P. Sabatier (Editor), *Theories of the Policy Process*. Westview Press, Boulder, CO, pp. 117-166.
- Sabatier, P., Leach, W., Lubell, M. and Pelkey, N., 2005c. Theoretical Frameworks Explaining Partnership Success. In: P. Sabatier et al. (Editors), *Swimming Upstream: Collaborative Approaches to Watershed Management*. MIT Press, Cambridge, MA, pp. 173-199.
- Samuelson, C.D. et al., 2005. Citizen Participation and Representation in Collaborative Engagement Processes. In: P. Sabatier et al. (Editors), *Swimming Upstream:*

- Collaborative Approaches to Watershed Management. MIT Press, Cambridge, MA, pp. 138-169.
- SCMB, 2003a. Annual Report 2002-2003, Southern Catchment Management Board, Sydney.
- SCMB, 2003b. Integrated Management Plan for the Southern Catchment 2002. Southern Catchment Blueprint, Southern Catchment Management Board and NSW Department of Land and Water Conservation.
- SCMB, 2003c. Southern Catchment Blueprint Accreditation Appendix. Draft, Southern Catchment Management Board.
- SCMB, n.d.-a. Southern CMB Website, [online] <www.cmb.org.au>, accessed 2002.
- SCMB, n.d.-b. Southern CMB Website - Contacts, [online] <www.cmb.org.au>, accessed 2004.
- SCMCC, 1992. Total Catchment Management Annual Report 1991/92, State Catchment Management Coordinating Committee, Sydney.
- SCMCC, 1993. Total Catchment Management Annual Report 1992/93, State Catchment Management Coordinating Committee, Sydney.
- SCMCC, 1994. Total Catchment Management Annual Report 1993/94, State Catchment Management Coordinating Committee, Sydney.
- SCMCC, 1995. Total Catchment Management Annual Report 1994/95, State Catchment Management Coordinating Committee, Sydney.
- SCRG, 2005. Meeting Minutes, Shoalhaven Community Reference Group. www.sca.nsw.gov.au/publications/102.html, 25 July 2005.
- Selin, S. and Chavez, D., 1995. Developing a Collaborative Model for Environment Planning and Management. *Environmental Management*, 19(2): 189-195.
- Slocombe, D.S., 1993. Implementing Ecosystem-based Management. *Bioscience*, 43(9): 612-622.
- Sproule-Jones, M., 1999. Restoring the Great Lakes: Institutional Analysis and Design. *Coastal Management*, 27: 291-316.
- SRCMA, 2004. Southern Rivers Catchment Management Authority Website, [online] <[ww.southern.cma.nsw.gov.au](http://www.southern.cma.nsw.gov.au)>, accessed 2004.
- SRCMA, 2005. Southern Rivers CMA Catchment Action Plan (Draft), Southern Rivers Catchment Management Authority, Wollongong.
- SRCMA, n.d. DRAFT 3-Year Investment Strategy (2004/05-2006/07), Southern Rivers Catchment Management Authority, Wollongong.

