

**School of Built Environment
Department of Urban and Regional Planning**

**Monitoring Community Engagement in Social Learning for
Sustainability in Natural Resource Management: Two Western
Australian Examples**

Graham James Thompson

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Doctor of Philosophy
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Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

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**This thesis was completed with grateful assistance of an
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ABSTRACT

Contemporary international social-ecological and related human geographical research is examining the capacity of collaborative monitoring to improve community engagement in social learning, in order to achieve more sustainable natural resource management (NRM) in practice. In Australia, a focus for this research is local community-based Landcare and its incorporation into more strategically oriented and scientifically-based regional NRM programs. This thesis contributes towards this research and, potentially, to sustainable NRM practice. It examines community engagement in social learning for achieving sustainable NRM in an adaptive management based local community engagement project in the Central Wheat Belt region of rural Western Australia, and, in a broader co-operative management based program in metropolitan Perth. The results suggest that, through these endeavours, community engagement in social learning for achieving sustainable NRM is being effectively facilitated at the local community level, but not as effectively between these communities and the relevant governing bodies at larger scales up to the national policymaking level. Analyses of these results suggest that there is a disjuncture, between the development of sustainable NRM policy ideas, which continues to move rapidly ahead, and the implementation of these ideas in practice at the local community level, which tends to lag in comparison. These analyses undertaken for this thesis suggest that the social and institutional barriers that exist between these key groups tend to impede information flows and, therefore, progress towards achieving more sustainable NRM in practice, despite the efforts of such adaptive and co-operative management based projects and programs. This thesis also contributes towards improving our understanding of why this is the case. Analyses suggest that little is still understood about the differential learning that occurs both within and between these local participant communities. Furthermore, they suggest that there is still little understanding about how these differences can be leveraged to improve community engagement in social learning for achieving sustainable NRM between local communities and the relevant governing bodies, and thereby to overcome at least some of these barriers. Moreover, through combining this data analysis with an ongoing evaluation of the methodological design and the data collection methods used in this thesis, a collaborative monitoring tool that can be used in sustainable NRM research and practice to monitor and improve community engagement in social learning for achieving sustainable NRM in practice is postulated. As such, this thesis contributes towards improving collaborative monitoring in more contemporary adaptive co-management based local community engagement projects and programs in Western Australia. Furthermore, this thesis also contributes towards overcoming social and institutional barriers in sustainable NRM policy development and implementation in Australia and thus towards achieving more sustainable NRM in practice at a global scale.

Key words: collaborative monitoring, community engagement, social learning, sustainability, natural resource management (NRM), policy development and implementation, social and institutional barriers, governance, scaling, adaptive management, cooperative management, adaptive co-management, case-study and action-research methodologies, monitoring tools.

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For my beautiful wife and children Suzanne, Holly and Liam

CONTENTS	Page
1. <u>INTRODUCTION</u>	1
1.1 SUSTAINABLE DEVELOPMENT and SOCIAL LEARNING in NRM	1
1.2 ADAPTIVE MANAGEMENT, COOPERATIVE MANAGEMENT, MONITORING and EVALUATION	5
1.3 ADAPTIVE CO-MANAGEMENT and COLLABORATIVE MONITORING	11
1.3.1 Collaborative Monitoring	12
1.4 THESIS OBJECTIVES	12
1.4.1: Merging the Second and Third Objectives: A Broad Overview	13
1.4.2: A Scientifically-Based Collaborative Monitoring Tool Underpinned by an Evolving Learning Methodology (ELM)	14
1.5 THESIS ORGANIZATION	19
2. <u>LINKING COMMUNITY ENGAGEMENT, SOCIAL LEARNING and SUSTAINABILITY in NRM</u>	21
2.1 PRAGMATIC COEVOLUTION	21
2.2 AN HISTORICAL OVERVIEW	26
2.3 CONTEMPORARY HISTORICAL DEVELOPMENTS	30
2.4 MORE RAPID PROGRESS TOWARDS achieving SUSTAINABLE NRM	31
2.5 DEVELOPMENT of SUSTAINABLE NRM in AUSTRALIA	34
2.5.1: <i>National Strategy for Ecological Sustainable Development (NSES)</i>	35
2.5.2: Contradictions in Managing the Great Barrier Reef	36
2.5.3: Australia's Landcare Program: Community Engagement Partnerships and Social Learning	39
2.6 SUMMARY	41
3 <u>LANDCARE: POLICY DEVELOPMENT and IMPLEMENTATION in WESTERN AUSTRALIA 1990-2012</u>	43
3.1 Part One: <u>The Implementation of Landcare in Western Australia</u>	44

3.1.1: Landcare and the <i>NLP</i>	44
3.1.2: <i>NHT1</i>	51
3.1.3: <i>NHT2</i>	62
3.1.4: <i>Caring for Our Country</i>	67
3.2 Part Two: <u>Regional and Local Landcare Community Engagement Projects in Western Australia</u>	75
3.2.1: Regional NRM in Western Australia	76
3.2.2: The <i>Living Landscapes</i> Rural Nature Conservation Planning Project	82
3.2.3: A SCC South Regional Sub-Program	97
3.3 SUMMARY	108
4. <u>METHODOLOGY and METHODS</u>	113
4.1 CASE STUDY and ACTION RESEARCH METHODOLOGIES	113
4.2 DATA COLLECTION METHODS	117
4.2.1: Preliminary Discussions	118
4.2.2: Quantitative and Qualitative Data Collection	121
4.2.2.1: <i>Rural Data Collection</i>	122
4.2.2.2: <i>Urban Data Collection</i>	125
4.2.2.3: <i>Limitations</i>	126
4.2.3: Interviews with <i>Perth Region NRM</i> and <i>Wheatbelt NRM</i> Managers and Chairs	127
4.2.3.1: <i>Regional Catchment Council Interview Process</i>	128
4.2.3..2 <i>Limitations</i>	129
4.3 SUMMARY	129
5. <u>RESULTS</u>	133
5.1 A SUMMARY of the MAIN LIMITATIONS	133
5.2 RURAL CASE STUDY RESULTS for the <i>LIVING LANDSCAPES</i> PROJECT	138

5.2.1: Facilitating Community Engagement in Social Learning for Achieving Sustainable NRM in Broad Terms	139
5.2.2: Facilitating the “Scaling Up” of Community Engagement in Social Learning for achieving Sustainable NRM	145
5.2.3: <i>Living Landscapes</i> Facilitating Community Engagement in Social Learning for achieving Sustainable NRM over Time	158
5.3 FARMERS’ FEEDBACK	164
5.4 MODIFIED URBAN CASE STUDY SURVEY/RUDIMENTARY COLLABORATIVE MONITORING TOOL RESULTS	170
5.4.1: Improved Knowledge	171
5.4.2: Shared Optimism	175
5.4.3: Sustained Motivation	181
5.4.4: On Reflection	184
5.5 COMMUNITY FEEDBACK	186
5.6 AN OVERVIEW of REGIONAL CATCHMENT COUNCIL INTERVIEWS	191
5.7 SUMMARY	192
<u>6. DIFFERENCES in COMMUNITY ENGAGEMENT in SOCIAL LEARNING at a LOCAL COMMUNITY LEVEL</u>	195
6.1 BETTER EXPLOITING DIFFERENTIAL LEARNING LOCALLY in the RURAL <i>LIVING LANDSCAPES</i> PROJECT	196
6.1.1 Developing a Schema for Engaging Living Landscapes Local Participant Communities more Substantively in Social Learning for achieving Sustainable NRM	199
6.2 BETTER EXPLOITING DIFFERENTIAL LEARNING LOCALLY in the URBAN <i>SERCUL/PERTH REGION</i> NRM PROGRAM	205
6.2.1 Further Evidence for Developing a Schema for More Substantive Local Community Engagement in Social Learning for achieving Sustainable NRM	209

6.3 SUMMARY	213
<u>7. A TOOL for MONITORING COMMUNITY ENGAGEMENT in SOCIAL LEARNING for achieving SUSTAINABLE NRM: A FEASIBILITY STUDY</u>	215
7.1 STRENGTH: COMPLYING WITH and ENHANCING PROGRAM LOGIC	216
7.1.1: Program Logic	216
7.1.2: Tracking Assumptions to Strengthen Program Logic	218
7.1.3: Monitoring Community Engagement in Social Learning for achieving Sustainable NRM: Helping to Solve a Common Problem	220
7.1.4: Potential for the Proposed Collaborative Monitoring Tool to Better Engage Participants in Learning about “People”/Governance	225
7.2 OPPORTUNITY: DEVELOPING a GIS-BASED MONITORING TOOL	230
7.3 RESEARCH-DRIVEN MONITORING: A WEAKNESS?	232
7.3.1: A Further Explanation of the Effectiveness of the Monitoring Tool in Practice	234
7.3.1.1: <i>Urban Survey Responses</i>	235
7.3.1.2: <i>Rural Survey Responses</i>	236
7.4 THREAT: CHANGES of GOVERNMENT/GOVERNMENT POLICY	238
7.5 SUMMARY	240
<u>8. CONCLUSION</u>	243
8.1 LITERATURE REVIEW and DEVELOPMENT of a HEURISTIC FRAMEWORK	243
8.1.1: Theoretical Review	244
8.1.2: Historical Review	246
8.2.3: Geographical Review	246
8.2 AN EVALUATION of COMMUNITY ENGAGEMENT in SOCIAL LEARNING for achieving SUSTAINABLE NRM	250

8.2.1 An Evolving Learning Methodology	251
8.2.2 Community Engagement in Social Learning for achieving Sustainable NRM Data	251
8.3 DEVELOPMENT of a RUDIMENTARY COLLABORATIVE MONITORING TOOL	253
8.4 IMPLICATIONS for FURTHER SUSTAINABLE NRM RESEARCH and PRACTICE	254
BIBLIOGRAPHY	257
APPENDIX 1	277
APPENDIX 2	367
APPENDIX 3	373
APPENDIX 4	389
APPENDIX 5	395
APPENDIX 6	399

LIST OF FIGURES

1.1: Single-, Double- and Triple-Loop Action Learning Model	8
1.2: Proposed Collaborative Monitoring Tool Implementation and Development in Adaptive Co-Management	15
2.1: Progress in Community Engagement in Social Learning for achieving Sustainable NRM from a Pragmatic Co-evolutionary Perspective	29
3.1: <i>NLP</i> Implementation in WA (1990-1998) Based on Community Engagement in Social Learning Pathways for achieving Sustainable NRM	49
3.2: Implementation of the <i>NLP</i> through <i>NHT1</i> in WA (1996/7- 2001/2) Based on Community Engagement in Social learning Pathways for achieving Sustainable NRM	55
3.3: NRM Regions in Australia	62

3.4: Implementation of the <i>NLP</i> through <i>NHT2</i> in WA (2002-2007) Based on Community Engagement in Social learning Pathways for achieving Sustainable NRM	63
3.5: Ideal Implementation of Landcare through <i>Caring for Our Country</i> Based on Community Engagement in Social learning Pathways for achieving Sustainable NRM	69
3.6: Actual Implementation of Landcare through <i>Caring for Our Country</i> (WA 2007-2012) Based on Community Engagement in Social learning Pathways for achieving Sustainable NRM	73
3.7: Locations of NRM Regions and Regional Catchment Councils in WA	76
3.8: <i>Perth Region NRM</i> Local Community Engagement Structure	78
3.9: ACC Broad Conservation Zones (Black) and Geomorphological Areas (Red)	80
3.10: <i>Wheatbelt NRM</i> Region and Geographic Sub-catchment Reference Groups	81
3.11: Evolving Sustainable Systems Conceptual Model	83
3.12: Locations of the <i>Living Landscapes</i> Sub-Catchment Groups (Central Wheat Belt WA)	85
3.13: Implementation of <i>Living Landscapes</i> via the Combined Focal Species-Experiential Learning Nature Conservation Planning Approach	96
3.14: Location of <i>SERCUL</i> 's Main Office in the Swan Catchment	99
3.15: Location of <i>SERCUL</i> 's Main Office in the SCC South Sub-Region	100
3.16: <i>SERCUL</i> Main Program Areas	101
3.17: Bannister Creek Catchment and Drainage Channel	102
3.18: <i>TRCG</i> Extended Area	104
3.19: Engaging the <i>BCCG</i> and the <i>TRCG</i> in Social Learning for achieving Sustainable NRM under the <i>SCC</i> and <i>NHT2</i> (2003-2007)	107
6.1: Schema Augmenting <i>Living Landscapes</i> Existing Methods for Better Engaging Local Communities in Social Learning for achieving Sustainable NRM	201

6.2: Schema Augmenting <i>Perth Region NRM's</i> Existing Methods and Activities for Better Engaging Local Communities in Social Learning for achieving Sustainable NRM	212
7.1: Program Logic in the Context of the Australian Government's NRM <i>MERI</i> Framework	217
7.2: Monitoring Community Engagement in Social Learning for achieving Sustainable NRM via Program Logic in the <i>Wheatbelt NRM</i> Region	222
7.3: Monitoring Community Engagement in Social Learning for achieving Sustainable NRM via Program Logic across Regions in Western Australia	224
7.4: Rudiments of a GIS-Based Collaborative Monitoring Tool (Based on Living Landscapes Results and Analyses)	231
8.1 Revised View of Proposed Collaborative Monitoring Tool Implementation and Development in Adaptive Co-Management	245

LIST OF TABLES	Page
3.1: Major Challenges that Arose in <i>NHT1</i> in Guiding Local Communities towards Independence in Landcare and NRM	60
3.2: <i>Caring for Our Country</i> Effectiveness Report: Relevant Key Findings	71
3.3: <i>Living Landscapes</i> Sub-Catchment Groups: Overview and Assessment of Prior Levels of Engagement in Nature Conservation via "Green" Landcare	94
4.1: Case Study and Action Research Methodologies: Key Differences in their Capacities to Engage Communities in Social Learning for Sustainability in NRM	116
4.2: Locations of Rural and Urban Sub-Catchment Groups and their Participation in Quantitative and Qualitative Data Collection	122
4.3: Interview Schedule	128
4.4: Summary of Steps Taken towards Development of an Evolving Learning Methodology (ELM) as a basis for the Proposed Collaborative Monitoring Tool	130
5.1: Suggested Weighted Average Categories, Values and Associated Descriptors	137

5.2: Farmers’ Initial Comments Concerning the Effectiveness of <i>Living Landscapes</i>	138
5.3: Facilitating Community Engagement in the Five Designated Social Learning Aspects: Sub-Catchment Groups’ Assessments	140
5.4: Facilitating Local Community Engagement in the “People” Aspect of Social Learning for achieving Sustainable NRM: Sub-Catchment Groups’ Assessments	143
5.5: Facilitating the Sharing of Designated Social Learning Aspects: Sub-Catchment Groups’ Assessments	147
5.6: Facilitating the Sharing of “Picture” by Social Geographical Scale: Sub-Catchment Groups’ Assessments	150
5.7: Facilitating the Sharing of “People” (i.e. “Personalities”, “Traditions”, “Government”) by Social Geographical Scale: Sub-Catchment Groups’ Assessments	154
5.8: Facilitating the Sharing of the “Picture” Compared with Other Potential Sources of Similar Learning: Sub-Catchment Groups’ Assessments	156
5.9: Facilitating Community Engagement in All Designated Aspects of Social Learning Over Time: Sub-Catchment Groups’ Assessments	159
5.10: Facilitating Community Engagement in Social Learning for achieving Sustainable NRM Over Time (“Picture”): Sub-Catchment Groups’ Assessments	161
5.11: Design and Implementation of the Initial Case Study Survey: Sub-Catchment Groups’ Assessments	165
5.12: Associated Further Comments	166
5.13: Preferences for Follow-up Interviews: Sub-Catchment Groups’ Assessments	167
5.14: Preferences for Creative Participation in Survey Development: Sub-Catchment Groups’ Assessments	169
5.15: Facilitating Community Engagement in Social Learning for achieving Sustainable NRM (Improved Knowledge): <i>BCCG</i> and <i>TRCG</i> Assessments	172
5.16: Facilitating Community Engagement in Social Learning for achieving Sustainable NRM (Shared Optimism): <i>BCCG</i> and <i>TRCG</i> Broad Assessments	176

5.17: Facilitating Community Engagement in Social Learning for achieving Sustainable NRM (Shared Optimism): <i>BCCG</i> and <i>TRCG</i> Detailed Assessments	178
5.18: Facilitating Community Engagement in Social Learning for achieving Sustainable NRM (Sustained Motivation): <i>BCCG</i> and <i>TRCG</i> Detailed Assessments	182
5.19: Facilitating Community Engagement in Social Learning for achieving Sustainable NRM (On Reflection): <i>BCCG</i> and <i>TRCG</i> Detailed Assessments	184
5.20: <i>BCCG</i> and <i>TRCG</i> Opinions of the Modified Case Study-Action Research Based Survey	187
5.21: <i>BCCG</i> and <i>TRCG</i> Preferences for Follow-up Interviews	188
5.22: <i>BCCG</i> and <i>TRCG</i> Preferences for Creative Participation in the Implementation and Development of the Modified Survey	190
6.1: Examples of Gabby Quoi Quoi and Sout Tammin Farmers Main Concerns: Summaries of Relevant Recorded Interview Comments	197
6.2: Examples of the <i>BCCG</i> Main Concerns: Summaries of Relevant Recorded Interview Comments	206
6.3: Examples of the <i>TRCG</i> Main Concerns: Summaries of Relevant Recorded Interview Comments	208
7.1: Linking Local Community Initiatives to Regional Priorities and Australian Government Policy	229

LIST OF BOXES	Pages
7.1: Regional Catchment Council Comments on Monitoring Community Engagement, Social learning and capacity-Building in Sustainable NRM in WA	221
7.2: Regional Catchment Council Comments on Monitoring Community Engagement: Overlooking Misplaced Assumptions	221
7.3: Soil Acidity Project Scenario: An Example of a Sustainable NRM Issue for Discussion via Collaborative Monitoring	228

LIST OF PLATES	Pages
3.1: WA Wheat Belt, Northam Area, Aerial View Showing Extent of Arable Land, Remnant Vegetation, Natural Vegetation and/or Revegetation	86
3.2: WA Wheat Belt, Northam Area, Aerial View Showing Extent of Arable Land, Remnant Vegetation, Natural Vegetation and/or Revegetation	86
3.3: WA Wheat Belt, Northam Area, Ground View of Mortlock Catchment Arable Land, Remnant Vegetation, Natural Vegetation and/or Revegetation	87
3.4: WA Wheat Belt, Northam Area, Ground View of Mortlock Catchment Arable Land, Remnant Vegetation, Natural Vegetation and/or Revegetation	87
3.5: WA Wheat Belt, Dowerin Town Site, Aerial View of Surrounding Arable Land, Remnant Vegetation, Natural Vegetation and/or Revegetation and Natural Salt Lakes (Distance)	88
3.6: WA Wheat Belt, Ground View of Natural Salt Lake Characteristic of the Dowerin Area	88
3.7: WA Wheat Belt, Ground View of Mortlock Catchment, Severe Gully Erosion	89
3.8: WA Wheat Belt, Ground View of Mortlock Catchment, Waterlogging	89
3.9: WA Wheat Belt Aerial View of Mortlock Catchment, Wind Erosion	90
3.10: WA Wheat Belt Ground View of Mortlock Catchment, Salinity	90
3.11: WA Wheat Belt Ground View of Mortlock Catchment, Riparian Vegetation	91
3.12: WA Wheat Belt Ground View of Mortlock Catchment, Bank Vegetation	91
3.13: WA Wheat Belt Ground View of Mortlock Catchment, Riparian Revegetation	92
3.14: WA Wheat Belt Ground View of Mortlock Catchment, Riparian Revegetation	92
3.15: Bannister Creek Prior to <i>Living Streams</i> (Circa Late 1990s)	103
3.16: Bannister Creek Prior during <i>Living Streams</i> (Circa Early 2000s)	103
3.17: Bannister Creek on Completion of <i>Living Streams</i> (Circa Early 2006/7)	104
3.18: Garvey Park Biodiversity Project (December 2001)	105

3.19: Garvey Park Biodiversity Project (January 2004)	106
4.1: Initial Rural Case Study Survey of the South Tammin Sub-Catchment Group (Tammin Landcare Education Centre)	123
4.2: Initial Rural Case Study Survey of the Morbinning Sub-Catchment Group (Morbinning Hall)	123
4.3: Urban Case Study Follow-up Discussion with the Two Rivers Catchment Group (City of Canning Offices)	126

CHAPTER 1

Introduction

Since the mid-1980s our understanding of social learning and the central role it plays improving the management of social-ecological complexity has been extended by collaborative social-ecological and, increasingly, human geographical research with Natural Resource Management (NRM) managers and practitioners. The primary focus of this research has been on improving sustainable NRM policy, strategy and major program development and implementation. (Cundill and Rodela 2012 who, *inter alia*, trace the origins of different approaches to social learning in sustainable NRM; Reed *et al* 2010, Muro and Jeffrey 2008, Wals 2007, Pahl-Wostl 2007 and Keen *et al* 2005. Keen *et al* 2005 provide a useful introduction to these areas of research and practice. They disentangle five “braided strands” of social learning in environmental management: reflection; systems orientation; integration; negotiation; and participation.) This thesis has a practical focus drawing on local sustainable NRM projects and programs that adopt adaptive management approaches to community engagement (Lee 1996, Walters 1986 and Holling 1978) and later cooperative management approaches (Roling 2002, Buck *et al* 2001, Daniels and Walker 1996, Pinkerton 1994 and Dale 1989). More contemporary research in this area examines the potential of adaptive co-management approaches (Armitage *et al* 2007, Olsson *et al* 2004 and Folke *et al* 2005). Notwithstanding the contributions that these researchers and practitioners have made, significant challenges remain (Bown *et al* 2013). This thesis contributes towards meeting these challenges. This chapter introduces the areas of sustainable NRM research and practice most relevant to this thesis.