- Steins, N.A. and Edwards, V.M., 1998. Harbour Resource Management in Cowes, Isle of Wight: An Analytical Framework for Multiple-Use Decision-Making. *Journal of Environmental Management*, 54: 67-81.
- Syme, G.T., Butterworth, J.E. and Nancarrow, B.E., 1993. National Whole Catchment Management - A Review and Analysis of Processes. Consultancy Report No. 93/30 prepared for the Land and Water Resources Research and Development Corporation, CSIRO.
- Taylor-Powell, E., Rossing, B. and Geran, J., 1998. Evaluating Collaboratives: Reaching the Potential, University of Wisconsin-Extension, Cooperative Extension, Madison, Wisconsin.
- Torell, E.C., 2002. From Past to Present: The Historical Context of Environmental and Coastal Management in Tanzania. *Development Southern Africa*, 19(2): 273-288.
- Trachtenberg, Z. and Focht, W., 2005. Legitimacy and Watershed Collaborations. The Role of Public Participation. In: P. Sabatier et al. (Editors), *Swimming Upstream: Collaboratives Approaches to Watershed Management*. MIT Press, Cambridge, Massachusetts, pp. 53-82.
- TWG, 2002. *Blueprint for a Living Continent: A Way Forward from the Wentworth Group of Concerned Scientists*, WWF Australia, Sydney.
- TWG, 2003. *A New Model for Landscape Conservation in New South Wales: The Wentworth Group of Concerned Scientists Report to Premier Carr*, WWF Australia, Sydney. 17.
- Verhoeven, T.J., 1997. Status Report of ICM in New South Wales, 2nd National Workshop on Integrated Catchment Management, Australian National University, Canberra.
- Waage, S., 2003. Collaborative Salmon Recovery Planning: Examining Decision Making and Implementation in Northeastern Oregon. *Society and Natural Resources*, 16: 295-307.
- Wallace, M.G., Cortner, H.J. and Burke, S., 1995. Review of Policy Evaluation in Natural Resources. *Society and Natural Resources*, 8: 35-47.
- Weber, R.P., 1985. *Basic Content Analysis*. Sage University Press Series on Quantitative Applications in the Social Sciences. Sage Publications, Beverly Hills, CA, 95 pp.
- Wild-River, S., 2003. Local Government. In: S. Dovers and S. Wild-River (Editors), *Managing Australia's Environment*. Federation Press, Sydney, pp. 338-362.

- Wondolleck, J.M. and Yaffe, S.L., 2000. Making Collaboration Work - Lessons from Innovation in Natural Resource Management. Island Press, Washington, DC, 277 pp.
- Woodhill, J., 1996. Natural Resource Decision Making: Beyond the Landcare Paradox. *The Australasian Journal of Natural Resources Law and Policy*, 3(1): 91-114.
- Yaffe, S.L., 1998. Three Faces of Ecosystem Management. *Conservation Biology*, 13(4): 713-725.
- Yaffe, S.L. and Wondolleck, J.M., 2003. Collaborative Ecosystem Planning Process in the United States: Evolution and Challenges. *Environments*, 31(2): 59-72.
- Yin, R.K., 2003. *Case Study Research: Design and Methods*. Sage, Thousand Oaks, CA, 181 pp.
- Young, O.R., 2003. Environmental Governance: The Role of Institutions in Causing and Confronting Environmental Problems. *International Environmental Agreements: Politics, Law and Economics*, 3(4): 377-393.
- Young, O.R., 2005. Science Plan - Institutional Dimensions of Global Environmental Change. IHDP Report No. 16, International Human Dimensions Programme on Global Environmental Change, Institutional Dimensions of Global Environmental Change, Bonn.

**Appendix A: Research Approach Information – Relationship
between research questions, variables and data**

Research question: What institutional design and change have been tried in the context of NSW catchment management initiative?

QUESTIONS	VARIABLES*	DATA/INFORMATION
Who have taken part in catchment management institutions?	Position rules: participants in the institutions.	Legislation Government directives Meetings minutes Review/evaluation reports Consultations and interviews
How have participants been selected?	Boundary rules: process for selecting participants.	Legislation Review/evaluation reports Consultations and interviews
What kind of authority has been assigned to institutions?	Choice rules: institutions' roles and functions.	Legislation Meetings minutes Annual reports Management plans Review/evaluation reports Consultations and interviews
What decision-making and aggregation arrangements have been used?	Aggregation rules: decision-making and aggregation arrangements.	Government directives Meetings minutes Annual reports Management plans Review/evaluation reports Consultations and interviews
What have been the arrangements for communication, interaction, reporting and monitoring?	Information rules: arrangements for communication, interaction, reporting and monitoring.	Government directives Meetings minutes Annual reports Management plans Review/evaluation reports Consultations and interviews
What human and financial resources have been available for institutions to exercise their authority?	Payoff rules: human and financial arrangements.	Government directives Legislation Annual reports Investment strategies Review/evaluation reports Consultations and interviews
What functional scope and geographic domain have been adopted for the institutions?	Scope rules: functional scope and geographic domain.	Legislation Meetings minutes Management plans Review/evaluation reports Consultations and interviews

Note: * The elements examined.

Research question: How and why have institutional design and change occurred?

QUESTIONS	VARIABLES	DATA/INFORMATION
What is the context in which collective-choice catchment management institutions have been designed and changed?	Focal events, the primary events that have induced institutional design and change, and the resulting actions, outputs and outcomes.	Legislation Policy statements Media releases Reports Review/evaluation reports Previous research
What focus events have led to institutional design and change?		
What choices have been made and what have been the actions, outputs and outcomes?		

Research question: How have institutional design and change facilitated collaborative NRM?

QUESTIONS	VARIABLES	DATA/INFORMATION
Has participation in catchment management institutions been inclusive?	Position rules: participants in the institutions, inclusiveness.	Legislation Government directives Meetings minutes Review/evaluation reports Consultations and interviews
Have selection processes allowed for representative and accountable participation? Have they been deemed to be legitimate and democratic?	Boundary rules: process for selecting participants, legitimacy, representation.	Legislation Review/evaluation reports Consultations and interviews Previous research
Have institutions had meaningful and independent authority to affect NRM?	Choice rules: institutions' roles and functions, nature of authority and power devolved.	Legislation Meetings minutes Annual reports Management plans Review/evaluation reports Consultations and interviews
Has decision-making sought to aggregate the preferences, values and needs of a wide range of stakeholders?	Aggregation rules: decision-making and aggregation arrangements, public and stakeholder engagement.	Meetings minutes Annual reports Management plans Review/evaluation reports Consultations and interviews
Have arrangements for communication and interaction with stakeholders reinforced legitimate/accountable representation, and entailed mechanisms for reporting and monitoring performance?	Information rules: arrangements for communication, interaction, reporting and monitoring, accountability, public and stakeholder engagement.	Meetings minutes Annual reports Management plans Review/evaluation reports Consultations and interviews
Have the resources available been adequate for institutions to exercise their authority?	Payoff rules: human and financial arrangements.	Annual reports Investment strategies Review/evaluation reports Consultations and interviews
Have institutions addressed multiple and inter-related environmental and socio-economic problems within a place-based domain?	Scope rules: functional scope and geographic domain.	Legislation Meetings minutes Management plans Review/evaluation reports Consultations and interviews

Appendix B: Core Documentation and Archival Records Collected

Legislation/policy statements

- Total Catchment Management: A State Policy, NSW Soil Conservation Service, Sydney, 1987
- Catchment Management Act 1989, New South Wales
- Catchment Management Regulation 1999, New South Wales
- Catchment Management Authorities Act 2003, New South Wales
- Natural Resources Commission Act 2003, New South Wales
- Hunter-Central Rivers Catchment Management Authority Regulation 2005, New South Wales

Government directives/guidelines

- Government Boards and Committees Guidelines. NSW Premier's Department, Sydney (NSWPD, 1999)
- Draft Catchment Management Board Support Package. NSW Department of Land and Water Conservation (DLWC, 2000)
- Catchment Management Authorities Information Kit. NSW Department of Infrastructure, Planning and Natural Resources (DIPNR, 2004a)

Review/evaluation reports

- Development and Implementation of Total Catchment Management Policy in New South Wales - A Background Paper, NSW Soil Conservation Service, Sydney (Burton, J.R., 1985).
- National Whole Catchment Management - A Review and Analysis of Processes. Consultancy Report No. 93/30 prepared for the Land and Water Resources Research and Development Corporation, CSIRO (Syme et al., 1993)
- Enhancing the Effectiveness of Catchment Management Planning. Final Report for the Department of Primary Industries and Energy, AACM and Centre for Water Policy and Research (AACM and CWPR, 1995)
- Review of Catchment Management in New South Wales. Final Report, Department of Land and Water Conservation, Sydney (AACM, 1996)
- Outcomes of the Review of Total Catchment Management in NSW, New South Wales State Government (NSW, 1997)
- Co-ordinating Catchment Management - Report of the Inquiry into Catchment Management, House of Representatives Standing Committee on Environment and Heritage, Canberra (CoA, 2000)
- Integrated Catchment Management: Learnings from the Australian Experience for the Murray-Darlin Basin. Overview Report, CSIRO Sustainable Ecosystems, Canberra (Bellamy et al, 2002)
- Native Vegetation Reform Implementation Group. Final Report, Department of Infrastructure, Planning and Natural Resources, Sydney (DIPNR, 2003a)

Continues...