1.1 SUSTAINABLE DEVELOPMENT and SOCIAL LEARNING in NRM

Sustainable development has been a major objective of many countries since the publication of the *Brundtland Report* in 1987, and especially since the *Rio Earth Summit* in 1992. The *Brundtland Report* defines sustainable development as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (World Commission on Environment and Development 1987, p.2). The *Rio*

Earth Summit brought nations together to discuss how best to develop and implement any future national environmental policies based on this concept, and to formally commit themselves to sustainable development by signing *Agenda 21* (UNED 1992 cited in Neumayer 2003, p.1). The significance of sustainable development is evidenced through the development of national strategies for sustainable development (Swanson and Pintér 2004). In NRM, implementing these strategies has involved a fundamental shift on the part of governments at all levels in terms of their approach to problem-solving, decision-making and policymaking. This has involved a departure from a centralized, top-down or 'command and control' approach (Pahl-Wostl 2007, p.561) that privileges the knowledge of experts (e.g. government agencies, scientists and academics) and formal science, to a more collaborative approach whereby experts and the wider community share their knowledge and understanding of the natural environment to a greater extent.

In NRM, such learning is commonly referred to as 'social learning' - a general approach to learning that involves 'the collective action and reflection that takes place among both individuals and groups when they work to improve the management of the interrelationships between social and ecological systems' (Keen *et al* 2005, cited in Cundill and Fabricius 2009, p.1; see also Stagl 2007 who describes social and ecological systems more broadly in terms of 'human-environmental interrelations' (p.56), and especially Pahl-Wostl 2007 who describes these systems as 'human-technology-environment interactions', p.561). The move towards social learning in NRM thus coincided with the increased demand for public participation in and the growing credibility of sustainable development approaches (Tabara and Pahl Wostl 2007) and it has since become especially important in this field (Cundill and Rodela 2012; Reed *et al* 2010; Muro and Jeffreys 2008; Wals 2007; Keen *et al* 2005). Social-ecological research contends that approaches to learning in NRM have changed because of the limitations of the former command and control approach to implement NRM policy ideas, strategies and major programs in practice (Pahl-Wostl 2007). However, Pahl-Wostl also shows how social learning has yet to facilitate an effective shared understanding of uncertainties in the factual knowledge bases of participants, ambiguities in problem framing and differences in perceptions of the nature of the problem (Pahl-Wostl 2007, pp.567-568). Pahl-Wostl provides useful examples that illustrate the practical consequences of these limitations including:

- Levee and dam construction for flood control that led to more severe floods
- Pesticide and herbicide application that led to resistant pests and weeds

- Road building to ease traffic congestion that led to more traffic congestion
- Fire suppression policies that led to increases in the size and severity of forest fires
- Subsidized water supply systems that led to the public expecting services at no cost

(Pahl-Wostl 2007, p.562)

With respect to levee and dam construction for example, sustainable NRM policy makers, managers and engineers have shared their scientific and technical (factual) knowledge and understanding well and with good intention to protect local populations from flooding. However, recent evidence suggests that such measures have been counterproductive at regional scales and over the longer term. Firstly, levees and dams have interrupted natural transmissions of floodwaters and sediments to the sea. They have thus contributed towards ongoing sediment starvation of delta areas, subsidence and other geological processes that have increased vulnerability of deltas to coastal flooding. Farms, farming and myriad local communities have been adversely affected. Secondly, engineering solutions have been employed to mitigate these effects. Spillways have been built along levees at strategic points to release excessive floodwaters and to help re-distribute sediment more evenly across floodplains and deltas. These solutions by themselves, however, have not always been successful. Locating spillways in the right place is a significant issue. Syvitski and Brakenridge (2013) and Syvitski *et al* (2009) have demonstrated the effects of levees and dams along the Indus in Pakistan. Syvitski in particular has published extensively on the human impacts of dams worldwide. His works provide a useful introduction to research and practice in this area. See also Brown *et al* (2008).

Lewis *et al* (2009) examine the impacts the Burdekin Falls Dam (BFD) on agriculture in north Queensland and on the Great Barrier Reef. They show how models predict the BFD to be a very efficient trap for sediment and particulate matter (80%-90%). They then present the results of their own fieldwork that further examined BFD trapping efficiency and sediment dynamics. These data suggest that the BFD traps 60% of sediment and particulate matter. Lewis *et al* (2009) thus challenge the accuracy of the prediction models. In so doing, they suggest that prediction modeling should be revisited to see how it might better forecast and thus help regulate bulk sediment flows to lower catchments and the Great Barrier Reef. Moreover, they highlight ongoing conflict between scientific modeling and fieldwork. (Such conflicts over methodological accuracy in science are highly relevant in this thesis and are examined further in this chapter.) By way of introduction, these examples help illustrate

how sustainable NRM policy makers, managers and engineers have yet to share their scientific and technical (factual) knowledge to better manage social-ecological complexity (Pahl-Wostl 2007; Stagl 2007; Keen *et al* 2005) at greater scales.

Moreover, NRM policy makers, managers and engineers can underestimate the impacts of ambiguity and peoples' perceptions in problem framing (Pahl-Wostl 2007). The example of levees and dams provides a useful context for exploring this notion. To address regional scale impacts of levee and dam construction such as those illustrated above these experts often seek to reconcile the views of multiple stakeholders (National Research Council 2012). Multiple stakeholders might include local communities, local, regional and national government organizations and agencies, non-government organizations and industry groups. All parties, ideally, seek more effective (more sustainable) solutions to what are increasingly complex social-ecological problems. However, in reality, these groups are responsible for and/or have vested interests in managing social-ecological environments at their respective geographical scales. They are more likely, therefore, to focus on problem solving at these scales. Also, their expectations concerning the length of time for achieving success can differ. Each group may thus have very different views about the root causes of problems and, moreover, about how they should be managed. This makes it very difficult for multiple stakeholders (even in a social learning context) to collaborate and to arrive at a consensus, or a common understanding, of what the real problems are. Insufficient knowledge and understanding of the impacts of such ambiguity and perception in sustainable NRM, then, can serve to impede or even negate progress towards the building and/or management of more sustainable levees and dams in practice.

Pahl-Wostl (2007) argues that to better assist all parties to break out of such negative feedback loops (Lefroy 2008) social learning 'must be embedded in a better understanding of multi-scale processes of human-environment interactions' (p.568). (Wilson 2012; 2009; 2007; Westgate *et al* 2013, Pound *et al* 2012, Leys and Vanclay 2011 and Prager 2010 provide examples of how this social learning issue is manifested in sustainable NRM in Australia.) An earlier investigation by Frost *et al* (1999) suggests that meeting this challenge in Australia is about assisting participants to establish 'a common language and shared understanding of the principles and processes espoused by all consultants' (p.21). While progress has been made towards consolidating social learning in this way, especially since Pahl-Wostl's 2007 publication, deciding *how best* to achieve this *in practice* through

improving relevant community engagement methods remains a significant challenge. Local adaptive management, cooperative management and adaptive co-management based projects and/or programs have been vehicles for sustainable NRM researchers and practitioners in their endeavors to improve such community engagement. Moreover, improving monitoring and evaluation in these contexts has become a key objective of researchers and practitioners.

1.2 ADAPTIVE MANAGEMENT, CO-OPERATIVE MANAGEMENT, MONITORING and EVALUATION

Adaptive management adopts a scientific or experimental approach to engaging local communities in social learning to help achieve more sustainable NRM in practice. As Broderick (2008) explains, in adaptive management '[t]he idea of increasing knowledge through an experiment is appealing - it provides a logical and rational base for understanding a complex problem' (p.304). This experimentation is underpinned by the process of 'learning by doing, monitoring and action' (Cundill and Fabricius 2009, p.3206). Monitoring, then, is critical to the successful implementation of adaptive management. Monitoring can be defined as 'the regular gathering and analysing of information that is needed for evaluation or project management' (Woodhill and Robins 1998, p.6). This is in contrast to evaluation, which the same authors define as 'a periodic but comprehensive assessment of the overall progress and worth of [an adaptive management] project' (*ibid.*). To explain the centrality of monitoring in adaptive management in the context of this thesis, these differences are compared and contrasted in the following scenario.

In an adaptive management project, local communities might be engaged in social learning through innovative community engagement methods. The 'focal species-experiential learning' nature conservation planning method examined in this thesis is an example of such experimentation (Lambeck 1999; 1997; Frost *et al* 1999). Data that can determine the success of these methods are collected and analyzed regularly by the relevant sustainable NRM researchers and practitioners. Through such monitoring - i.e. through every iterative assessment of 'the activities completed or products made during a project' (Woodhill and Robins 1998, p.6) - these researchers and practitioners can determine scientifically how well these methods are engaging participant local communities in social learning. In this way, community engagement methods can be improved as the project proceeds. Such improvements can contribute towards positive evaluations of progress in, and, ultimately,

positive outcomes for, an adaptive management project. In this sense, monitoring in adaptive management becomes a means of driving community engagement in social learning and action among NRM researchers, practitioners and participant local communities.

In cooperative management monitoring plays a less central role. Community engagement in social learning in this context is achieved through 'collaborative and inclusive decision-making' (Cundill and Fabricius 2009, p.3206) as a basis for conflict resolution (Plummer and Fitzgibbon 2004 and in Armitage *et al* 2007). The meetings of local urban Landcare communities, Non-Government Agencies (NGOs), government agencies and organizations and regional catchment councils explored in this thesis are examples of how this occurs. Under the umbrella of a regional catchment council for example, these multiple stakeholders discuss any differences of opinion they might have regarding the impacts of regional NRM planning and management in their local areas. This may include discussions about how better to engage local communities in social learning processes. Through these discussions appropriate sustainable NRM knowledge and understanding is shared between local communities and governing bodies. Ideally, working partnerships between multiple stakeholders are strengthened; relationships are developed and trust is built as parties "co-operate" to improve governance and decision-making. Similarly, as a consequence of these meetings and developing partnerships, differences are resolved and more appropriate (more sustainable) NRM measures (e.g. better community engagement methods) are implemented locally. In contrast to adaptive management therefore, improving governance and decision-making is central to achieving success in co-operative management. Achieving effective community engagement in social learning, then, is an indirect outcome of this broader process. Monitoring for more effective community engagement in social learning as outlined in this introduction is thus much more problematic in cooperative management.

Indeed, while cooperative management initiatives (many of them regional NRM programs) have been and are being evaluated there has been a dearth of monitoring undertaken in this area generally. The Australian Government 2012 report on *Caring for Our Country* was a major sustainable NRM policy initiative which sought to address this issue through its *Monitoring, Evaluation, Reporting and Improvement (MERI)* program. To chart the lack of progress in this area in Australia see Australian Government 2012a; 2012b; 2011; 2009; 2003; Australian National Audit Office 2007-8; and Hassall and Associates Pty Ltd 2005.

Success in cooperative management NRM programs has been measured through evaluating their tangible on-ground achievements. Success in community engagement in social learning in co-operative management is a broader reflection of this process. The following scenario helps to explain this proposition.

An evaluation of ecological restoration in a local area might be implemented as part of a suite of measures to ascertain the effectiveness of a co-operative management based NRM program. This might involve recording the numbers of re-introduced native plants and/or animal species, areas of re-vegetated land and declining levels of pollution in waterways. These biophysical changes are tangible and are thus more readily quantified (compared to changes in learning!). There are also some associated social impacts that can be similarly quantified. The numbers of volunteers employed in ecological restoration and their levels of satisfaction with on-ground outcomes are relevant examples. Their satisfaction with the community engagement methods used is another example. Zurba *et al* (2012) provide further examples of such measures in improving co-management between indigenous and non-indigenous communities in Australia. They cite: the wider delegation of management and conservation responsibilities over time (e.g. the management of cultural heritage sites, weed control, sea patrolling); increases in the sharing of traditional knowledge on species over time; and, increases in (indigenous) 'agency interest and support to protect sites of cultural significance on land and sea' (p.1136). Though not specifically quantifying community engagement in social learning, these social and ecological evaluations, when combined, can reflect such success in cooperative management programs.

Similar evaluations are also conducted in adaptive management projects. However, in adaptive management there is an additional focus on monitoring (e.g. of the community engagement methods used) leading up to these evaluations. This aids progress towards more effective community engagement in social learning (Pahl-Wostl 2007). However, adaptive management has been only partially effective at utilizing monitoring in this capacity.

Arguably, a key limiting factor is that such monitoring has not been 'underpinned by a specific goal of [social?] learning' (Broderick 2008, p.305). As Broderick infers, if it were to be underpinned by a specific goal of learning - in this thesis context social learning - it would facilitate among participants a greater 'reflection of progress on the adaptive cycle and identifying changes in system understanding over time, gradually bringing parties

together in learning' (p.312). In other words, it would better aid "triple-loop" learning (Figure 1.1).

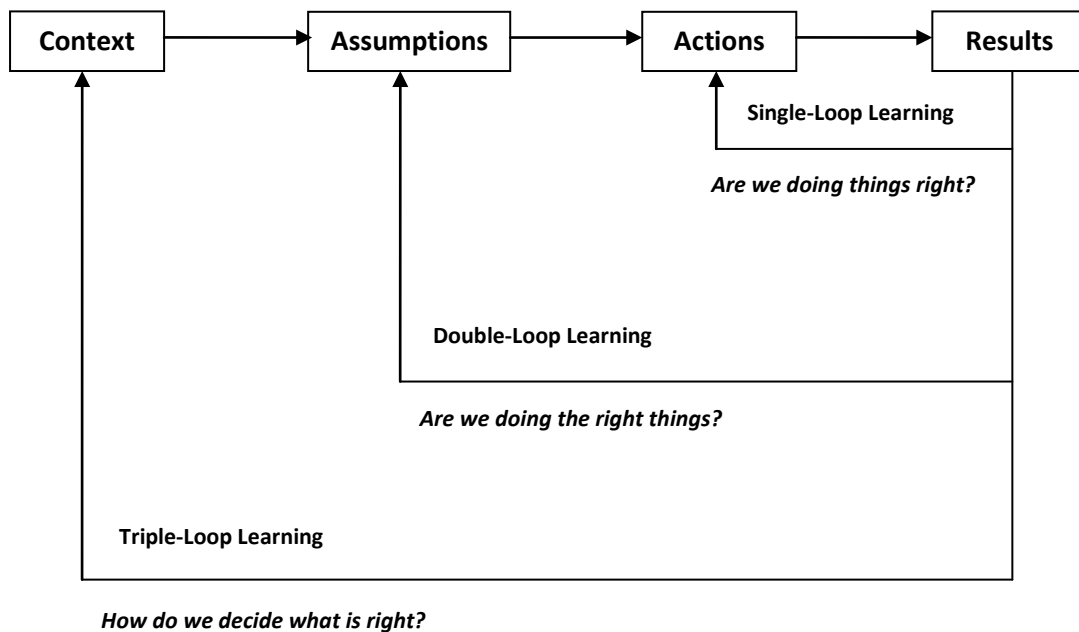


Figure 1.1: Single-, Double- and Triple-Loop Action Learning Model

Based on the works of Argyris and Schon (1978; 1996) and Nielsen (1993)
Sourced at: http://www.thorsten.org/wiki/index.php?title=Triple_Loop_Learning

Figure 1.1 illustrates triple-loop learning in the context of two interrelated concepts: single- and double-loop learning. It shows that single- and double-loop learning are about improving knowledge and understanding of our actions and their underlying assumptions. This learning helps us to answer the "what", "where", "when", "why" and "so what" questions. Triple loop learning is about improving our knowledge and understanding of the broader and deeper contexts or systems within which single- and double-loop learning take place. It is, therefore, about gaining a better understanding of the values on which our assumptions and ultimately our actions are based. Learning how to reflect on one's own values in a constructive and positive way, is a key part of triple loop learning. (Foldy and Creed 1999 and Ojha *et al* 2012, respectively, provide indications of how such learning is progressing in the workplace and in policy implementation). In sustainable NRM projects and programs such learning would involve practitioners, participant communities, and, indeed, scientists and researchers, sharing relevant information. Triple loop learning helps us to answer the "how" questions; how to find and apply solutions to complex problems of

the sort described above. Given the relationships between these learning concepts and social learning they are useful in aiding our understanding of the practice of engaging communities in social learning. The concept of triple loop learning is especially useful. Figure 1.1 provides a basis for examining the capacity of adaptive management to monitor and improve community engagement in social learning.