Continued.

Meeting minutes

Illawarra Catchment Management Committee:

- 1/91 minutes, meeting held on 5 April 1991
- 2/91 minutes, meeting held on 17 May 1991
- 3/91 minutes, meeting held on 21 June 1991
- 4/91 minutes, meeting held on 2 August 1991
- 5/91 minutes, meeting held on 13 September 1991
- 6/91 minutes, meeting held on 25 October 1991
- 7/91 minutes, meeting held on 6 December 1991

- 1/92 minutes, meeting held on 7 February 1992
- 2/92 minutes, meeting held on 3 April 1992
- 3/92 minutes, meeting held on 5 June 1992
- 4/92 minutes, meeting held on 31 July 1992
- 5/92 minutes, meeting held on 25 September 1992
- 6/92 minutes, meeting held on 20 November 1992

- 1/93 minutes, meeting held on 29 January 1993
- 2/93 minutes, meeting held on 26 March 1993
- 4/93 minutes, meeting held on 25 June 1993
- 5/93 minutes, meeting held on 20 August 1993
- 7/93 minutes, meeting held on 10 December 1993

- 2/94 minutes, meeting held on 11 May 1994
- 3/94 minutes, meeting held on 30 June 1994

- 1/95 minutes, meeting held on 3 February 1995
- 2/95 minutes, meeting held on 10 March 1995
- 3/95 minutes, meeting held on 2 April 1995
- 4/95 minutes, meeting held on 21 April 1995
- 5/95 minutes, meeting held on 21 July 1995
- 6/95 minutes, meeting held on 1 September 1995

- 1/97 minutes, meeting held on 7 February 1997
- 2/97 minutes, meeting held on 21 March 1997
- 3/97 minutes, meeting held on 2 May 1997
- 4/97 minutes, meeting held on 13 June 1997
- 5/97 minutes, meeting held on 25 July 1997
- 6/97 minutes, meeting held on 5 September 1997
- 7/97 minutes, meeting held on October 1997

- 1/98 minutes, meeting held on 6 February 1998
- 2/98 minutes, meeting held on 20 March 1998
- 3/98 minutes, meeting held on 1 May 1998
- 4/98 minutes, meeting held on 12 June 1998
- 5/98 minutes, meeting held on 24 July 1998
- 6/98 minutes, meeting held on 11 September 1998
- 7/98 minutes, meeting held on 16 October 1998
- 8/98 minutes, meeting held on 27 November 1998
-

Continues...

Continued.

Meeting minutes (continued)

Illawarra Catchment Management Committee (continued):

- 1/99 minutes, meeting held on 5 February 1999
- 2/99 minutes, meeting held on 12 March 1999
- 3/99 minutes, meeting held on 4 June 1999

- 4/99 minutes, meeting held on 16 July 1999
- 5/99 minutes, meeting held on 27 August 1999
- 6/99 minutes, meeting held on 15 October 1999
- 7/99 minutes, meeting held on 22 November 1999

- 1/00 minutes, meeting held on 4 February 2000
- 2/00 minutes, meeting held on 17 March 2000

Southern Catchment Management Board:

- 1/00 meeting held on 1 September 2000
- 2/00 meeting held on 24 November 2000

- 1/01 minutes, meeting held on 11 January 2001
- 2/01 minutes, meeting held on 8 March 2001
- 3/01 minutes, meeting held on 26 April 2001
- 4/01 minutes, meeting held on 7 June 2001
- 5/01 minutes, meeting held on 6 July 2001
- 6/01 minutes, meeting held on 7 September 2001
- 7/01 minutes, meeting held on 12 October 2001
- 8/01 minutes, meeting held on 23 November 2001

- 1/02 minutes, meeting held on 12 March 2002
- 3/02 minutes, meeting held on 30-31 May 2002
- 5/02 minutes, meeting held on 11 July 2002
- 6/02 minutes, meeting held on 22 August 2002

- 1/03 minutes, meeting held on 6-7 March 2003
- 2/03 minutes, meeting held on 22 May 2003
- 3/03 minutes, meeting held on 14 August 2003
- 4/03 minutes, meeting held on 20-21 November 2003

Southern Rivers Catchment Management Authority:

- 1/04 minutes, meeting held on 31 May 2004
- 2/04 minutes, meeting held on 16-17 July 2004
- 3/04 minutes, meeting held on 6 August 2004
- 4/04 minutes, meeting held on 24 September 2004
- 5/04 minutes, meeting held on 19 November 2004
- 6/04 minutes, meeting held on 9-10 December 2004

- 1/05 minutes, meeting held on 25 February 2005
- 2/05 minutes, meeting held on 18 March 2005
- 3/05 minutes, meeting held on 19 April 2005
- 4/05 minutes, meeting held on 23 June 2005

Continues...

Continued.

Annual reports

- Total Catchment Management Annual Report 1991/92, State Catchment Management Coordinating Committee, Sydney
- Total Catchment Management Annual Report 1992/93, State Catchment Management Coordinating Committee, Sydney
- Total Catchment Management Annual Report 1993/94, State Catchment Management Coordinating Committee, Sydney
- Total Catchment Management Annual Report 1994/95, State Catchment Management Coordinating Committee, Sydney
- Annual Report 1996/97, Illawarra Catchment Management Committee, Wollongong
- Annual Report 1997/98, Illawarra Catchment Management Committee, Wollongong
- Annual Report 1998/99, Illawarra Catchment Management Committee, Wollongong
- Annual Report 1999/2000, Illawarra Catchment Management Committee, Wollongong
- Annual Report 2002-2003, Southern Catchment Management Board, DLWC, Sydney
- Catchment Management Authority Combined Annual Report 2003/04, Catchment Management Authorities, Sydney
- Catchment Management Authority Annual Report 2004/05, Catchment Management Authorities, Sydney

Management plans and strategies

- Illawarra CMC Strategy, Illawarra Catchment Management Committee, Wollongong, 1997
 - Illawarra CMC Strategy, Illawarra Catchment Management Committee, Wollongong, 1999
 - Integrated Management Plan for the Southern Catchment. Southern Catchment Blueprint, Southern Catchment Management Board and NSW Department of Land and Water Conservation, 2002
 - Southern Catchment Blueprint Accreditation Appendix. Draft, Southern Catchment Management Board, 2003
 - Southern Rivers CMA Catchment Action Plan (Draft), Southern Rivers Catchment Management Authority, Wollongong, 2005
 - DRAFT 3-Year Investment Strategy (2005/05-2006-07), Southern Rivers Catchment Management Authority, Wollongong, n.d.
-

Appendix C: Research Consultation and Interview Process Information

Appendix C-1: Stakeholder group consultation

STAKEHOLDER GROUP	NO. OF INDIVIDUALS	BASIS FOR SELECTION	EXAMPLE OF INFORMATION CONTRIBUTED
Chairs of committees/boards and coordinators	6	Participant, leading role in processes and operation of catchment bodies.	“Modus operandi” of catchment management institutions (e.g., development of plans, implementation of programs), their structure and processes (e.g., format of meetings, composition of committees/boards).
Members of committees/boards	7	Participant, representative of different stakeholder groups.	Facts and views on decision-making arrangements, aggregation and information mechanisms.
Staff	7	Participant, employee of government agency/department.	Factual information on the administrative, technical, financial support arrangements; agencies’ views on and support of collaborative NRM.
Government officials	3	Non-participant, knowledgeable observer.	Insights into decision- and policy-making at agency and government levels; views on institutional structure, processes and outcomes.
Academics and researchers	4	Non-participant, knowledgeable observer.	Scholar/technical appraisal of collaborative NRM initiatives; views on institutional structure, processes and outcomes.