Arguably in adaptive management monitoring, the progress of methods for engaging communities in social learning has been successful in facilitating single-loop learning (an important first step in social learning?). It has helped participants to reflect on whether they are “doing things right”; if they are implementing existing practices and procedures (such as community engagement methods) in the right way. Through this process minor fixes or adjustments are made to these methods to improve their performance. This monitoring has also been successful at facilitating double-loop learning (an important second step). That is, it has also helped participants to reflect on whether they are “doing the right things”; to question assumptions that underpin community engagement methods and methodologies and, ultimately, to transform their values. This can lead to the improved functioning of these methods within an existing organizational structure and sometimes to organizational re-structuring. Major fixes and adjustments are thus also made to the implementation of community engagement methods. These changes however are made within the constraints of participants’ ‘societal environments or tradition systems’ (Foldy and Creed 1999, p.208). To help participants better understand this broader and deeper context, and to better reflect on “how to decide what is right” (Figure 1.1), monitoring the progress of methods for engaging communities in social learning in adaptive management must also succeed in facilitating triple-loop learning (the most important final step in this monitoring process?). The following scenario further explains this proposition.

Firstly, development and implementation of community engagement methods and methodologies in adaptive management, and the monitoring thereof, take place within well-established and respected scientific contexts and ways of knowing and thinking. However because of this, adaptive management researchers, practitioners and participant communities might, assume a direct link between the accuracy of the scientifically-based methods and methodologies used to engage them in social learning and valid and reliable outcomes (Hooshangi *et al* 2013, Section 1.1). Moreover, they might be more hesitant about drawing inferences between making these assumptions and a lack of scrutiny

concerning how adaptive management is actually “done” (Broderick 2008, p.303). That adaptive management also ‘holds practical policy appeal’ (*ibid.*) lends support to these notions. For example, community engagement methods and methodologies used in adaptive management have become increasingly popular among researchers, practitioners and communities alike. This is justifiable because they have become more local community-focused and as such have engaged the broader community in social learning - i.e. in the single- and double-loop learning steps (Figure 1.1). By engaging local communities adaptive management has made significant contributions towards consolidating social learning (Pahl-Wostl 2007) and achieving more sustainable NRM. Might this combination of “accepting” the science and popular appeal prevent adaptive management from improving on this success? In other words, might it impede progress towards engaging communities in triple-loop learning (i.e. as part of the social learning “mix” - see Figure 1.1); and towards researchers, practitioners, communities and policymakers becoming more self-critical about how they go about doing adaptive management?

Indeed as Broderick (2008) infers, unless adaptive management is able to facilitate such triple-loop learning there is an increased risk of adaptive management becoming:

an ongoing modelling activity [where] managers fail to adequately address the deep value conflicts that underlie management decisions, and [where] the actual management actions (experiment) are not implemented (p.304; see again Section 1.4).

(To chart progress in this area see: Westgate *et al* 2013; Rodela 2011; Muro and Jeffrey 2008; Plummer and Armitage 2007; Armitage 2005; Conley and Moote 2003.) This thesis posits that in order to avoid this adaptive management proponents and participants must be assisted to develop such constructive self-criticism. It also posits that monitoring the progress of methods for engaging communities in social learning can facilitate this process.

Two related questions arise from these analyses. Could the scientific monitoring of community engagement in social learning as practiced with some success in adaptive management be applied in cooperative management contexts to help overcome these difficulties? (See Berkes 2009). Might a relevant monitoring tool, underpinned by a specific goal of social learning, achieve this in practice? In seeking answers to such questions contemporary sustainable NRM research and practice examines collaborative monitoring in adaptive co-management.

1.3 ADAPTIVE CO-MANAGEMENT and COLLABORATIVE MONITORING

Cundill and Fabricius (2009) explain how adaptive co-management ‘harnesses’ the governance aspects of cooperative management and the scientific aspects of adaptive management (p.3206). They also, provide a definition of adaptive co-management that is most suited to this thesis, namely:

A governance based approach aimed at dealing with complexity and uncertainty in NRM and which relies on collaboration among a diverse set of actors, and on a form of social coordination in which actions are coordinated voluntarily by individuals and organizations in a self-organizing and self-enforcing manner (Cundill and Fabricius 2009, p.3206)

This definition shows that the emphasis in adaptive co-management is on improving governance (This concept is defined more fully in Chapters 2 and 3). This is not to say that the science is less valued. Indeed, adaptive co-management recognizes the great importance of science in sustainable NRM (Armitage *et al* 2008). Governance in an adaptive co-management context is about creating more opportunities for all participant communities to engage in science; to discuss with each other how science might be used to deal with complexity and uncertainty in order to achieve more sustainable NRM. Community engagement in social learning in the contexts already described remains critical in adaptive co-management for achieving such goals. However, the problem for adaptive co-management researchers and practitioners remains of how best to engage communities in social learning in practice, especially towards including triple-loop learning “steps”(Figure 1.1), to achieve sustainable NRM. For example, *how* to:

1. decide which stakeholders to engage in social learning (Mitchell *et al* 2011) ‘to help provide appropriate processes to promote the development of shared understandings among diverse stakeholders’ (Allen and Jacobson 2009, p.1); and, in this way,
2. overcome ‘important social, organizational and institutional barriers’ (*ibid.*) that have contributed towards impeding progress towards such developments.

Moreover, within this context these researchers examine the potential of collaborative monitoring to achieve such goals (Cundill and Rodela 2012, Cundill *et al* 2012, Cundill 2010, Cundill and Fabricius 2010; and in Australia, Measham 2009, Measham *et al* 2009).

1.3.1: Collaborative Monitoring

Cundill and Fabricius (2009) provide a useful definition of collaborative monitoring. Collaborative monitoring occurs where:

Multiple actors are engaged in an ongoing process of data gathering, analysis and decision making which might offer an avenue through which to pursue social learning objectives in natural resource management (p.3206).

They also explain why collaborative monitoring in adaptive co-management has great potential for engaging participant communities in social learning and especially triple-loop learning/constructive self-criticism: because it provides ‘a tight link between [the science of] information gathering and [the governance in] decision making [which] is considered vital for ongoing learning in social contexts’ (p.3208). Furthermore, these authors support their argument by showing how in collaborative monitoring:

1. Information gathering is about designing the most appropriate methods for data collection.
2. Well designed and implemented methods can provide great opportunities for consensus building in decision making and action.
3. Such consensus building in decision making and action is the cornerstone of ‘transformative learning...that leads to a questioning of the values that underpin institutions and decision making’ (Keen *et al* 2005 cited in Cundill and Fabricius 2009, p.3208).

Based on the analyses presented thus far this thesis seeks to achieve three main objectives.

1.4 THESIS OBJECTIVES

The objectives of this thesis are to:

1. Review the historical, geographical and theoretical literature on community engagement, social learning and sustainability in NRM. This review establishes a heuristic framework for this thesis. It is based on the notion that community engagement in social learning pathways in NRM policy development and implementation must be strengthened to make these policies more sustainable.
2. Evaluate the effectiveness of a rural adaptive management and an urban cooperative management project in Western Australia in terms of their capacities to engage local communities in social learning. This evaluation identifies the related triple-loop learning issue. It also discusses ways in which this issue might have been better identified and addressed in a stronger learning-based NRM policy context.
3. Discuss the feasibility and develop the rudiments of a collaborative monitoring tool for achieving such community engagement in practice. This study compiles a “how-to” manual. It also examines how this tool might be applied and developed in an adaptive co-management context - to strengthen community engagement in social learning pathways in sustainable NRM policymaking in Australia.

Achieving the second and third objectives merges the data analyses and methodological critiques in this thesis. Such a merger underpins the operation of the proposed collaborative monitoring tool. Some preliminary explanation of this merger is provided at this juncture as a basis for more detailed subsequent explanations.

1.4.1: Merging the Second and Third Objectives: A Broad Overview

The case study survey methods used to collect data in this thesis evolved to form the basis of the proposed collaborative monitoring tool. That is, the initial case study survey evaluated how well the rural *Living Landscapes* project, based on principles of adaptive management, engaged its participant local communities in social learning. The survey response rate was good with participant farmers answering most questions. However, feedback from respondents concerning its implementation indicated that the survey was too lengthy, repetitive and complex. Fortunately, shortly after completing this survey and during a period of primary data analyses, an unexpected opportunity to conduct a related survey arose. This survey evaluated how well an urban sub-regional program based on principles of cooperative management engaged its participant local communities in social learning. The initial rural case study survey instrument was simplified to expedite collection and analyses of these data.

Simplifying a case study survey instrument in this way - i.e. through “the researcher” learning from experience - is not unusual in case study research. However, in light of contemporary critiques of the case study methodology and ongoing reviews of the relevant sustainable NRM research and practice (some of which have been outlined in this introduction) “the researcher’s” learning experience in this thesis was more extensive. That is, the initial rural case study survey was not only simplified to improve the research outcomes. It was also modified with a view to it forming the basis of an operational collaborative monitoring tool for use in sustainable NRM research *and* practice. It was envisaged that such a tool might facilitate the ongoing collection of local community engagement/social learning data, the sharing of these data between local communities and the relevant governing bodies and hence data analyses. Moreover, it was also envisaged that the ongoing development and implementation of the monitoring tool itself would form a central part of this learning process. It was in this way that the case study research methods used to collect data for this thesis evolved to form the basis of the proposed collaborative monitoring tool.

With this in mind, the follow-up urban survey also became, in effect, a pilot study into developing the rudiments of a scientific collaborative monitoring tool underpinned by an evolutionary learning methodology (Hooshangi *et al* 2013).

1.4.2: A Scientifically-Based Collaborative Monitoring Tool Underpinned by an Evolutionary Learning Methodology (ELM)

Figure 1.2 provides a snapshot of how this collaborative monitoring tool might be implemented and further developed in an adaptive co-management context.

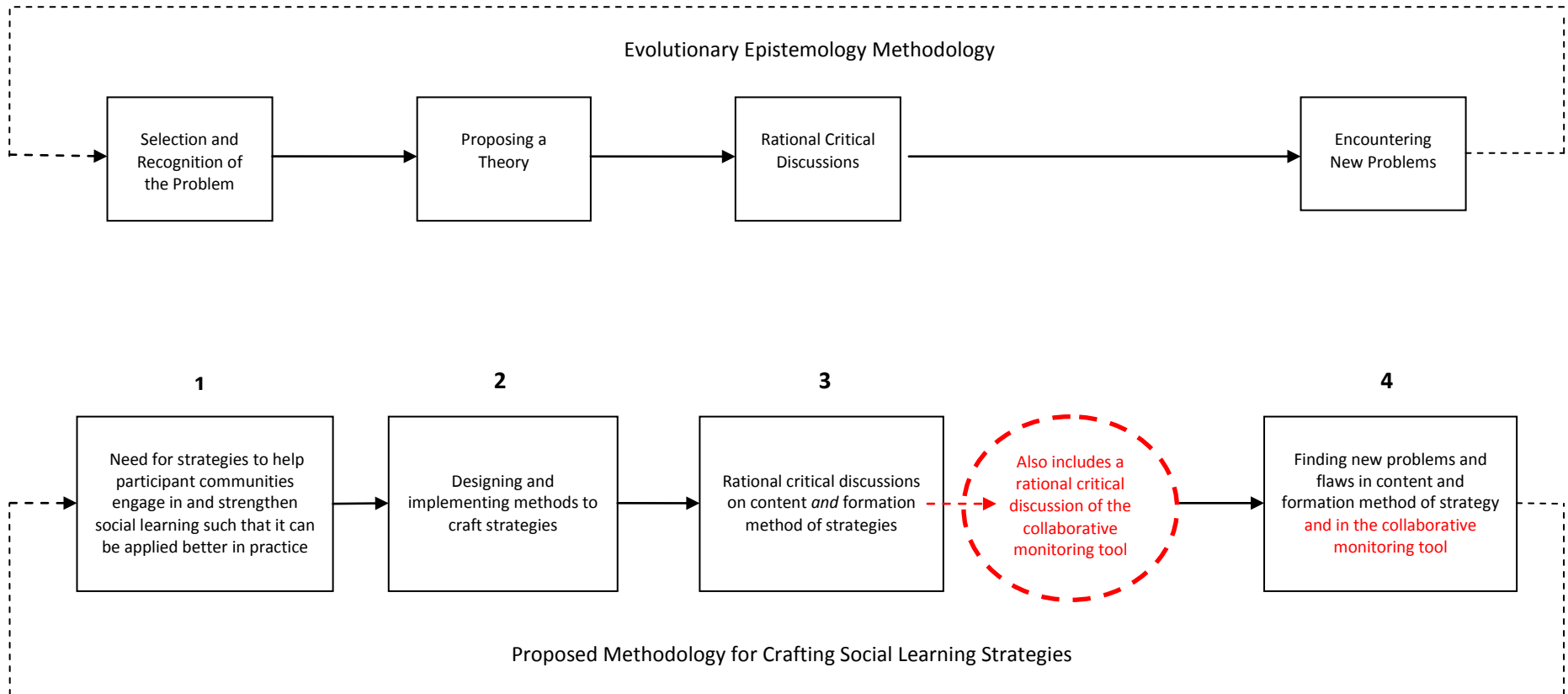


Figure1.2: Proposed Collaborative Monitoring Tool Implementation and Development in Adaptive Co-Management

Source: Based on Hooshangi *et al* (2013, p.963)

Figure 1.2 demonstrates the iterations in the development of the proposed collaborative monitoring tool. It provides an example of how this tool might be used to monitor and improve community engagement in social learning to address issues of social-ecological complexity in sustainable NRM (see Section 1.2, especially Pahl-Wostl 2007). In particular, it shows how this tool might facilitate triple-loop learning (Figure 1.1) by making the ongoing (self) assessment of the collaborative monitoring tool (highlighted in red) central to achieving these goals.

That is, this thesis proposes that ongoing implementation and development of monitoring should be managed in a facilitated or coordinated way by the relevant researchers and project managers as opposed to being managed totally by them. This tool and hence the researchers and/or managers using it should also be open to the same levels of scrutiny that they apply to those being monitored (“the researched”). Mechanisms for helping “the researched” to provide the substantive feedback required would be “built-in” to the relevant quantitative and/or qualitative surveys. In this way the researchers would also be encouraged to further examine their own values pertaining to the science of monitoring and to the associated methodologies and implementation methods. This level of engagement might also help researchers-as-facilitators to reduce the risk of making too many assumptions - for example about the accuracy of their scientific methods (Hooshangi *et al* 2008) - thus improving implementation, analyses and project and program outcomes (Broderick 2008; Blichfeldt and Andersen (2006) and Corcoran *et al* (2004)) Moreover, being more open to scrutiny researchers would also be better placed to build trust between sustainable NRM research communities, practitioners and broader communities. This could strengthen the nexus between sustainable NRM research and practice to “drive” the ongoing implementation and development of the proposed collaborative monitoring tool. Woodhill and Robins (1998), show how ‘continued monitoring requires [such] commitment and perseverance’ (p.18).

Self-assessment of the proposed collaborative monitoring tool, therefore, is the “linchpin” for making these connections - for finding common ground in learning (Frost *et al* 1999) - and thus for this tool’s effective operation. Figure 1.2 illustrates this and shows how this thesis builds on Hooshangi *et al*’s (2013) ideas as indicated by the following summary of their work.

Firstly, Hooshangi *et al* (2013) working in the field of R&D strategy development explain how ELM is about operationalizing evolutionary epistemology (Popper 1997; 1959). They show how the methods used for this purpose are underpinned by a process of learning over time in which both the content (of a proposed strategy) and the process (which includes methods of strategy formation) are subject to improvement. Thus they show how ‘at the limit formation and implementation become indistinguishable’ (p.958). When implementing these methods therefore:

R&D strategy is an *emergent* entity that is incrementally formed [not formulated] through decisions made, actions taken, and directions set by people who are involved in the strategy formation process (*ibid.*).

Operationalizing an evolutionary epistemology in R&D strategy development, then, is about creating a system for continuous improvement. Such an operation constitutes an ELM (*ibid.*). Figure 1.2 provides an initial snapshot of how ELM has been applied in this thesis: in data collection (Section 1.4.1) and then as a basis for a collaborative monitoring tool in crafting social learning strategies.

Secondly, Hooshangi *et al* (2013) posit that ELM compensates for the limitations of traditional rational approaches of data gathering and data processing. Using the example of planning methodology (PM), they argue that, in rational systematic data gathering and data processing, ‘strategy is considered a deliberate plan with formulation and implementation being separate processes’ (p.958). They suggest that the reason for this is the assumption ‘that validity and reliability of crafted [R&D] strategy are straightforward consequences of accurate and precise data analysis’ (pp.957-958). They argue that PM based on this assumption serves to divert attention away from the formulation process and onto the end goal - the formation of the strategy. This is achieved in practice through the relevant experts implementing strategic development methods that are already almost fully developed (ones that have been “tried and tested”; ones that experts are most familiar with?). The authors make the point that, based on these assumptions, strategic development methods are not subject to improvement during the formulation process and that this can result in R&D efforts being misdirected and unrewarded (*ibid.*). The possibility of such oversights occurring in sustainable NRM project and program implementation has already been raised in this chapter (Section 1.2, see especially Broderick 2008). Figure 1.2 also shows how the proposed collaborative monitoring tool, based on ELM, might minimize the risk of such errors occurring in the crafting of social learning strategies.

Thirdly, Hooshangi *et al* (2013) do not discard PM (see also Section 1.3, especially Cundill and Fabricius 2009). They demonstrate instead that ELM is most appropriate in areas like R&D strategy development:

When the environment is uncertain or fast changing, when there exist [sic] many stakeholders with conflicting interests, and when a method needs to be applied in a context other than the one for which it was initially developed (p.956).

Indeed, Hooshangi *et al* (2013) go on to caution that ELM and PM are not drastically different. For example, both methodologies need to take advantage of some data and analytical tools, to avoid errors, to minimize bias and to use supportive information. Essentially, they argue that ELM:

1. 'is different from trial and error [e.g. as in PM] in that it is based on rational critical discussions and expert judgment and is complemented by taking advantage of existing theories, tools, models, and knowledge' (p.972), and
2. 'that these [judgments and discussions] are not intended to and should not fully replace analytical tools or traditional research methods, such as scientific theories, case studies, statistical methods, mathematical models, and decision support tools' (p.973); and that, in fact
3. 'the evolutionary process and critical discussions are most effective when used in conjunction with such tools' (*ibid.*).

Hooshangi *et al* (2013) thus demonstrate that, although the two methodologies are theoretically distinct, they are still able to complement each other in practice. That is, they show how PM is not *systematically* focused on taking advantage of learning and tends to 'obsess over the accuracy of any single iteration' (p.973) while showing on the other hand how ELM *is* systematically focused on such learning and 'encourages a reasonable effort to do a good job in each of the iterations' (*ibid.* and see Figure 1.2). They then show how, despite these theoretical differences, learning still provides the common ground that is necessary for facilitating complementarity in practice: organizations seek to 'add to their experience - to learn from - a strategy formulation event no matter which methodology they use' (p.959). Hooshangi *et al* (2013) conclude by stating that notwithstanding such advances in understanding the presence of 'a well-defined procedure to conduct the relevant critical discussion panels' (p.973) is still missing. Figure 1.2, in providing a snapshot of how the proposed collaborative monitoring tool might operate in contemporary sustainable NRM, describes one such procedure.

This thesis, in achieving its three objectives, explains further the operation of the proposed collaborative monitoring tool as depicted in Figure 1.2. It also describes how this tool has been configured to compile a more comprehensive “how-to” manual. The thesis is organized as follows to achieve these objectives.