Appendix C-2: Key informant interview

INFORMANT	DATE	DURATION*	BASIS FOR SELECTION	EXAMPLE OF INFORMATION CONTRIBUTED
1	30.01.04	1:45	Participant, long-term involvement in NRM.	Challenges in developing and implementing decentralised decision-making processes in NSW.
2	03.02.04	1:00	Knowledgeable non-participant observer, long-term involvement in NRM at high levels of decision-making.	Insights into the interaction of catchment management institutions with higher decision-making and policy levels.
3	26.09.05	2:00	Participant, long-term involvement in NSW community based initiatives, representative of different stakeholder groups, both government and non-government.	Potentialities and challenges to catchment management, e.g., policy and government imperatives, organisational culture etc.
4	06.10.05	0:45	Participant, knowledgeable of administrative and financial arrangements.	Clarification of the financial arrangements, including their strengths and weaknesses.
5	25.11.05	1:00	Participant, history of involvement in community-based NRM, member of key interest groups.	Challenges to promote decentralised and participatory approaches, and community engagement.
6	01.12.05	2:00	Participant, long-term involvement in NSW catchment management/NRM, solid "institutional memory".	Historical perspective on institutional arrangements for NSW.

Note: * in addition to the formal interview time, most of the key informants were contacted several times during the course of the research.

Appendix D: Consent Forms and Research Ethics Clearance



Consent form

I have been given information about the research project entitled *Institutional Analysis of Catchment Management in NSW* by Mr. Pedro Fidelman who is conducting this research as part of a PhD program supervised by Professor John Morrison at the University of Wollongong.

I understand that, if I consent to participate in this project, I will be asked to answer questions about my involvement in and perspectives on Catchment Management and/or other Natural Resources Management initiatives (e.g., coastal management, water management, estuary management), during an interview at a time and location convenient to me. The interview may be recorded, if I give permission to do so. Otherwise, Mr. Fidelman may only take notes for later reference.

I understand that the information I may provide will be considered confidential and anonymous. The summary results may be used for Mr. Fidelman's thesis and associated publications, such as journal and conference papers, and I consent for it to be used in that manner providing my identity is not disclosed.

I understand that my participation in this research is voluntary, I am free to refuse to participate and I am free to withdraw from the research at any time. My refusal to participate or withdrawal of consent will not affect my relationship with the University of Wollongong.

If I have any enquiries about the research, I can contact Mr. Fidelman (on 02 4221 4044) and Prof. John Morrison (on 02 4221 4134). If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Complaints Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on 02 4221 4457.

By signing below I am indicating my consent to participate in the above mentioned research as it has been described to me in the information sheet and in discussion with Mr. Fidelman.

Signed

Date

.....

...../...../.....

Name (please print)

.....

Please also indicate whether you consent that the interview be tape recorded or not:

- I consent that the interview be tape recorded.
- I DO NOT consent that the interview be tape recorded.
- Not Applicable



Consent form

(for the SRCMA Meetings)

The Southern Rivers Catchment Management Authority (SRCMA) has been given information about the research project entitled Institutional Analysis of Catchment Management in NSW by Mr. Pedro Fidelman, who is conducting this research as part of a PhD program supervised by Professor John Morrison, at the University of Wollongong.

I understand that if I – as the Chair of the SRCMA and in consultation with the Board members – consent for Mr. Fidelman to attend the SRCMA meetings, he may take notes during the meetings for future reference. I understand that the information gained from these meetings will be considered CONFIDENTIAL and ANONYMOUS. Such information will be used for the researcher to gain insights into the organisational processes of the Catchment Management Authorities in New South Wales. Only summary results may be included in the thesis document and/or associated journal and conference publications.

I understand that the SRCMA will determine which of its meetings the researcher may or may not attend. The SRCMA will also determine if the researcher may attend the meetings in their full duration or only parts of such meetings.

I understand that the participation of the SRCMA in this research is voluntary. The SRCMA is free to refuse to participate as well as to withdraw from the research at any time. The refusal to participate or withdrawal of consent will not affect the SRCMA (and/or its Board members and staff) relationship with the University of Wollongong.

I understand that enquiries about the research can be directed to Mr. Fidelman (on 02 4221 4044) and Prof. John Morrison (on 02 4221 4134). Concerns or complaints regarding the way the research is or has been conducted, can be directed to the Complaints Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on 02 4221 4457.

By signing below I am indicating the consent of the SRCMA to participate in the above mentioned research as it has been described to the SRCMA in the information sheet and in discussion with Mr. Fidelman.

Signed

Date


.....

...../...../.....

Pam Green, Chair
Southern Rivers Catchment Management Authority

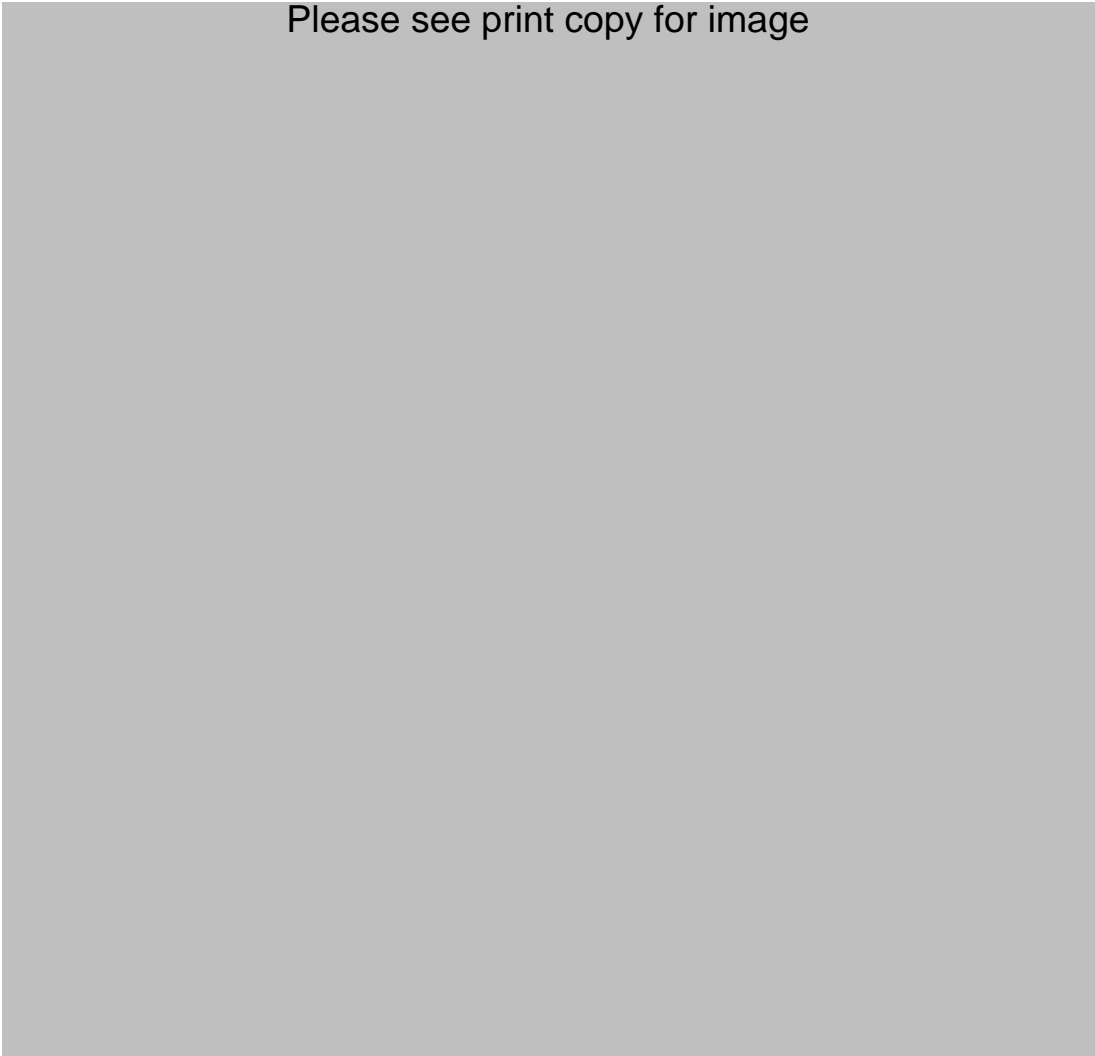


Please see print copy for image

A large, solid grey rectangular area that occupies most of the page, indicating that the content is missing or has been redacted.




Please see print copy for image

A large, solid grey rectangular area that occupies most of the page, indicating that the image content is missing or obscured.



Please see print copy for image

A large, solid grey rectangular area that has been redacted, covering the majority of the page's content.

Appendix E: Interview Guide

Who participate in catchment management institutions? (Position Rules)

- ✓ representation/inclusiveness
- ✓ skills and knowledge
- ✓ how participation compare to other catchment management institutions?
- ✓ things that should be changed

How participants are selected to catchment management institutions? (Boundary Rules)

- ✓ selection process
- ✓ legitimacy of the selection process
- ✓ how the selection of participants compare to other catchment management institutions?
- ✓ things that should be changed

What are the roles of catchment management institutions? (Choice Rules)

- ✓ roles and functions
- ✓ functions beyond their capacity
- ✓ challenges in undertaking the roles (e.g., inadequate resources)
- ✓ autonomy and flexibility (e.g., government priority and requirements)
- ✓ how roles/functions compare to other catchment management institutions?