1.5 THESIS ORGANIZATION

This thesis is organized into eight chapters. Chapters 2 and 3 constitute the heuristic framework for this thesis. Each chapter represents an increasingly powerful “lens” through which more light is gradually shed on the community engagement, social learning and sustainable NRM concepts and practices examined in this introduction. Chapter 2 places these concepts and practices into their historical context. The chapter explores how they influenced each other (co-evolved) from early times to the present day. It concludes with an overview of the impact of these influences on contemporary sustainable NRM policy development and implementation in Australia. Chapter 3 examines how these Australian government policies were implemented in Western Australia (WA) first through Landcare and then through regional NRM programs. Part 1 discusses the implementation of Landcare and NRM programs in WA from 1990-2012. Part 2 describes the geographical locations and histories of the WA rural and urban regional organizations most relevant to this thesis. These organizations have guided the implementation of Landcare and regional NRM programs locally. This places the rural and urban initiatives examined in this thesis into their respective regional NRM contexts. It then describes these initiatives. It does so in terms of their capacities to engage their participant local communities in social learning to achieve more sustainable NRM in Australia. Chapters 2 and 3 thus achieve the first thesis objective. In so doing, they provide a firm basis for subsequent data collection, presentation and analyses.

Chapters 4, 5 and 6 describe, respectively, how data were collected, presented and analyzed in this thesis. Chapter 4 describes, firstly, how rural data and then urban data were collected using evolving case study survey methods. Building on the brief description of this process earlier in this chapter, Chapter 4 also includes further descriptions of how and why this “evolving learning methodology” unfolded in the way that it did. These descriptions situate the urban survey as a *de facto* pilot study and explain how the urban survey might also form the basis of the proposed monitoring tool. (Appendix 6 summarizes what this tool might look like, how it might work and which organizations might facilitate its

operation in practice. Appendix 6 thus constitutes a “how to” manual that can act as a general guide for the reader both prior and during the reading of this thesis.) Chapter 5 presents the results of these processes. While the results are presented in tables, the table configurations change in line with the evolving case study survey methods. The configurations of the urban results tables thus form the basis for presenting data collected using the proposed monitoring tool. (See in Appendix 6). Chapter 6 discusses these results identifying similarities between the rural and urban results. This chapter then discusses a common community engagement/social/triple learning issue and proposes a schema for addressing this issue. Chapters 4, 5 and 6 thus achieve the second thesis objective and form the basis for achieving the third.

Chapter 7 achieves the third thesis objective. This chapter discusses the feasibility of developing and implementing the proposed monitoring tool with the help of regional catchment councils in WA. In essence, this chapter discusses how this tool might be used, in practice, to identify the sort of community engagement/social learning issues brought to light in this thesis, and to track the effectiveness of a schema for addressing them. This feasibility study is based on Strengths, Weaknesses Opportunities and Threats (SWOT) analyses. Chapter 8 summarizes the thesis findings and identifies areas of research that would need to be undertaken to further these findings.

CHAPTER TWO

Linking Community Engagement, Social Learning and Sustainability in NRM

This chapter traces the historical development of interrelationships between the practices, processes and philosophies of, respectively, community engagement, social learning and sustainability in NRM. It does so from a pragmatic co-evolutionary perspective. The chapter seeks to provide a broader understanding of why managing social-ecological complexity in practice and achieving more sustainable NRM policies is still difficult to achieve in Australia. This chapter thus comprises the first part of a heuristic framework for this thesis.

2.1 PRAGMATIC CO-EVOLUTION

Until Charles Darwin published *On the Origin of Species*, in 1859, there was broad agreement among biological and social evolutionary scientists and philosophers of the day (e.g. Jean-Baptiste de Lamarck, Erasmus Darwin - Charles Darwin's grandfather, Sir Herbert Spencer and Thomas Henry Huxley) about how, for example, landscapes or bees or people and societies evolved. Essentially, such entities were acknowledged to evolve in linear progression from early primitive states characterized by disorder towards a modern evolutionary end-state characterized by ordered (harmonious) co-existence. Competition and struggle between entities were seen as necessary driving forces for reaching this ideal end-state and logical conclusion. Charles Darwin challenged this way of thinking about biological evolution and later, together with Huxley, social evolution. (Winder *et al* 2005).

Charles Darwin's theory of (biological) evolution differed from the ideas of his contemporaries in that he proposed a dynamic process of evolution driven, not by struggle alone, but by the much more complex process of natural selection. As Winder *et al* (2005) state:

To be evolutionary in a Darwinian sense of the word, a population of recognisable things must be capable of generating a variable response to its environment and be subject to some natural selection in respect of those responses. Natural selection, manifest as higher death rates and lower reproductive success, is a source of stress or selection pressure imposed differentially across the population. This process, which Darwin called "descent with modification" and Spencer called "survival of the

fittest”, is the defining feature of evolution and any theory that does not include it may describe a dynamic system, but not an evolutionary one (p.350).

Spencer, then, a ‘practising [sociologist] in an imperial age’ (*ibid.*) and perhaps the most traditional pre-Darwinian evolutionary thinker, embraced Darwin’s general idea of natural selection as the driving mechanism for the evolution of societies. However, he disagreed with Darwin about the internal dynamics of natural selection, or what drives this process. Darwin’s “descent with modification” view of natural selection embedded into biological evolution myriad feedback loops, reciprocities and contingencies to influence change and development in nature in space and over time. In contrast to pre-Darwinian thinking, this renders biological evolution a much more complex, uncertain and unpredictable process where both partial and systemic changes are possible and thus where many evolutionary end-states are also possible. Accordingly, cooperation as well as competition between populations of recognisable things must also be possible. Spencer however, in calling natural selection the “survival of the fittest” retained the notion of competition as the most prevalent dynamic driving natural selection in societal evolution.

There appears, then, at the time of these early debates, not so much complete opposition among biological and social scientists and philosophers to Darwin’s ideas of natural selection and its usefulness in understanding how nature *and* society (co) evolved, but rather emerging tensions and contradictions concerning its internal dynamics. All the scientists and philosophers named above, and others such as Karl Marx, became involved in the debates that characterized these tensions and contradictions. However, it was Huxley who perhaps best exploited them. He proposed (with the benefit of hindsight) an incipient complex dynamic systems view of natural selection to bolster Darwin’s great idea (*op. cit.*); to understand *how* nature and society (e.g. landscapes, bees, people and societies) developed and changed together (co-evolved) in space and over time.

Huxley ‘popularised a conception of biological and social dynamics’ (Winder *et al* 2005, p.350). His central thesis was that, while natural and/or societal populations change and develop in response to relevant external stresses (e.g. climate change, re biology, or institutional change, re society), sometimes these responses are more mechanistic than evolutionary. Again, Winder *et al* (2005) best explain the difference between mechanistic and evolutionary change:

A dynamic model of rainfall, or the movement of water in a river may exhibit continual state changes, but these changes are not evolutionary in the Darwinian

sense: they are mechanistic. The dynamic relations between the parts of the system (the system dynamic rules) do not change appreciably with time. To say this does not mean that damming rivers or anthropogenic soil loss have [sic] no hydrological impact, but rather that the hydrosphere's response to these changes is not evolutionary (p.350)

The crux of the matter for Huxley, given the introduction of the human factor, and given that the issue of choice now becomes a key dynamic, is being able to identify which process or processes is/are strongest in any given situation. Darwin also recognized the importance of Huxley's hypothesis for enhancing his own theory, both as a powerful metaphor for explaining biological *and* social evolution and thus its potential usefulness (e.g. in policymaking). Indeed, Winder *et al* (2005) have revisited this 'Darwin-Huxley synthesis' (cited first on p.347) to further examine its importance for strengthening contemporary co-evolutionary theory and, moreover, its application in contemporary policy development and implementation (e.g. in sustainable NRM).

Winder *et al* (2005) thus identify the sometimes subtle degrees to which contemporary natural and/or societal population responses to external stresses are: (1) mechanistic responses, (2) simple evolutionary responses, (3) isolated evolutionary responses and/or (4) co-evolutionary responses. Mechanistic responses have been defined above. Simple evolutionary responses occur when an evolutionary system is 'coupled to a mechanistic environment' (Winder *et al* 2005, p.356). Isolated evolutionary responses occur, not so much in *total* isolation, but when the dynamic linkages between populations of recognizable things that evolve in a Darwinian sense are weak. Winder *et al* (2005) use the example of the evolutionary relationship between a bee and a donkey; there may be a (co-evolutionary) relationship but if there is it is most likely to be a weak one. Co-evolution occurs 'when two or more evolutionary systems are linked in such a way that each helps determine the evolutionary trajectory of the other' (p.353). Here, in contrast to mechanistic, simple or isolated evolutionary dynamics the 'dynamic linkages between populations [e.g. between landscapes, bees and people and societies] are strong and the selective stresses they impose on each other are manifest and reasonably well understood' (Winder *et al* 2005, p.356).

Winder *et al* (2005) thus bring to light much that has been obscured by contemporary understandings of co-evolution. They argue that until quite recently, contemporary co-evolutionary theory as developed and popularized by Richard Norgaard (1984; 1994) in particular (but see also Ehrlich *et al* 1964 for the origin of modern ideas of co-evolution) has

been perceived by many contemporary socio-natural scientists as a relatively new idea; as 'a starting point rather than a staging post' (p.348). As such, these scientists subscribe to the idea that co-evolution is ubiquitous. Winder *et al* (2005) allude to a growing gap in our developing knowledge and understanding of (co) evolution that has impeded progress towards the effective application of this theory.

Winder *et al* (2005) argue that this knowledge gap arose, somewhat paradoxically, because of the (justifiably) high value attached to Norgaard's theory of co-evolution in the socio-natural sciences as 'a beacon for theorists and practitioners' (p.348). However, they also infer that, albeit unintentionally, such popularity has meant that contemporary co-evolutionary theory has not been scrutinized to the extent that it perhaps should have been, and that this led to the *de rigueur* view in socio-natural sciences that:

dynamic linkages between [co-evolving] populations [e.g. between landscapes, bees and people and societies] are [always] strong and the selective stresses they impose on each other are [always] manifest and reasonably well understood (Winder *et al* 2005, p.356).

Winder *et al* (2005) revisit the Darwin-Huxley synthesis not so much to find fault with popular contemporary co-evolutionary theory that has contributed so much to our understanding of the changing and developing relationships between nature and society, but to build on this good work. They thus seek to close this knowledge gap, or to unmask and reinvigorate an age-old debate. In summary, Winder *et al* (2005) revisit the Darwin-Huxley synthesis to contribute to improving the application of contemporary co-evolutionary theory (e.g. in sustainable NRM policy settings).

Most recently Richard Norgaard has recognized the work of Winder *et al* (2005) and others that has reignited interest in co-evolutionary theory and how it might be better applied (Kallis and Norgaard 2010; Gual and Norgaard 2010; Kallis 2007 Porter 2006; Winder 2005). According to Kallis and Norgaard (2010) it is less productive to debate whether one should focus on either direct (strong) or diffuse (weak) co-evolution of the relevant biological and social systems - e.g. between interacting 'institutions, technologies, beliefs, values, genes, human and animal behaviours' (p. 691) - as Winder *et al* (2005) argued. Although so doing forms a good basis for a new epistemology, it is more productive in formal theorizing and moreover in empirical research 'to recognize that each [system] has something to offer' in an all-pervasive co-evolving process (Kallis and Norgaard 2010, p.691):

An understanding that "everything" is coevolving with everything else needs to be complemented with the identification of what is co-evolving with what and how in

specific conditions or contexts and as relevant to specific analytical and policy purposes (*ibid.*).

Lastly, Kallis and Norgaard (2010) explore ideas about how this more pragmatic co-evolutionary approach might be applied in relevant research and policy settings (e.g. in sustainable NRM research and policymaking). Kallis and Norgaard (2010) discuss therefore the development of relevant “co-evolutionary mechanisms” based on learning and achieving the best possible outcomes. They assume first ‘the acceptance of an incommensurability of values [...] and the pragmatism of philosophers [...] for who thought itself is an evolutionary process’(Kallis and Norgaard 2010, p. 697); and then that:

- inquiry has a value in and of itself as a central process in the continuous adjustment of an organism and its environment;
- diversity of ideas, experimentation through trial and error, and continuous interaction and learning are desired *per se*;
- the theorist/analyst is a political actor, participant in the policy process, who generates information and seeks to attract attention (i.e. a positioned actor in the struggle of ideas for survival);
- scientific theories, including coevolution itself, are experiments to be judged by communities in terms of their consequences;
- such situated knowledge is partial, incomplete and politically motivated, yet critical and politically accountable through inter-subjective conversation.

(Kallis and Norgaard 2010, pp.697-698)

The last two points in particular highlight how a co-evolutionary mechanism based on learning can avoid relativism (*ibid.*). Any co-evolutionary mechanism therefore must be both focused in its design (e.g. well-planned, organized and configured according to some recognized standard and standardized) and flexible (e.g. able to be similarly applied across a number of different but relevant project, geographical and temporal contexts). The idea of pragmatic co-evolution as discussed above is thus relevant to achieving the scientific objectives of this thesis, in particular the proposed ongoing development and implementation of the monitoring tool outlined in Chapter 1 (Hooshangi *et al* 2013). However, this idea is also important philosophically in this thesis, which postulates the possibility that:

1. human societies were sharing their ideas about nature and how to implement them in practice for much of their early history (i.e. they were engaging in social learning for achieving more sustainable NRM for much of this time);

2. as such, human societies also had a pragmatic understanding of a co-evolutionary relationship between nature and society for much of this time;
3. this understanding became more idealistic around the time of agricultural settlement - at a time when the development of ideas became the remit of a power-elite to the detriment of learning how best to apply them in practice;
4. in more recent times, especially since the advent of the Industrial Revolution (indeed, at the time of Darwin), there have been many attempts to try and reinvigorate this time-honoured pragmatic understanding of co-evolution;
5. at the end of 20th Century/beginning 21st Century this reinvigoration of the concept of co-evolution, and thus of learning how best to develop and implement sustainable NRM, is being impeded.

The remainder of this chapter therefore explores the history of community engagement in social learning for achieving more sustainable NRM from this pragmatic co-evolutionary perspective in order to provide the basis of a relevant heuristic framework for this thesis.

2.2 AN HISTORICAL OVERVIEW

In pre-historic times prior to agricultural settlement around ten thousand years ago, humans had in effect been engaging in social learning for achieving more sustainable NRM in practice for millennia. Small isolated communities achieved this through sharing ideas about how best to manage nature and, through this process, they built strong partnerships. Indeed, such cooperation or collaboration in planning was part of everyday life and had much to do with satisfying basic survival needs in what must have been at times a very harsh world. By the time of agricultural settlement, then, humans had learnt much about the “kindness” and “cruelty” of nature and how to manage nature for the greater good. Arguably, such learning/planning was also a significant factor in humans achieving dominance as a species. (Hornborg *et al* 2007; McCall 2007; Wenke and Olszewski 2007; Boyd and Richerson 2005; Rice and Maloney 2005; Castro and Toro 2004; Ewert 2004; Dominguez-Rodrigo 2002; Hughes 2001; Guha 2000; Flinn 1997; Eder 1996; Feder 1996; Mannion 1991; Glacken 1967). Hughes (2001) sees these early forms of community engagement in social learning as strengthening relationships between human-environmental thought and action. He adds however that from the time of agricultural settlement this relationship began to weaken.

Firstly, Hughes (2001) explains how the ruling classes gradually took ownership of big ideas about nature ostensibly for the broader political and economic good of the populations in

their charge. He shows how the ruling classes took ownership of early forms of religious knowledge to manage nature for the “good” of agricultural settlements, and then how they used natural philosophy to manage nature for the good of city states, and later natural science to manage nature for the good of nation states (Glacken 1967). Hughes acknowledges that such management was not always implemented with good intentions, that it sometimes led to catastrophic outcomes for both nature and society, and, that it was a complex and uneven process worldwide. However, he does suggest that by and large the plans that powerful groups had for managing nature were well intended. Hughes then goes on to explain the adverse consequences of such knowledge accumulation by the ruling classes.

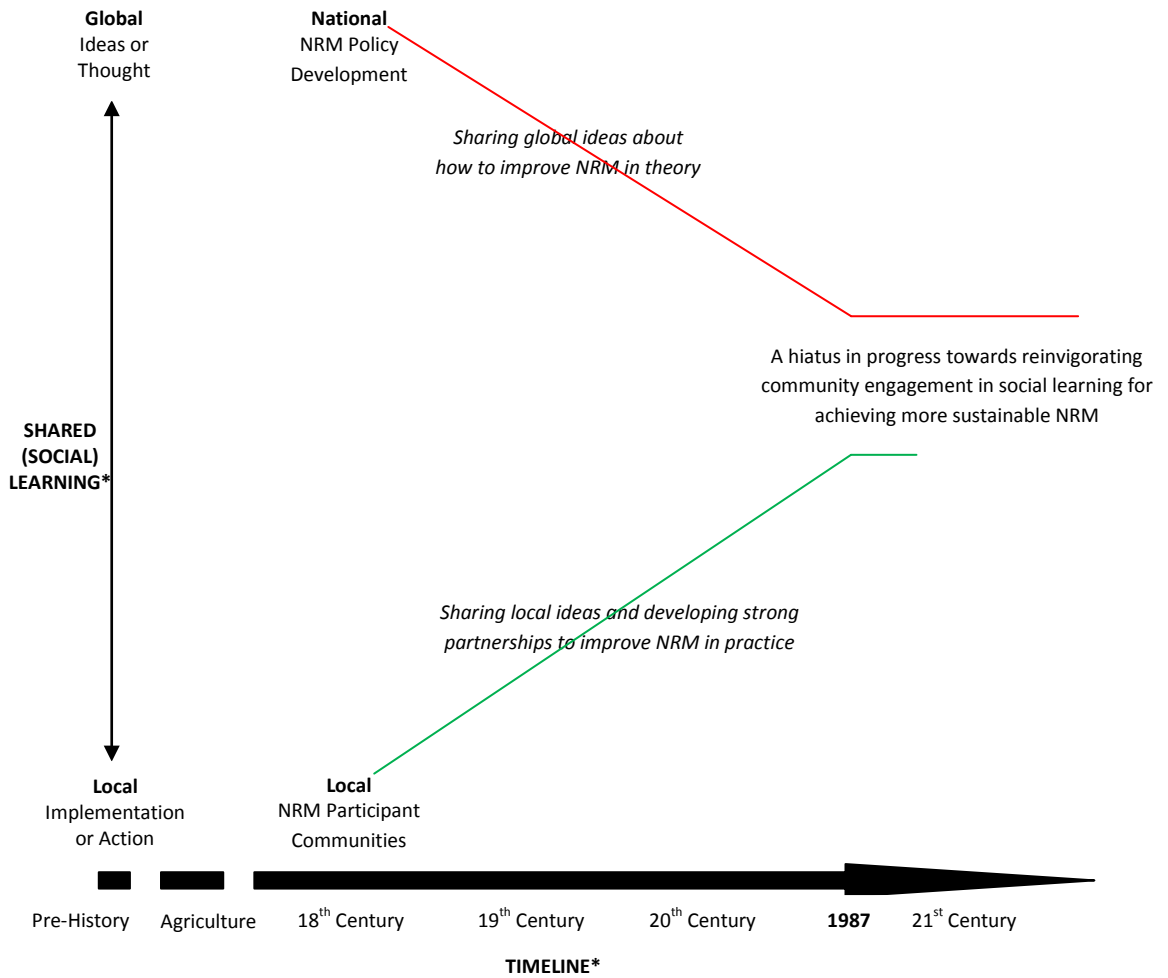
As the ruling classes gradually took more ownership of ideas concerning the management of nature, shared local knowledges and understandings of nature became less a part of broader and longer-term decision-making processes. As small isolated local community groups were assimilated into larger agricultural settlements, city states and then nation states they were increasingly less able to manage nature in accordance with their past traditions. As a consequence they felt disempowered and focused even more on what nature could offer their immediate families and communities; for example, in food production, building materials and resources for manufacturing crafts and artefacts to strengthen kinship bonds. While development of global ideas of nature became the domain of power elites, shared local knowledges and understandings of nature remained local and became more entrenched at this level. As such, the core partnership building processes that underpinned the effective implementation of these global ideas, based respectively on religion, natural philosophy and science, also remained local.

Secondly, Hughes, and others, show how wide this “disconnect” between global ideas of nature and their implementation at local community levels had become by the mid-18th Century and the advent of the Industrial Revolution (Goudie 1993; Pepper 1984). By this time global ideas of nature and its management had become increasingly scientifically and/or technologically-based. However, by the mid-19th Century, following broad recognition of the adverse impacts of the Industrial Revolution on nature and society, this position began to change. Former disparate national (and increasingly international) governing bodies and institutions and local community groups began to work better together to solve increasingly complex social-ecological problems (Hornborg *et al* 2007;

Peterson del Mar 2006; Ewert 2004). From the start of the Age of Globalisation in the mid-20th Century, where 'local people [became further] embedded in larger systems at the national and international level' (Tainter 2007, p.361), these social-ecological problems became even more complex. It became even more imperative that formerly disparate vested interest groups work together to share their respective knowledges and understandings of nature. Tainter (2007) however provides insights into why progress towards narrowing this gap has slowed over the past thirty or forty years, essentially as the pace of globalisation has increased (Terkenli 2005).

Thirdly, adopting a world systems view Tainter (2007) sees this slowing of progress as being the consequence of a 'disjuncture of scale' (p.361) in environmental (in this thesis, NRM) information transfer. Tainter bases his analysis on comparative geographical case studies of very different village settlements in Epirus, Greece, and Hispanic settlements in New Mexico, USA. He shows that, while the scale of the economic and political contexts of both populations had grown from the local to the national, and to the international community, changes in the scale of relevant NRM information had not kept pace with these developments. That is, the scale of their (the villagers') NRM information, instead of being embedded more in these global contexts, remained local. As with most local communities around the world, when faced with such global (external) pressures they become focused on information that mattered most to them: 'kin, community, politics, economy, infrastructure, government services, weather and sports' for example (p.372). However, Tainter (2007), while acknowledging the importance of this kind of local information in NRM, also suggests that there has until quite recently been a tendency for the relevant governing bodies to, in a sense, "over value" this local information. That is, with all good intent, in helping local groups to manage their natural environments NRM governing bodies have focused too much on what these local communities require (or on what they think local communities require). They have, at the same time, lost sight of how best to help local participant communities to think more about NRM in terms of 'systems and interconnections at all scales' (p.373). In effect, contemporary well-meaning governing bodies are again facilitating the "withdrawal" of local community groups from broader and longer-term decision-making processes (Hughes 2001). Globalisation does impact on local communities. There is, therefore, an ever greater need for governing bodies in NRM to help these communities to understand these interconnections, so that they can manage their local natural environments more sustainably in this broader context. Figure 2.1 provides a

snapshot of how this disjuncture of scale in information transfer developed in an historical context which forms the basis of the pragmatic co-evolutionary heuristic used in this thesis.



*These “scales” simply denote how the learning concepts and practices explored in this chapter may have interacted (co-evolved) historically and geographically.

Figure 2.1: Progress in Community Engagement in Social Learning for achieving Sustainable NRM from a Pragmatic Co-evolutionary Perspective

Figure 2.1, based on the evidence described above, illustrates how community engagement in social learning for achieving sustainable NRM has changed over time. This notion of a hiatus in progress thus forms the basis of the pragmatic co-evolutionary heuristic used in this thesis. Beginning with the advent of the Industrial Revolution the following sections describe in more detail how this hiatus eventuated in contemporary times thus consolidating its central value in this heuristic.

2.3 CONTEMPORARY HISTORICAL DEVELOPMENTS

The advent of the Industrial Revolution gave rise to more complex interrelated social and natural environmental problems that proved increasingly difficult to solve (Hornborg *et al* 2007; Hughes 2001; Goudie 1993). From the early 19th Century through to the early 20th Century this spawned the development of the nature conservation movement. This occurred initially in the UK through the writings of the romantic poets, but later mainly in the USA through the writings of naturalists like John Muir, Aldo Leopold and David Henry Thoreau (Garrad 2004). The world's first national park - Yellowstone National Park - was established in the USA in 1872. The 19th Century also saw the birth of modern environmentalism (Peterson del Mar 2007; Lewis 2007; Guha 2000; Pepper 1996; 1984; Worster 1988). However, this period was also characterised by a growing awareness of how nature and society were interrelated. As a consequence, there was a realisation that, if social-ecological problems were to be effectively addressed, the relevant parties, many of them with strong competing vested interests (e.g. naturalists and industrialists), needed to work together. They needed to share their respective knowledge, understandings, skills, expertise and experience and develop collaborative processes. Schmandt (2010) and Dresner (2008) note the development of the ideas of sustainability and sustainable development and their applications. Such collaboration became embedded in NRM during the early to the mid-20th Century in the USA.

As Ewert *et al* (2004) explain, this was a period of growing conservation enlightenment in the USA which, somewhat paradoxically, brought about a split in the conservation movement. This split was initiated as a result of debates between *conservationists*, like President Theodore Roosevelt, also a forester, who had a utilitarian view of nature, and *preservationists* like John Muir, who continued to argue for pristine nature. Divisions between these groups became more blurred in the 1930s with the advent of water impoundment (e.g. through the building of great dams such as the Hoover Dam in Nevada) and the contemporary rise worldwide of the discipline of ecology. (Ecology was then a new science that investigated how all species interacted with their environments.) In this context, while the adverse impacts of these large constructions on fragile, primarily desert, environments were realized so too were the benefits of these dams to millions of people in improving their quality of life. Ewert *et al* (2004) explain how debates between relevant individuals, communities and organisations became more complex as they encompassed the political, commercial, social and cultural aspects of nature conservation. Adjudicating

between competing interests became more difficult to manage and this necessitated government involvement. Ewert *et al* (2004) describe this period of large-scale dam construction in the USA as the first manifestation of how increasingly complex multi-scale problems could be solved more effectively through such government led or planned collaboration.

The period of conservation enlightenment in the USA, reinvigorated community engagement in social learning in NRM and a time-honoured pragmatic understanding of the co-evolutionary relationship between nature and society. However, progress towards incorporating these improvements and understandings into what was to become government sanctioned sustainable NRM did not begin until the late 1960s and early 1970s. A world-wide growth in grass roots environmental awareness and activism and the spread of the concept of sustainable development, which was subsequently espoused by the relevant governing bodies, expedited this progress (Dresner 2008; Peterson del Mar 2006; Garrad 2004; Pepper 1996; 1984; Gruen and Jamieson 1994).

2.4 MORE RAPID PROGRESS TOWARDS achieving SUSTAINABLE NRM

During the late 1960s and early 1970s awareness of the environmental impacts of development began to impact on the consciousness of populations worldwide. For example, major highways were being built, often encroaching on green space; air pollution from factories increased with wide-ranging effects; major waterways were being polluted; and the adverse effects of mining were being felt by communities downstream (Hornborg *et al* 2007; Hughes 2001; Rootes 1999; Goudie 1993; Worster 1988). These issues transcended national borders and subsequently united sections of the population worldwide in the cause of environmental activism. Popular and influential books and reports by campaigning individuals and groups brought such issues to the public's attention, notably: on the impact of DDT on the natural environment (Rachel Carson in her book *Silent Spring*); on the risks associated with nuclear power (the Sierra Club); and on poor methods of waste disposal (David Brower, also a member of the Sierra Club and founder of Friends of the Earth). There were also burgeoning permaculture and antinuclear movements. The term sustainability was used by such authors and environmental groups to promote pro-environmental ideologies to the general public. Sections of the general public at this time readily accommodated these ideas. They were becoming much more aware of the impacts that rapid 20th Century industrial developments were having on the

natural environment. Though not an entirely new concept (McNeill 2001; Boyden 1997; Ponting 1990 and in Volume 1 of *Ecological Economics*), it was during this period of rapid industrial, technological and indeed social change that the term “sustainability” became established in the modern environmental lexicon. The publications of the *Spaceship Earth* essay by Kenneth Boulding in 1966 and then *Limits to Growth* in 1972 were influential precursors of the concept of sustainability (Dovers 2005, p.39).

By the 1970s pro-environmental groups were gaining wider acceptance and the term sustainability was beginning to be mentioned in an official context. For example, the Club of Rome published *Limits to Growth* in 1972. As a consequence of the increasingly consolidated pro-environmental voice, legislation supporting the conservation and protection of the natural environment was introduced in many advanced industrial countries. Such legislation necessitated the development of environmental policies and management plans. The proliferation of new laws, policies and management plans to protect the natural environment during the 1970s and into the 1980s resulted in intense debates over the merits of pro-environmental policies and laws. As Gruen and Jamieson (1994) in particular show, these debates were not so much centred on pro-environmental policies (e.g. clean air policies) *per se*, but more on their meaning and application in practice. The focus of attention in these debates, then, was not on the problems (e.g. of pollution) but on the broader implications of the solutions being proposed. For example, there was some criticism that environmental policies were beginning to place the welfare of animals before that of people, and, that such policies could not effectively cope with complex issues such as rapid population growth. Better (more sustainable) management of the environment could be achieved, according to these critics, by also incorporating the reality of economic growth. However, during this period sectionalism crept into these debates as both economists and environmentalists defended their respective positions. Their arguments became overly simplistic - being reduced to the espousal of personal profit versus that of the public good. Eventually, a stalemate ensued and tension mounted as these groups found themselves at loggerheads. It was in this context during the 1980s that the search for a compromise between groups with competing vested interests began in earnest, and, that the notion of sustainability, as we understand it thus far, emerged and became institutionalised (Leach and Pelkey 2001).

During the mid to late 1980s therefore the concept of sustainability was beginning to provide a paradigm within which diverse interest groups could construct compromise solutions to complex environmental problems. For example, internal debates within the environmental movement also emerged - between the “dark greens” (deep ecology) and the “light greens” (ecological economics) (Guha 2000 and Gruen and Jamieson 1994). It was in this shifting context of simplistic arguments concerning natural environment management and more complex arguments about how best to manage the natural environment in a context of rapid and uneven human development that the compromise term sustainable development emerged. Gro Harlem Brundtland is generally recognised as the first person to popularise the use of the term sustainable development in the publication *Our Common Future*. This report came at a time when national governments were searching for an overarching theme that they could use to bring together those groups arguing for better environmental protection and those groups arguing for more rapid economic growth in the context of the development of more effective NRM policies (Dovers 2005). Brundtland defined the concept of sustainable development as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (World Commission on Environment and Development 1987, p.2). This definition of sustainability has since underpinned many strong partnerships between competing interest groups at a variety of scales from the international to the local community level. It has been used as a basis for governments and governing bodies developing much more structured collaborative approaches to managing the natural environment - sustainable NRM for example.

Progress towards reinvigorating community engagement in social learning for achieving more sustainable NRM, underpinned now by the notion of sustainable development (and thus a reinvigoration of a time-honoured pragmatic understanding of a co-evolutionary relationship between nature and society) had begun to accelerate during the mid to late 1980s. However, this chapter contends that, despite such underpinnings, progress towards achieving these goals in practice has been impeded in recent decades (Figure 2.1). Tracing the recent development of sustainable NRM in Australia can shed some light on how this hiatus in progress eventuated.

2.5 THE DEVELOPMENT of SUSTAINABLE NRM in AUSTRALIA

As in the USA, during the 19th Century early European settlers in Australia were becoming aware of the impacts of land clearing and landscape changes on the country's native flora and fauna. More organised environmental activism emerged out of this awareness and by the end of the 19th Century activist groups were beginning to have an impact on government policy concerning the environment. For example, the world's second national park, the Royal National Park south of Sydney in New South Wales, was established in 1879. In 1879, also, 'several public men ... raised their voices in favour of the government providing public parks, pleasure grounds, and places of recreation adjacent to all thickly populated areas' a signpost 'national' park (Royal National Park Trust 1902, p.7, cited in Dovers 2000, p.2). Kings Park in Perth, Western Australia, was formed in 1901 (from the originally named Perth Park formed in 1895) following such protests. By the early 20th Century, formally organised environmental activist groups became even more influential in this regard through their attempts to mitigate the environmental impacts of, for example, the gold rush and more extensive land-clearing. By the mid-20th Century, environmental lobby groups were becoming increasingly concerned about the environmental impacts of more extensive mining practices. They were also becoming concerned about a growing hydro-electric power industry and associated dam-building projects. These environmental lobby groups argued that such large-scale developments would have a devastating impact on the natural environment. However, as seen during the building of the great dams in the USA and the advent of more collaborative watershed management (Ewert *et al* 2004), competing interest groups were, by the mid-20th Century, beginning to work better together to try and reconcile human economic development and protection of the natural environment (Dovers 2000; Young 2000; Hutton and Connor 1999; Dovers 1994). Despite their many political differences several competing interest groups in Australia were able to find common ground in the interest of furthering human economic development and protecting of the natural environment. Such early cooperation was the basis for more structured government-led sustainable NRM approaches to be established in Australia during the 1980s based on international principles of sustainable development.

As in the USA, from which many lessons were learnt (Ewert *et al* 2004, Powell 2000), conflict over water use and its management was a significant catalyst for the establishment of more formal collaborative NRM strategies in Australia:

On the international scene the [World Commission on Environment and Development] WCED report (1987) and the subsequent 1992 National Strategy for Ecologically Sustainable Development endorsed by all levels of government in Australia, gave formal recognition to environmental issues many of which were water-related (Smith 2003, pp.60-61)

Construction of the Burdekin Dam in Queensland, the Ord Dam in Western Australia and (successful) battles to prevent the building of the Franklin Dam in Tasmania are examples of such conflicts; as is the ongoing debate over irrigation in the Murray-Darling Basin (Powell 2002). By the late 1980s, then, international ideas of sustainability and sustainable development, implemented through collaborative NRM projects, were being integrated into environmental policy development in Australia. These ideas were integrated into Australian environmental policy development through the establishment of the *National Strategy for Ecologically Sustainable Development (NSES D)*, which was endorsed by the Council of Australian Governments in December 1992.

2.5.1: National Strategy for Ecologically Sustainable Development (NSES D)

During the early 1990s, the Australian Labor government 'in consultation and negotiation with industry, community, conservation groups, scientific organisations and all levels of government' over a period of two years, defined and applied 'the concept of sustainable development taking into account our unique natural environment, the aspirations and values of the Australian people and the prevailing patterns of economic production and consumption' (www.environment.gov.au/esd/). Negotiations resulted in the development of the *National Strategy for Ecologically Sustainable Development (NSES D)*, which defined ecologically sustainable development as:

Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased (www.environment.gov.au/esd/).

The strategy was based on five broad guiding principles:

- Integrating economic and environmental goals in policies and activities
- Ensuring that environmental assets were properly valued
- Providing for equity within and between generations
- Dealing cautiously with risk and irreversibility
- Recognising the global dimension (e.g. *NSES D* ties in with Agenda 21/the Rio Earth Summit 1992)

Since its introduction, the *NSESD* has underpinned the development of sustainable NRM policies in Australia and these have been implemented through a variety of national environmental programs and local projects largely based on the principles of catchment management (see Chapter 3). However, The Great Barrier Reef and its hinterland was the first large scale area in Australia to be managed on this basis. This is evidenced through the successful establishment of the Great Barrier Reef Marine Park Authority (GBRMPA) in July 1976 and, moreover, its capacity to facilitate shared knowledge and understanding between major players across the catchment (Lane and Robinson 2009; GBRMPA 2009a 2009b; Dore *et al* 2003, p.171.) Dore *et al* (2003) also examine other sustainable regional initiatives in Australia). The GBRMPA has been quite successful in facilitating community engagement in social learning for achieving sustainable NRM. However, notwithstanding this success, the natural environment of The Great Barrier Reef is still very much under threat. The management of the Great Lakes area of the USA and Canada that adopted similarly based watershed management approaches is facing similar challenges (Breffle *et al* 2012). The contradictions inherent in the management of the Great Barrier Reef are examined in the following subsection.

2.5.2: Contradictions in Managing the Great Barrier Reef

In terms of its iconic status as an area of natural beauty ‘the jewel in Australia’s natural crown’ is the Great Barrier Reef in Queensland (Nurse-Bray 2000, p.166). The GBRMPA has been instrumental in maintaining the reef’s status in this regard. GBRMPA’s policy implementation provides a relevant illustration of how competing interests were able to respond to a common environmental problem – loss of coral and biodiversity on the reef:

There has been a long history of jousting between the Commonwealth and Queensland governments which eventually led to the creation of the [GBRMPA], which is variously supporting, controlling or serving other parts of the ‘institution’ including advisory groups and a Ministerial Council. The initiative has produced a 25-year plan, released in 1994 [...], which is an excellent example of clearly expressed objectives and strategies. It is also a good example of an institution which is necessarily multifunctional, as research, planning and management are all required to inform new policy (Dore *et al* 2003, p.171).

From the late 1980s, in this incipient sustainable development/ecologically sustainable development NRM policy framework, the Australian Conservation Foundation (ACF), the National Farmers Federation (NFF), Queensland State Government and Australian Government agencies and volunteer community groups began to form strong working partnerships to establish the GBRMPA (Nurse-Bray 2000, pp.166-169). Hutton and

Connors (1999, pp.99-106) provide a more detailed account of the environmental activism and the gradually increasing public and government awareness of the deteriorating ecological health of the Great Barrier Reef that preceded the establishment of the GBRMPA. The formation of the GBRMPA, then, is a good example of how governing bodies began to valorise and fund, the development of partnerships involving diverse interest groups. However, notwithstanding the success of the GBRMPA, the ecological health of the reef remains under threat. For example, while the health of local natural environments and catchments that drain into the Coral Sea/Great Barrier Reef are improving, the health of the reef as a whole is not improving, and is perhaps in decline:

The Great Barrier Reef receives the runoff from 38 major catchments which drain 424 000 km² of coastal Queensland. Over the last decade, the declining quality of water entering the Great Barrier Reef has been recognised as a major threat to the ecosystem. However, despite improvements in local land management, the quality of catchment runoff entering the Great Barrier Reef continues to cause deterioration in the water quality in the Great Barrier Reef Region (GBRMPA 2009a, p.11).

Consequently, there is growing concern among the many groups involved in the sustainable management of the Great Barrier Reef about the long term effectiveness of current programs, and of the community engagement in social learning approach that underpins this process. Murphy (2011) for example examines the broader issues affecting the implementation of these NRM programs in the Great Barrier Reef region: climate change, overfishing, pollution, tourism and differing viewpoints. Taylor *et al* (2012) examine some of the more complex social learning problems that extend into the sub-catchments and catchments that drain into the reef.