- ✓ things that should be changed

What are the decision-making arrangements for catchment management institutions? (Aggregation Rules)

- ✓ decision-making procedures (e.g., vote, consensus etc.)
- ✓ procedures to accommodate community, interest groups, industry and government views/preferences
- ✓ challenges to decision-making and aggregation processes
- ✓ how decision-making compare to other catchment management institutions?
- ✓ things that should be changed

What are the arrangements for communication, interaction, reporting and monitoring? (Information Rules)

- ✓ communication and interaction (e.g., among participants, with community, industry, government, interest groups, other NRM bodies)
- ✓ reporting procedures
- ✓ monitoring of performance
- ✓ accountability
- ✓ challenges to communication, interaction, reporting and monitoring
- ✓ how communication and interaction arrangements compare to other catchment management institutions?
- ✓ how reporting and monitoring arrangements compare to other catchment management institutions?
- ✓ things that should be changed

What are the resources available to catchment management institutions? (Payoff Rules)

- ✓ level of resources
- ✓ funding arrangements (e.g., sources, management)
- ✓ staff arrangements
- ✓ challenges
- ✓ how funding and staff arrangements compare to other catchment management institutions?
- ✓ things that should be changed

What is geographic domain and functional scope of catchment management institutions? (Scope Rules)

- ✓ area of operation
- ✓ issues addressed
- ✓ activities and expected outcomes
- ✓ challenges
- ✓ how geographic domain and functional scope compare to other catchment management institutions?
- ✓ things that should be changed

Appendix F: Initial List of Codes

INSTITUTIONAL RULES	IR	NOTES
IR: POSITION	IR-POSIT	Participants
IR: BOUNDARY	IR-BOUN	Processes for selecting participants
IR: CHOICE	IR-CHOI	Institutions' roles and functions
IR: AGGREGATION	IR-AGGRE	Decision-making and aggregation arrangements
IR: INFORMATION	IR-INFO	
	IR-INFO-COMM	
	IR-INFO-REPOR	Arrangements for reporting
	IR-INFO-MONIT	Arrangements for monitoring
IR: PAYOFF	IR-PAYOF	
	IR-PAYOF-STAF	Staff arrangements
	IR-PAYOF-FUND	Funding arrangements
IR: SCOPE	IR-SCOP	
	IR-SCOP-GEO	Geographic domain
	IR-SCOP-FUNC	Functional scope