Taylor *et al* (2012) note first the extensive cattle grazing, intensive sugar cane farming and horticultural production that take place in the reef-related catchments. The authors then note that, while many of these local industries have reduced their levels of pollution and, as such, have also contributed towards improving the quality of the natural environment in their local areas (GBRMPA2009b), collectively, they still pose an environmental risk for the Great Barrier Reef. Sediment, nutrient and pesticide runoff from these catchments continue to degrade coastal and marine ecosystems. They then examine some of the more complex problems that underpin these biophysical issues:

multiple sources of ambiguity - competing values, political motivations, the language of plans and policies, regulatory discretion from devolved responsibility, and legislative change [which are] features present in the policies and processes associated with the co-regulatory arrangements of reef planning (p.163).

Taylor *et al* (2012) examine some possible causes for the 'disjuncture of scale' scenario proposed by Tainter (2007) in an Australian NRM context (Wallington *et al* 2012). Moreover, with the exception of competing values and political motivations that can occur across all groups, the authors seem to suggest that the problem of 'multiple sources of ambiguity' originate at the governmental, legislative, policy planning and management levels. Taylor *et al* (2012) for example show how, on the one hand, governing bodies responsible for the management of the Great Barrier Reef are "moving ahead" - developing legislation, policies and plans - in an endeavour to address complex problems such as competing values and political motivations at the broader catchment scale that are a product of rapid globalisation (Tainter 2007). However, on the other hand they also show how these governing bodies are (unintentionally) still not communicating such global issues to local communities across the broader Great Barrier Reef catchment in ways that are meaningful to these communities. Arguably, then, it is this situation that has helped to create greater feelings of uncertainty among local communities as they become even more overwhelmed by these bigger picture issues. As Tainter (2007) suggests, under such circumstances local communities tend to "withdraw" and focus on what matters most to them. In this Great Barrier Reef example, local communities across the catchment have begun to focus mainly on local initiatives to improve their immediate natural environments. Wilfully or not, they remain unaware of information about the bigger picture issues that affect local communities and their natural environments, and through them the entire reef ecosystem. Improvements in local natural environments may be occurring but not the more sustainable management of Great Barrier Reef terrestrial and marine ecosystems as a whole.

This Great Barrier Reef paradox raises questions about the effectiveness of the on-ground methods and tools used to engage local communities in social learning for achieving more sustainable NRM. The *National Landcare Program (NLP)*, however, the development of which was influenced a great deal by these Great Barrier Reef experiences (Nurse-Bray 2000, pp.166-171), provides a much better context for examining these practical issues. Firstly, Landcare is perhaps the most recognised and successful large scale environmental management program undertaken by the Australian Government. Secondly, Landcare is noted for its capacity for bringing disparate groups together through the implementation of relevant on-ground measures. Thirdly, notwithstanding this success, Landcare is experiencing contradictions similar to those experienced in the management of the Great

Barrier Reef. Landcare thus provides a much more suitable context for further investigation of the effectiveness of on-ground methods for engaging communities in social learning for achieving sustainable NRM. The *NLP* is described more fully in Chapter 3. The following section provides a preliminary overview of Landcare in general terms.

2.5.3: Australia's Landcare Program: Community Engagement Partnerships and Social Learning

The origins of Landcare can be traced to the post-war development period in Australia, and more specifically to the amalgamation of individual rural soil conservation programs in the 1946:

The Standing Committee of Soil Conservation was established in 1946 ... to act as the national coordinating body on soil conservation. The Committee reported to the Australian Agricultural Council, established in 1935 for continuous consultation amongst Australian governments on economic aspects of primary production (Love 2012, p.12) (Youl 2006, Youl *et al* 2006, Lockie and Vanclay 1997 and Campbell 1994 also write on the history of Landcare).

Initially, individual farmers were provided with state government grants, loans and extension services backed by research for on-farm soil conservation. During this early period, the associated advice was usually top-down, given to farmers by members of the relevant government agencies. The Department of Agriculture in Western Australia was an example of one such agency. This advice was not always well received by farmers, and was not always good advice. By the 1960s, such assistance was extended catchment-wide. This involved increasing collaboration between state government departments and rural farming communities across Australia and the consequent formation of relevant authorities, committees, divisions, boards and national groups. This was a catalyst for developing the federally funded *National Soil Conservation Program*, which, by the 1980s, was operational throughout the country. This program worked well nationally, but especially well in Western Australia given the state government's long history of addressing problems of salinity, and in southeast Victoria where the name Landcare was initially coined during the late 1980s by the program participants.

The name Landcare arose because the *National Soil Conservation Program* was proving to be as much about people and communities as it was about soil conservation. This was evidenced by the strong collaborative partnerships and social networks that were being built between individuals and organisations. The name Landcare reflected a more holistic approach to land management: an approach with a strong social as well as economic base

underpinned by an ethos of developing good governance. Recognising the growing strength of Landcare in this context, Joan Kirner, Victorian Minister for Conservation, Forests and Lands in an ALP government, and Heather Mitchell, president of Victoria Farmers Federation (VFF), clearly of opposing political persuasions, collaborated to help convert a regional movement for improved soil conservation into a 'multidisciplinary community-based highly autonomous Landcare program' (Youl 2006, p.5). However, the name Landcare was not to be used officially, as part of a major program, until further collaboration had been achieved between advocates of opposing political views, this time at the Australian government level (Love 2012).

Ongoing and effective collaboration between advocates of opposing political views and environmental values continued officially at the national level, initiated by the late Rick Farley, then president of the National Farmers Federation (NFF) and Philip Toyne, then president of the Australian Conservation Foundation (ACC). These advocates for Landcare found common ground. They met with Bob Hawke, then Prime Minister, and convinced him and other members of the Labor Federal Government that the nation, primarily the rural sector and the environment, needed urgent action otherwise agriculture, pastoralism and the natural environment would be severely damaged. The idea, initially, was to establish a Year, followed by a Decade, of Soil Conservation that was soon renamed the Decade of Landcare. The first year of the Decade of Landcare was 1990.

In 1992 the *NLP* was established as a formal framework for implementing Landcare across Australia and to work towards the establishment of sustainable ecosystems:

The National Landcare Program's primary focus on sustainable agriculture included improved management of the natural resource base - soils, water, and vegetation - at the farm level

http://www.daff.gov.au/natural-resources/landcare/national_landcare_program#nlpspc

In general terms, though, the *NLP* was part of a broader push for more sustainable environmental management.

Much of the success of Landcare can be attributed to the ways in which Landcare helped volunteer neighbourhood groups to engage in practical natural environmental management. More importantly for this thesis, Landcare also helped local community groups to form strong and creative partnerships with other associated interest groups. Partnerships have been developed between local Landcare community groups and local, state and/or Australian government agencies and organisations, non-government

organisations, industry groups, non-professional (hobby) farmers, nature conservation groups and between people of all ages (Youl 2006; Youl *et al* 2006; Gleeson *et al* 2004; Williams 2004; Curtis 2003; Locke and Vanclay 1997; Campbell 1994). Landcare, then, is probably the best known and most successful example of a major environmental program in Australia. It succeeded in enabling, facilitating, improving and strengthening community engagement in social learning partnerships between local communities and governing bodies. However, notwithstanding these on-ground successes Landcare has experienced and is still experiencing problems. These are discussed in more detail in Chapter 3.

Landcare in Australia, then, provides a very suitable context within which to interrogate community engagement in social learning and sustainable NRM, and thus to consider the pragmatic co-evolutionary, issues examined in this chapter and, moreover, how one might better address them in practice.

2.6 SUMMARY

This chapter has explored the history of the developing and changing interrelationships between community engagement, social learning and sustainability from a pragmatic co-evolutionary perspective. It attempted to provide an understanding of how nature and society co-evolve. In so doing this chapter has revealed gaps in our understandings of how these practices, process and ideas interweave and to suggest possible reasons why nature and society are not co-evolving as effectively as they could or should be. Moreover, this chapter has demonstrated how these “gaps” might be better visualized in terms of a pause (a hiatus) in our developing understandings in this regard. The notion of a hiatus may help us to see contemporary theories (such as co-evolution) less as starting points and more as staging posts on the route to a more sustainable future. This notion might help us to better acknowledge (and track) not only past mistakes but also attempts at all levels of society to put things right. Such learning is nothing new and we have much to gain from past endeavours. In short, if these gaps in our knowledge and understanding are understood in these terms there is perhaps less chance of “throwing the baby out with the bathwater” in developing more sustainable NRM policies and practices. More specifically, then, the notion of a hiatus attempts to place the issue of engaging communities in social learning for achieving more sustainable NRM policy development and implementation into clearer perspective. This chapter thus paves a way for developing the co-evolutionary mechanisms

required to achieve such community engagement in practice. Chapter 3 illustrates the usefulness of this co-evolutionary heuristic in greater detail.

CHAPTER THREE

Landcare: Policy Development and Implementation in Western Australia 1990-2012

This chapter provides the Australian geographical and associated sustainable NRM context for this thesis. The chapter develops a broad preliminary understanding of how and why a hiatus in progress towards achieving sustainable NRM may have emerged. It provides a framework for examining ways to better engage local communities in social learning as a means for reinvigorating progress in this area. It also provides a basis for developing the necessary mechanisms - for better applying co-evolutionary theory in practice (Chapter 2). The chapter is in two parts. Part One (3.1) discusses the implementation of Landcare in Western Australia between 1990 and 2012 through the Australian Government's *National Landcare Program (NLP)*, *Natural Heritage Trust 1 Program (NHT1)*, *Natural Heritage Trust 2 Program (NHT2)* and *Caring for Our Country Program*. This discussion focuses on the changing capacity of government to engage local participant communities in social learning for achieving sustainable NRM in Western Australia (WA) and in Australia. Part Two (3.2) describes the geographic locations and histories of *Perth Region NRM* and *Wheatbelt NRM* in terms of the changes that occurred in Australian government policymaking in sustainable NRM. It also describes two projects in which local communities were engaged in social learning for achieving sustainable NRM. This part of the chapter provides further insights into the extent to which these projects were able to engage their local participant communities in such learning during this period of change. The chapter concludes with a summary of the findings of these broad preliminary analyses as a basis for further discussion in this thesis.

3.1 Part One: The Implementation of Landcare in Western Australia

Landcare was implemented through four consecutive Australian government programs.

These were:

1. *National Landcare Program (NLP)*
2. *Natural Heritage Trust 1 Program (NHT1)*
3. *Natural Heritage Trust 2 Program (NHT2)*
4. *Caring for Our Country Program*

3.1.1: Landcare and the NLP

Prior to Landcare, during the early 1980s, Land Conservation Districts (LCDS) and Land Conservation District Councils (LCDCs) were established in rural WA to help local farmers engage in the *National Soil Conservation Program (NSCP)*. An LCD is 'any portion of the State defined for that purpose by the Governor in Council under the Authority of the Soil and Land Conservation Act (1991)' (Soil and Land Conservation Council 1991, p.122). Land Conservation District Committees (LCDCs) were formed subsequently to 'assume responsibility for action' (Campbell 1992, p.80); to coordinate and administer Landcare/soil and land conservation, 'to oversee projects, works and land use' (Soil and Land Conservation Council 1991, p.76), within the LCDs as defined by the 'Soil and Land Conservation Act' (Soil and Land Conservation Council 1991; Campbell 1992). They were gazetted by state governments and were imbued with some statutory authority. Moreover, the gazetted boundaries of LCDs often coincided with those of local authorities and shire councils to 'provide a focus for broader community involvement in land use planning and implementation' (Soil and Land Conservation Council 1991 p. 57). These broader LCD/LCDC boundaries have significant implications for examining community in social learning for achieving sustainable natural resource management (NRM) in this thesis.

In addition to their roles as bureaucratic organisations advising and assisting local farming communities with soil conservation and agricultural land management administration, LCDCs also helped improve communication. They were better able to discuss *NSCP* funding, planning and management of local Landcare community groups at and between the various tiers of operation. They were able to liaise with other relevant local state government partners. For example, LCDCs could discuss local soil and land conservation issues with local government representatives, the Department of Agriculture and other agencies such as the (then) Department of Conservation and Land Management (CALM) for the benefit of local Landcare groups and the Shire. Moreover, as such:

It soon became apparent [that LCDCs] were willing and able to play a more active role, so in the 1988 amendments, the roles and responsibilities of LCDCs were broadened to [inter alia] develop, promote and implement programs within Land Conservation Districts (Campbell 1994, P.24).

As part of this expanding role, LCDCs facilitated community engagement in learning for achieving sustainability in Landcare through helping to implement relevant on-ground methods and activities. For example, 'many LCDCs organized field days, workshops, tours and seminars to support their activities, and produced a newsletter and arranged publicity to keep all member landholders in touch' (Soil and Land Conservation Council 1991, p.57). Although later criticised (Schapper 1997), then, LCDCs during the formative years of Landcare were much more than administrative bodies. They were providing 'a focus for broader community involvement in land use planning and implementation' (*ibid.*). LCDCs were perhaps becoming effective conduits for building stronger partnerships with the relevant governing bodies in WA and, as such, for implementing the *NLP* in WA (Youl *et al* 2006 and Lockie and Vanclay 1997 discuss these issues).

This example of Shire/LCD/LCDC community engagement in WA shows how, at the start of the Decade of Landcare (1990), *NLP* governing bodies had begun to engage local farmers effectively in core social learning processes. However, by the mid-1990s Landcare in Australia along with other major environmental programs had moved towards developing and implementing more inclusive, strategic and scientifically-based catchment management approaches to achieve more sustainable environmental management (later NRM). To achieve this goal in WA, the relevant *NLP* governing bodies began incorporating Integrated Catchment Management (ICM) principles into the existing Shire/LCD/LCDC based approach to Landcare (Bowden 1999). Through incorporating ICM principles into Landcare, local Landcare communities in WA were being asked by the relevant *NLP* governing bodies to become engaged in social learning at a much more inclusive and strategic planning level for improving soil and land conservation (Campbell 1992, pp.79-82). LCDs/LCDCs, despite showing early signs of success in building strong partnerships for such engagement started to become less effective at helping local participant communities adapt to ICM-based Landcare (Goss and Chatfield 1992 cited in Campbell 1992, p.81). This transition is a complex process and is explained further in the following subsection.

During the early 1990s, LCDs, supported by LCDCs, began to incorporate the newly forming ICM-based sub-catchment groups into Landcare with some success (Campbell 1994). Under

the auspices of *NLP* governing bodies, the LCD-based agricultural extension officers and participant Landcare communities worked together to improve existing community engagement methods and activities to help these local Landcare communities adapt to ICM-based Landcare. The case study of the Peel-Harvey Community Catchment Centre (Campbell 1994, pp.113-121) demonstrates how this process was implemented in practice:

The Community Catchment Centre ... is about neighbours helping neighbours and implementing a diversity of low-tech strategies, each of which is capable of improving the quality of the catchment by a little bit The catchment works in close cooperation with the nine local authorities, three Landcare Conservation District Committees, numerous catchment groups, progress associations and other landholder committees (pp.114-115).

This case study is an example of how a 'two-tier' ICM-LCD/LCDC system for implementing Landcare at the local community level evolved to help local Landcare communities implement a more strategic and scientifically-based Landcare (Goss and Chatfield 1992, cited in Campbell 1992, p.80). Campbell (1992) suggested that such a transition towards more inclusive, strategic and scientifically-based Landcare was a complex process and that it was not managed by the relevant *NLP* governing bodies at all levels as well as it could have been.

Campbell (1992) explains how during the implementation of this two-tier ICM-LCD/LCDC system in WA the newly forming and much smaller ICM-based sub-catchment groups were keen to embrace this change, and to engage more substantively in strategic and scientifically-based Landcare: 'There is a strong trend among the groups in [WA] to ask themselves the question – *why are we here?*' (p.80). He explains how a major *NLP* governing body - the *Soil and Land Conservation Council* - recognised these (social) learning qualities. Noticing this trend, the council encouraged these sub-catchment groups to take advantage of the opportunities this new ICM approach to Landcare afforded them: to be able to look at their own performance, report on progress and discuss their future needs and thus to achieve the independence they desired. In terms of on-ground community engagement methods and activities another *NLP* initiative, the *NSCP*, funded specific goal-setting workshops. From the mid-1990s LCDs were beginning to be perceived less in terms of Landcare facilitators (see above) and more as an 'intrusion by ministerial appointment of farmer and grazier office-bearers' (Schapper 1997, p.110), and were becoming moribund. Campbell (1992) explains how a growing necessity for WA governing bodies to rapidly engage local community groups in ICM-based Landcare may have overshadowed an

important requirement: to build on the desires, capacity and willingness of local Landcare communities to engage in this more strategic and scientifically-based approach to Landcare. Goss and Chatfield (1992) show how these governing bodies were compelled by world events - unexpected external pressures - to expedite such community engagement. They explain the impacts of the global agricultural economic downturn in WA in late 1990 and how the Department of Agriculture responded by placing even greater emphasis on farm and catchment planning with groups. The aim of government was to use the economic recession as an opportunity 'to plan a better coordinated and more cost effective response when commodity prices pick up [because during such times] planning is cheap, implementation is not' (Goss and Chatfield cited in Campbell 1992, p.81). However, Goss and Chatfield also show how, in accelerating such community engagement, governing bodies contributed towards local Landcare community groups in transition feeling burnt out (Curtis 2003, pp.453-454). For example, they show how quickly these groups were expected to engage in and demonstrate and evaluate their success in some very ambitious corporate sponsored projects, with little or no prior experience of so doing. The newly forming sub-catchment groups were experiencing the adverse effects of 'rising expectations and information overload' (Goss and Chatfield cited in Campbell 1992, p.81; Curtis 2003, p.449). Chief among these unrealistic expectations was that in addition to improving their soils for more sustainable agricultural production these newly forming sub-catchment groups were also expected to focus on nature conservation. Goss and Chatfield (1991) commented:

[There was a] tendency for Landcare groups to broaden their focus to encompass rural nature conservation, land use planning, agricultural production, etc., and to a parallel trend which has seen external agencies (mostly, but not all from government) placing extra demands on groups to be aware of or involved in their programs (cited in Campbell 1992, p.81)

This comment suggests that the relevant governing bodies made assumptions about the capacity of local Landcare community groups to adapt to their proposed changes. They assumed that these newly forming sub-catchment groups could cope well on their own. They assumed, for example, that these groups were capable of working collaboratively with corporate sponsors, reporting on and evaluating their success, planning for the future *and* embracing nature conservation (Nurse-Bray 2000, p.174; Curtis 2003, pp.449-454). These assumptions were misplaced. There was a need for government in WA to shift to this ICM-based Landcare model (Campbell 1992, pp.79-81). There was also a desire among local

Landcare communities to embrace such change, for greater independence. However, these local groups still needed ongoing support from the relevant WA and Australian government bodies, via the *NLP*, to help them adapt to these changes. Building on Chapter 2, this chapter examines such local scale complex problem situations (Pahl-Wostl 2007; Chapter 1) - their causes and effects and how one might address them. It does so in the context of developing sustainable NRM policies in Australia focusing specifically on community engagement in social learning aspects of implementation.

This thesis suggests that the relevant (*NLP*) governing bodies made some erroneous assumptions about the abilities of local Landcare communities to cope with change (to ICM-based Landcare) because the *NLP* at this time was implemented as a “stand-alone” major program. Several reports (Australian Government 2003; Cary and Webb 2000; Commonwealth of Australia 1997) support this claim. Walker (2000) shows for example:

Landcare is primarily directed at natural resource management. Landcare groups are encouraged to address the fundamental causes of the problems shared by their members. It is not uncommon for groups to conclude that their natural resource problems are related to other problems of enterprise or community viability and function. Effective management of these interrelated problems means that Landcare must work with other interventions which are intended to enable rural Australia to become sustainable (Walker 2000, p.138).

This thesis posits, then, that while effective initially in engaging rural peoples in local community-based Landcare, the *NLP* was much less effective at engaging these people in the transition towards more strategic ICM-based Landcare. The thesis suggests that a major reason for this is the *NLP*'s ineffectiveness in facilitating community engagement in social learning for achieving sustainability between the major programs. This thesis argues that if the *NLP* had been able to facilitate such learning then these complex problems of transition would have been better identified, understood and addressed much earlier in the life of the *NLP*. Figure 3.1 provides an overview of the associated community engagement in social learning pathways in Australian government sustainable NRM policy development and implementation.

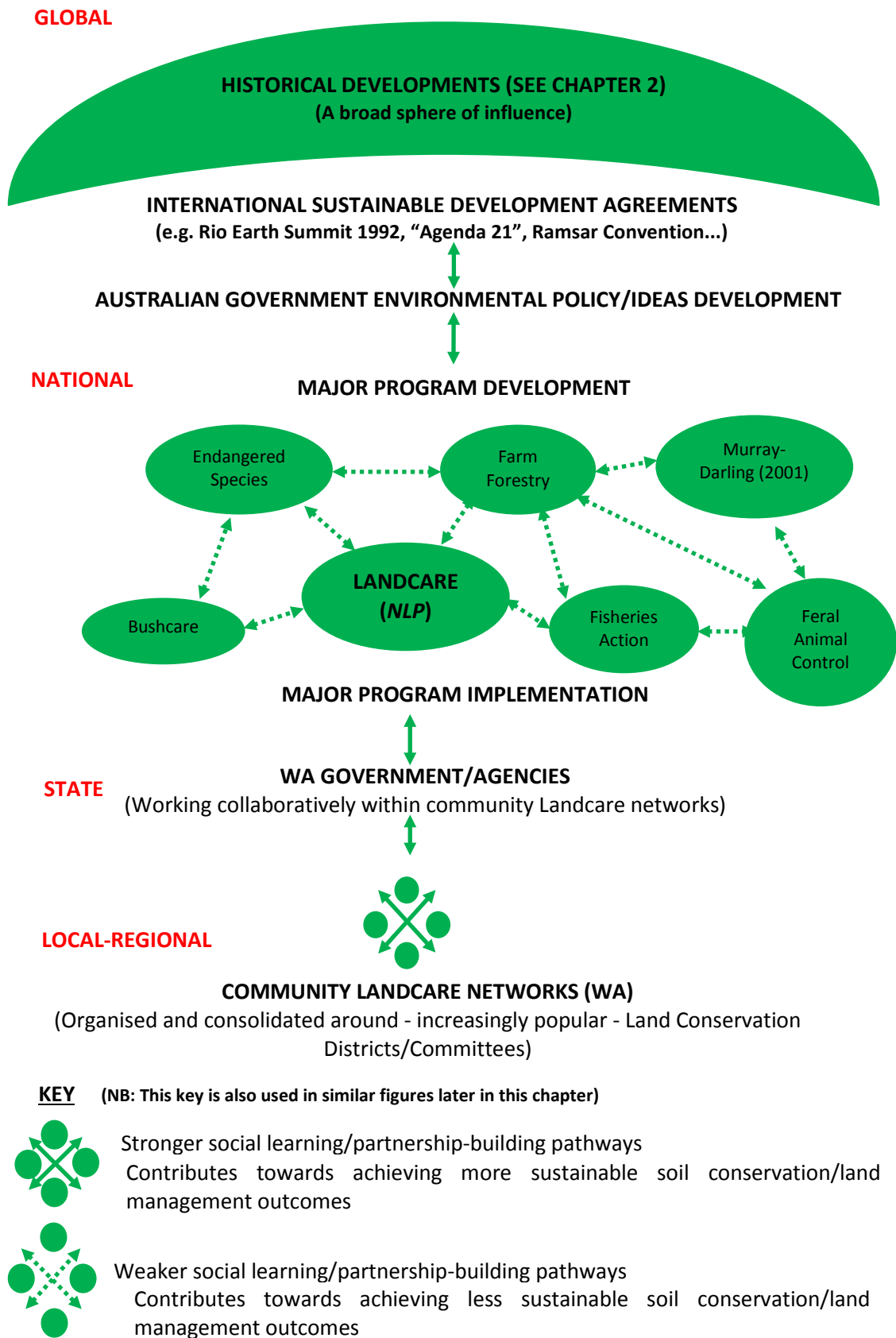


Figure 3.1: NLP Implementation in WA (1990-1998) Based on Community Engagement in Social Learning Pathways for Achieving Sustainable NRM

Figure 3.1 illustrates how the *NLP* implemented between 1990 and 1998 as a “stand-alone” program was partially effective at engaging WA Landcare communities in social learning for achieving sustainable NRM. It illustrates how the *NLP*:

1. Facilitated community engagement in social learning and built strong partnerships between local-regional participant communities/Land Conservation Districts (LCDs)/Committees (LCDCs) and the *NLP* governing bodies.
2. Contributed towards developing more sustainable soil conservation/agricultural land management practices especially at the local-regional community scale (e.g. reducing salinity and improving soil quality on local farms across the region).
3. Facilitated community engagement in social learning much less effectively between all the relevant *NLP* parties and those in other major programs at a national scale.
4. Contributed less effectively towards developing more sustainable soil conservation/land management practices, also, at much greater scales (i.e. could not repeat the local-regional success in WA Landcare more broadly at state, national and ultimately international scales).

Figure 3.1 thus shows how Landcare, via the *NLP*, may have in a sense become a victim of its own early success. Because the *NLP* was a local success story, in “the rush” towards introducing more sustainable ICM-based Landcare *NLP* governing bodies overlooked some of the more complex problem situations associated with this transition. Figure 3.1 might help better explain why and how sustainable NRM policy development and implementation in Australia is being impeded.

Many authors concur that Landcare via the *NLP* had been successful in raising awareness, partnership-building and through these processes addressing land degradation problems on the farm and at the local community scale (see the HC Coombes Policy Forum Publications 2011; Dovers and Wild River 2003; Dovers 2000; Miller and Curtis 1999; Curtis and De Lacy 1996). More recent publications (reviewed below), however, broadly concur with Simpson and Clifton (2010) who concluded that the original aim of the *NLP* to provide agency support ‘to kick-start the community groups into action with the Landcare groups quickly becoming independent bodies’ (p.401), was unrealistic.

Over the past ten years sustainable NRM researchers and practitioners are now developing better mechanisms (tools) for engaging communities in social learning for achieving sustainable NRM policy development and implementation in practice. These tools are being developed for use at the community level, where more sustainable NRM polices are most

tangibly expressed (Wilson 2009; Wilson 2007; 2012). This work is still in its infancy (for a rural WA perspective see Allison and Hobbs 2006).

Measham (2009), moreover, goes further and examines the potential of incorporating social learning into dryland salinity program evaluation to solve the complex problems that arise in environmental management given the contested views of place. Measham also examines how such practical social learning-based evaluations can assist more sustainable NRM policy development and implementation (see also Cooke 2010).

Such research is making even greater in-roads into informing sustainable NRM practice. For example, Leys and Vanclay (2011) examine land use change to hardwood plantation forestry in sub-tropical Queensland, and the potential of social learning to bridge local knowledge and scientific knowledge to improve NRM policymaking. Wallis *et al* (2012) examine in the area of water management the potential for social learning to bridge the gap between *what is* and what local participant communities perceive *ought to be*. They cite, for example, the gap between *actual* centralized sustainable NRM policymaking and a desire among local communities to play a more proactive role as independent partners in this process. Community engagement in social learning in this context, then, has the power to transform sustainable NRM policy development and implementation. Mitchell *et al* (2012) conducted a literature review of social research in hydrology. These authors conclude that there is still room for much more social research in this area; for example, into the different perceptions about concepts, such as sustainable yield, that are used when communicating practices in hydrology to the wider community. Much of this new work in Australia is underpinned by growing international research in this area (Schusler *et al* 2003; Keen *et al* 2005; Muro and Jeffrey 2008; Collins and Ison 2009; Rodela 2011 and Diduck *et al* 2012).

In summary, while the *NLP* was successful within the confines of the program, it was much less successful at facilitating community engagement/social learning between major programs. This leads into the next section that discusses implementation of the “more integrated” *National Heritage Trust (NHT) Phase 1 (NHT1)* in WA.

3.1.2: NHT1

Between 1996 and 2007, the newly elected Australian Liberal government incorporated the *NLP* into a much larger national program called *The National Heritage Trust (NHT)*. This decision, widely supported by groups such as the *Australian Conservation Foundation (ACF)*,

the *World Wildlife Fund (WWF)* and the *National Farmers Federation (NFF)* (Hassel and Associates PTY Ltd 2005, p.2), was based on the 1996 State of the Environment Report, which stated that:

[Improvements in natural resource condition] will come about only with substantial changes in the way that land and oceans are managed, (State of the Environment Advisory Council, Australia: State of the Environment, Department of the Environment, Sport and Territories, 1996, pp.4–55, cited in Australian National Audit Office 2007-8, p.33).

An NHT Act was then established to implement a comprehensive integrated program to conserve, repair and replenish Australia's natural capital infrastructure. The Act stated that:

There is a need to integrate the objectives of environmental protection, sustainable agriculture and natural resources management consistent with the principles of ecologically sustainable development Natural Heritage Trust of Australia Act 1997, Preamble, p. 1, cited in Australian National Audit Office 2007-8, p.34).

Based on this State of the Environment report and on legislation the NHT's objectives were:

- Biodiversity conservation—the conservation of Australia's biodiversity through the protection and restoration of terrestrial, freshwater, estuarine and marine ecosystems and habitat for native plants and animals;
- Sustainable use of natural resources—the sustainable use and management of Australia's land, water and marine resources to maintain and improve the productivity and profitability of resource based industries; and [of major focus in this thesis]
- Community capacity building and institutional change—support for individuals, landholders, industry and communities with skills, knowledge, information and institutional frameworks to promote biodiversity conservation.

Source: (Australian National Audit Office 2007-8, p.34)

This major program was implemented in two major phases *NHT1* and *NHT2*. These NHT phases are examined in more detail in relation later in this Chapter. The following paragraphs provide brief overviews of *NHT1* and *NHT2*.

NHT1 (1996/7-2001/2) was an interim program implemented between ICM-based Landcare in WA¹ and the more inclusive, strategic and scientifically-based *NHT2* regional NRM approach based on principles of Integrated Natural Resource Management (INRM) (Ewert *et al* 2004). Key instruments for delivery of *NHT1* were Bilateral Agreements, which were formed between the Australian and State governments:

¹ Also, ICM in WA is known by other names across Australia; e.g. in NSW it is known as Total Catchment Management/TCM

Bilateral partnership agreements, struck between the Australian and State and Territory Governments in 1997, formed a key plank in the delivery of funding under Phase 1 of the Trust...The partnership agreements aimed to provide the framework for achieving on-ground results, integrating the delivery of the Trust activities at the State level. The partnership agreements also sought to ensure that State policies and regulatory structure were consistent with national objectives and priorities for environmental protection and sustainable development.

Source: (Hassel and Associates 2005 pp.4-7)

Bilateral Agreements are examined further in this section. Briefly, though, they were not coordinated well between the States and Territories. This prompted a mid-term review of *NHT1* to conclude that: 'contemporary approaches to NRM require comprehensive strategies at both the national and regional level to develop new sustainable land use and land management systems that will help meet environmental, economic and social goals' (Joint Team, Mid-term Review of the Natural Heritage Trust: Review of Administration, November 1999, p.5, cited in Australian National Audit Office 2007-8 p.41). *NHT2* followed. *NHT2* (2002/03 and 2007) was implemented in conjunction with the *National Action Plan Salinity and Water Quality (NAP)* established earlier in 2000/01 (see below). *NHT2* thus 'offered a framework for NRM planning and action that suited the specific circumstances of different regions and allowed the social, economic and environmental dimensions to be considered in an integrated way' (Australian National Audit Office 2007-8, p.35). Moreover, the *NAP* was implemented in conjunction with *NHT2* to motivate and enable regional communities to:

- Use coordinated and targeted action to prevent, stabilise and reverse trends in dryland salinity affecting the sustainability of production, the conservation of biological diversity and the viability of infrastructure; and
- Improve water quality and secure reliable allocations for human uses, industry and the environment.

Source: (Australian National Audit Office 2007-8, p.35)

With respect to community engagement, social learning and sustainability issues examined in this thesis associated monitoring and evaluation processes emerged as significant impediments to both *NHT1* and *NHT2* programs. (Audit Report No.36, 1996–97, *Commonwealth Natural Resource Management and Environment Programs*; Audit Report No.43, 2000–01, *Performance Information for Commonwealth Financial Assistance under the Natural Heritage Trust*; Audit Report No.17, 2004–05, *The Administration of the National Action Plan for Salinity and Water Quality*; and Audit Report No.31, 2006–07, *The*

Conservation and Protection of National Threatened Species and Ecological Communities.)

In retrospect, Australian National Audit Office (2007-8) especially provides examples of such non-compliance based on the best monitoring and evaluation processes available at the time. The report shows for example that:

- There is little evidence as yet that the programs are adequately achieving the anticipated national outcomes or giving sufficient attention to the 'radically' altered and degraded Australian landscape highlighted in the 1996 Australia: State of the Environment Report (p.16).
- At the time of the evaluations there was little evidence that there has been any substantial movement towards landscape scale repair and replenishment of natural resources as envisaged by the NHT (p.24).
- The Commonwealth Scientific and Industrial Research Organisation (CSIRO), in a report to the Joint Team in 2004, commented that the success of programs like the NHT depends on the knowledge and expertise of the regional bodies...Nevertheless, the regions surveyed by the Australian National Audit Office commented that there is still much to be done to improve the dissemination of lessons learned at the regional level (p.17).
- The success of the programs depended on the knowledge and expertise of [the regional bodies]. As such, focus should be given to strengthening knowledge transfer (p.44) [See also Tainter 2007].
- [With respect to] the availability of information about successful and unsuccessful initiatives...We do not share knowledge or products well and this is the single biggest weakness of the regional model (p.45).

Source: (Australian National Audit Office 2007-8)

The remainder of this section further examines the implementation of *NHT1*. It applies the heuristic developed in Chapter 2 in an endeavour to create more space for developing practical solutions to the complex problems explored in this thesis (Chapters 1 and 2). Figure 3.2 (using the same format and key as Figure 3.1) provides the basis for this examination.

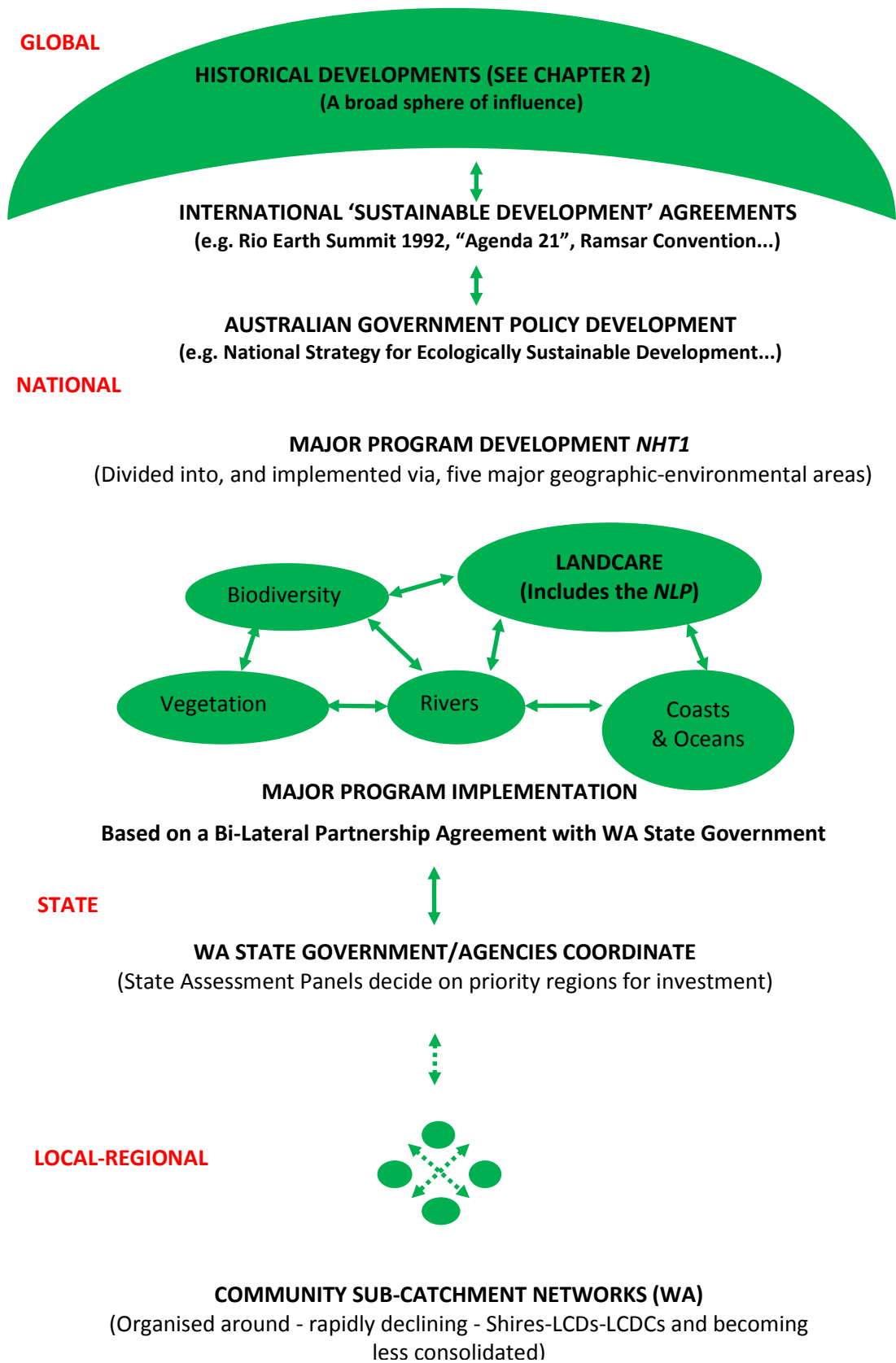


Figure 3.2: Implementation of the *NLP* through *NHT1* in WA (1996/7-2001/2) Based on Community Engagement in Social Learning Pathways for Achieving Sustainable NRM

Figure 3.2 illustrates how *NHT1*, organised and implemented on the basis of geographic-environmental areas or subprograms, might have achieved the following outcomes:

1. Stronger social learning for sustainability pathways at the national, policy development scale than was the case with the stand-alone *NLP*. Better facilitated the sharing of policy ideas between the relevant governing bodies of experts than did the *NLP*.
2. (Potentially) better big picture or landscape-scale plans and strategies for achieving more sustainable soil conservation and land management outcomes across Australia than had the *NLP*. For example, plans and strategies that could:
 - (i) connect local-regional Landcare communities and experts in WA (Figure 3.1) with other participant local-regional Landcare communities/experts across Australia, and, similarly, with communities and experts from other associated environmental programs and projects;
 - (ii) scale up local-regional knowledge sharing/social learning and thus contribute towards reducing, for example, salinity and improving soil quality beyond the farm and specific local-regional areas.

Figure 3.2 also illustrates how *NHT1* might not have achieved Item 2 in practice; how, in practice, *NHT2* began to:

3. weaken community engagement in social learning pathways for sustainability at the critical local-regional scale – pathways that were being developed via the *NLP* (cf. Section 3.1.1, Figure 3.1); and thus,
4. contribute, albeit unintentionally, towards impeding the implementation of sustainable soil conservation and land management policy ideas, plans and strategies in practice.

This sustainable NRM policy development and implementation scenario for WA Landcare in Figure 3.2 is also based on an examination of related national issues concerning knowledge management and transfer raised in the Natural Heritage Trust Phase 1 Final Evaluation 2005, and in the ITS Global 2006 report which evaluated the effectiveness of the Bilateral Agreements (see series of *NHT 1* annual reports available at <http://nht.gov.au/publications/books/index.html>). These issues were covered in broad terms previously in this section. However, to help further substantiate this proposed community engagement/social learning scenario the following paragraphs examine the effectiveness of some of the mechanisms established to help facilitate such information

flows, viz: Bilateral Agreements (already defined) and their operation via State Assessment Panels (SAP) (defined below).

Firstly, with respect to the Bilateral Agreements between the Australian government and the States and Territories concerning their capacity for facilitating “Information and Knowledge Exchange”:

The structure and processes specified in the Bilateral Agreements have delivered information and knowledge exchange at two levels. The processes implemented to develop and accredit regional plans are the drivers of information and knowledge exchange between Australian Government agencies, state and territory agencies, academia, industry, the community and regional bodies. This information and knowledge exchange, has resulted in a more scientific, and consistent, strategic approach to NRM, delivered primarily through regional bodies. *Unfortunately the same level of information and knowledge exchange cannot be demonstrated for operational aspects of the Bilateral Agreements* [my emphasis].

Regional bodies, in particular, registered two main concerns. First, while they provide voluminous information and some knowledge to [Joint Steering Committees] JSCs, and other entities involved in compliance, they are not included in information exchange processes. Regional bodies seek a stronger transparent process in decision-making by jurisdictions and JSCs, particularly decisions on funding levels to regions. Second, and related to the above, regional bodies consider they could learn more effectively and more seamlessly deliver programs and investments, by having a formal annual exchange of lessons learnt and views. This would be most useful if it involved JSCs and other regional bodies, from all states and territories. *For jurisdictional meetings of the JSC, the regional bodies consider the Bilateral Agreements should contain standard conditions for representatives of regional bodies to be observers at meetings, and for minutes of JSCs to be distributed to all regional bodies.* It is regarded as unfair and inefficient for JSC to allow representatives of some regional bodies to attend JSC meetings as observers, but exclude others. *The overall finding is that while limited information feedback and exchange is occurring at the JSC level, additional processes need to be developed and implemented to ensure that regional bodies are more effectively and efficiently engaged [as observers sanctioned through the Bilateral Agreement?] in information feedback and knowledge exchange* [my emphases].

Source: (ITS Global 2006, pp.32-33)

Secondly, earlier, the broader *NHT1* final report had reached similar conclusions:

Respondents in the strategic consultation highlighted the fact that strategic frameworks to direct investment were lacking at state and regional scales, creating an incomplete suite of NRM strategies. Inconsistent policy frameworks and vertical duplication between the Federal and State Governments was thought to have created a confusing governance structure. *Respondents noted that the governance skills and accountability of representatives on state and regional assessment panels were a critical factor in determining how effective the regional process was* [my emphasis].

Source: (Hassel and Associates 2005, p.102)

State Assessment Panel (SAPS) comprise independent experts and community representatives. Panel members further assess grant/funding applications initially reviewed by the relevant NRM organizations (defined later in this chapter) in line with the technical and regional advice given to them. SAPs then forward their recommendations to the WA NRM Ministerial Council, the chair of which is the Minister for Agriculture, Food and Forestry. Other members are Ministers for Environment, Water and Fisheries. The Ministerial Council provides final approval for grant/funding applications.

With respect to facilitating knowledge transfer, the above reports suggest that the crux of the matter is not so much the Bilateral Agreements and/or SAPs, *per se*, but the ways in which SAPs in particular have implemented this process. In the Upper South East Region of NSW for example: 'Respondents felt that some of the comments received back from the SAP showed lack of understanding for regional issues and the regional communities resented being told what their priorities were' (Hassel and Associates 2005, p.108). There seems to be, then, an impediment to progress in this area occurring at a state-regional scale (i.e. between the relevant state and regional bodies). Indeed, relatedly, the ITS Global Report (2006) suggests *inter alia* that to help improve the operation of SAPs 'the role of regional bodies and local governments could be more comprehensively incorporated into mutual obligations specified in the Bilateral Agreements, consistent with legislative requirements' (p.4). The crux of the matter for improving facilitation of knowledge transfer concerns governance:

Governance provides the social context that allows collective action, rule-making, and institutions for social coordination. The term governance refers to the interactions among structures, processes, rules, and traditions that determine how people in societies make decisions and share power, exercise responsibility, and ensure accountability, and how stakeholders have a say in the management of natural resources (Cundill and Fabius 2010, p.1).

Moreover, the crux of the matter is also about learning how better to improve governance in practice (e.g. see Chapter 1 re adaptive co-management).

In summary, the less than effective implementation of the Bilateral Agreements, via SAPs in particular, may have limited the newly forming regional catchment councils from further imparting bigger picture knowledge and understanding of Landcare to their respective participant local communities. For example, in this thesis the *Swan Catchment Council (SCC)* and the *Avon Catchment Council (ACC)* would have been limited in this way. Indeed, these incipient regional councils were themselves in need of better advice and support (feedback;

e.g. see Lefroy 2008) concerning implementation of Bilateral Agreements via SAPs in this emerging strategic and scientifically-based sustainable NRM policy context. As such, councils were much less able to help their respective local Landcare communities to become independent partners. Therefore, while “horizontal” knowledge transfers/flows, or community engagement in social learning pathways, between sub-programs (including the *NLP*) were strengthened, corresponding “vertical” pathways (previously strong under the “stand-alone” *NLP*; see Figure 3.1) were being impeded or weakened (Figure 3.2).

In terms of the heuristic used in this thesis, this situation is viewed as a contributing factor in the development of a hiatus in progress towards reinvigorating community engagement in social learning for sustainable NRM, and thus, arguably, an age-old pragmatic understanding of co-evolutionary relationships between nature and society (Figure 2.1). This heuristic might provide a useful framework for learning better how to facilitate governance in contemporary and in future Landcare/sustainable NRM programs in Australia, given the many different and changing views, competing interests and ideologies involved.

Table 3.1 provides examples of some related complex problem situations (Pahl-Wostl 2007; Chapter 1) in *NHT1* the solving of which might also benefit from such a framework. Table 3.1 thus provides further evidence in support of the thesis arguments.

Table 3.1: Major Challenges that Arose in *NHT1* Guiding Local Communities towards Independence in Landcare and NRM

SUB PROGRAMS	MAJOR CHALLENGES	PAGE
LAND	<ul style="list-style-type: none"> • Deepening knowledge and understanding of how farmers in different regions respond to drought and to other seasonal changes. Maintaining services of good facilitators. 	32
	<ul style="list-style-type: none"> • Dealing with complexity of changing seasonal conditions re management and control of feral animals. See value of 'adaptive management', but not yet incorporated into this area. 	40
	<ul style="list-style-type: none"> • Better recognising historical tensions with respect to the management of wild dogs (case study). Lack of good program coordination. 	41
	<ul style="list-style-type: none"> • Empowering responsible communities to control and manage weeds after and outside community government initiatives. 	44
VEGETATION	<ul style="list-style-type: none"> • Improving the involvement of indigenous Australians. 	50-51
	<ul style="list-style-type: none"> • Meeting project completion dates. 	54
RIVERS	<ul style="list-style-type: none"> • Improving synchronisation of seasonal activities and projects within the NHT funding and reporting cycle. Continuity of activities and retaining coordinators to oversee this process. 	58
	<ul style="list-style-type: none"> • Long term sustainability issues. Improving understanding of water ecosystems, biodiversity and ecological health, and understanding of environmental flows, presents a continuous challenge. 	60
	<ul style="list-style-type: none"> • Funding facilitators aiding transition to <i>NHT2</i>. Maintaining continuity of activity, particularly in activities involving the employment of project coordinators. 	66
	<ul style="list-style-type: none"> • Promote conservation across flyways of migrating birds. Promote conservation of these habitats by government and non-government organisations across the flyway. 	71
BIODIVERSITY	<ul style="list-style-type: none"> • Property acquisition. Dealing with unrealistic expectations of owners re prices. 	76
COAST & MARINE	<ul style="list-style-type: none"> • Meeting performance expectations for timing and outcomes. 	89
	<ul style="list-style-type: none"> • Building an understanding within the community of the role and benefits of Marine Protected Areas so that stakeholder involvement in the program can be positive and beneficial to all members of the community. 	105
	<ul style="list-style-type: none"> • Barriers created by state and local governments. Poorly trained government officers in state and local assessment processes (NB: see also above). 	105
	<ul style="list-style-type: none"> • Sub-contracting of the projects (to CSIRO). Problems in incorporating research into policy and management responses within the required timeframes of the project. Led to project management problems for local government agencies, which found it difficult to meet the conditions under which funding is given. 	107
	<ul style="list-style-type: none"> • Significant loss of experience and expertise of departing coordinators. 	112

Source: (Environment Australia 2003)

Table 3.1 provides some further practical examples of what *NHT1* missed while strengthening (social) learning between governing bodies at the sub-program and strategic level (e.g. Bilateral Agreements and State Assessment Panels), and, in becoming too “top heavy” in the ways it facilitated such learning. It shows how *NHT1*, and with some success, developed strategies to build on the successes of the *NLP* - in terms of partnership-building, awareness raising and in the delivery of improved on ground environmental outcomes. It also shows, though, how this major program overlooked the more complex issues: helping local Landcare and NRM communities to develop a deeper understanding of environmental issues, environmental flows and, relatedly, to address their concerns about empowerment. This is what much of the broader academic literature suggests has happened and mirrors what WA Landcare and NRM communities were feeling in the transition towards to ICM-based Landcare. Table 3.1, then, provides some further relevant practical examples of why WA Landcare and NRM communities in transition from the *NLP* to ICM-based Landcare via *NLT1* began to “withdraw”. Table 3.1 also provides some further examples of why local-regional community engagement in social learning pathways for achieving sustainability in WA Landcare became weaker (Figure 3.2).

In summary, incipient regional catchment councils in WA (the SCC and the ACC), without any specific guiding policy in this community engagement in social learning area, were less able to help their local Landcare and NRM communities to become more independent partners in transition towards ICM-based Landcare and NRM. They were thus unable to achieve what the relevant State and Australian governing bodies also required. Moreover, these newly forming regional catchment councils were also constrained from establishing and implementing the sort of governance that is required to make progress towards greater autonomy: they were unable to develop ‘the social context that allows collective action, rule-making, and institutions for social coordination’ (Dietz *et al* 2003, cited in Cundill and Fabricius 2010, p.1). This thesis proposes that in the continuing absence of a specific policy on community engagement in social learning for sustainability *NHT1*’s replacement, *NHT2*, though bolstered by the *National Action Plan Salinity and Water Quality (NAP)*, exacerbated this situation in WA.

3.1.3: NHT 2

Implementation of *NHT2* and *NAP* was based on principles of Integrated Natural Resource Management (INRM). These principles are similar to those of ICM but are focused on achieving more inclusive and strategic sustainable NRM outcomes at a national scale. Figure 3.3 provides a snapshot of how *NHT2* and *NAP* was implemented through a regional delivery model which saw Australia divided into 56 NRM regions.



Figure 3.3: NRM Regions in Australia

Source: <http://www.environment.gov.au/biodiversity/threatened/nrm-regions-map.html>

Figure 3.3 shows the locations of the two WA regions of significance in this thesis: Swan and Avon. The changing roles of these regions and the regional catchment councils are described in Part 2 of this chapter. Figure 3.4 provides a basis for discussion, about how and why this *NHT2* and *NAP*/regional approach may have further contributed towards developing the proposed hiatus in progress (Chapter 2).

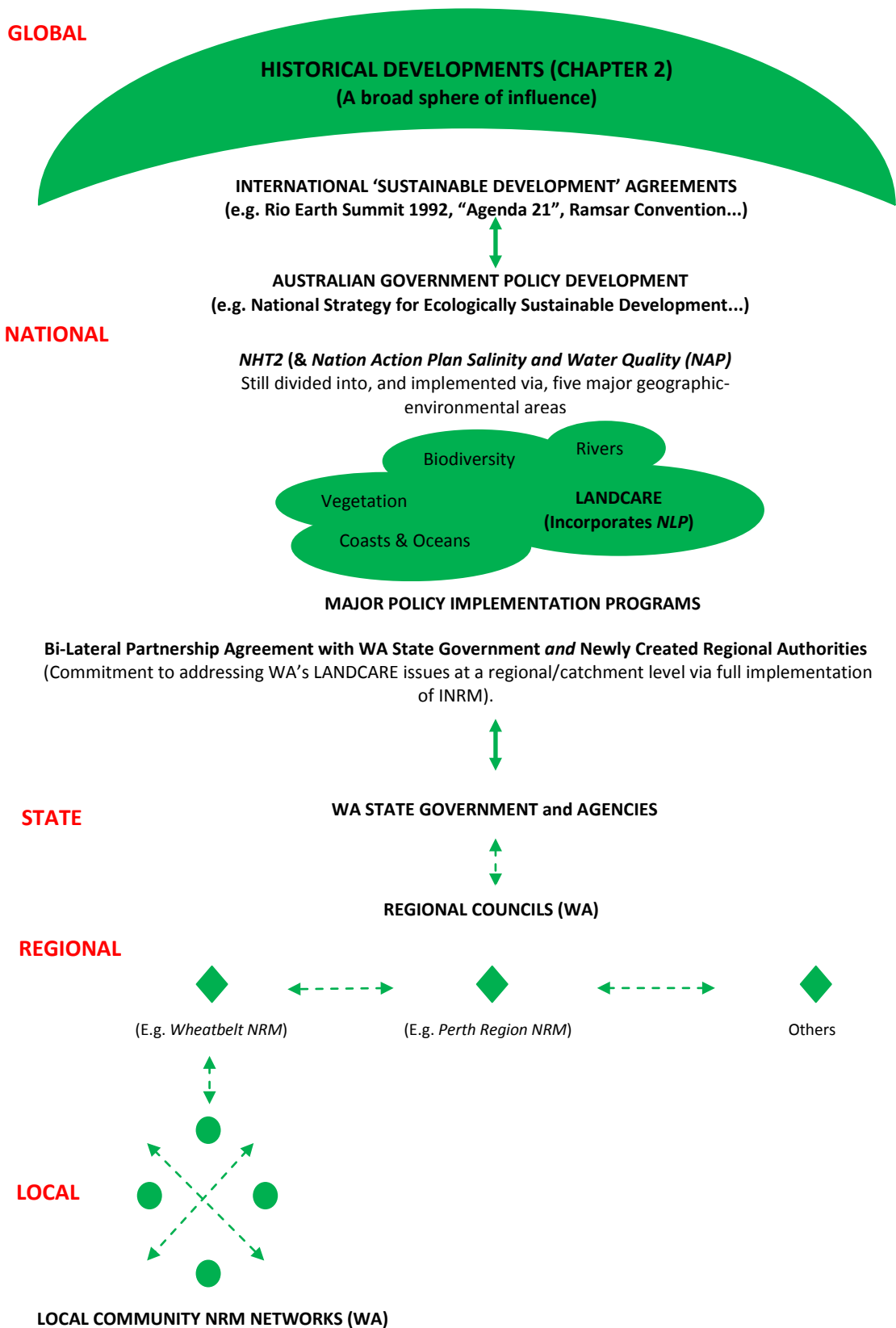


Figure 3.4: Implementation of the NLP through NHT2 (WA 2002-2007) Based on Community Engagement in Social Learning Pathways for Achieving Sustainable NRM

Figure 3.4 shows how *NHT2* bolstered by the *NAP* continued to strengthen knowledge transfer between the relevant governing bodies. It shows how the process of sharing policy ideas to identify better ways of helping local Landcare and NRM communities achieve greater independence was strengthened. However, Figure 3.4 also shows *NHT2* and *NAP* to be even less effective than its predecessor, *NHT1*, in facilitating this process to the regions and then to local participant communities. That is, it shows how a more inclusive regional approach based on INRM principles may have instead further limited the capacity of these communities to engage in such bigger picture planning through social learning processes. Figure 3.4 thus provides a basis for discussing how *NHT2* and *NAP* left these communities feeling more isolated in an increasing complex and fast-changing policy environment. This thesis posits that as these communities “withdrew” to concentrate on issues most important to them, their capacity to engage in social learning became similarly contained. In other words, while local participant communities were still engaging in social learning interlocutors were in the main local community members. Figure 3.4, then, illustrates possible consequences of *NHT2* and *NAP* governing bodies not reflecting on past accomplishments as effectively as they might have done. More specifically, this thesis posits that what was overlooked in the context of ongoing problems associated with implementing the Bilateral Agreements and SAPs was *how* the *NAP* might best be implemented to strengthen *NHT2*.

The *NAP*, a commonwealth initiative, agreed to by all States and Territories in Australia, and endorsed by the scientific community² was developed between 1997 and 2000 (alongside *NHT1*) and was implemented in 2001 (alongside *NHT2*). It identified high priority and immediate actions to address growing problems of rising salinity and declining water quality to ensure that our land and water management practices could sustain productive and profitable land and water use. One essential criterion was that the relevant plans be developed by regional catchment councils (Figure 3.3) within the framework of the standards and targets agreed between the Commonwealth, States and Territories and, now, by the 56 regions. The *NAP* was defined, then, as ‘an essential enabling and motivating force’ (Australian National Audit Office 2007-8, p.35) for implementing the *NHT2* regional delivery model in practice. It did so through making *NHT2* a much more rigorous program. For example, to receive funding the regions, in accordance with the *NAP*, had to:

² The role of Peter Cullen should be acknowledged here.

1. Develop an accredited integrated NRM plan and investment strategy or proposal.
2. Identify all NRM issues in a region (based on the best scientific and technical knowledge).
3. Develop actions to address these issues, and then prioritise the most important issues for action.
4. Set resource condition targets and management action targets based on agreed national standards.
5. Base plans on rigorous scientific and technical information and set achievable natural resource condition targets, as some plans and actions required further investment in research.

(See in Australian Government 2000)

<http://www.NAPswg.gov.au/NAPswg/index.html>

On the positive side, the *NAP* helped ensure that the respective regions were guided by well-defined national goals. The *NAP* was also enshrined in law and so the regions were provided with additional statutory authority in order to help them achieve their respective sustainable NRM goals. However, a major impediment to the effective implementation of the *NAP* was its misalignment with the regional delivery model:

NAP regional boundaries were defined prior to the introduction of the *NHT2* regions. In most States, there were pre-existing NRM regional organisations and some of these formed the basis for the final *NHT/NAP* regions. The bilateral agreements between the Australian and State/Territory governments expanded the capacity of pre-existing regional bodies (such as in Victoria) and established new regional bodies, particularly in Queensland, Western Australia and Tasmania. In New South Wales and South Australia new state regional bodies were established under state legislation in the early period of the programs.

The *NAP* regions were designed to align with the greatest priority for investment in the management of salinity and water quality. In May 2002, the Australian and State/Territory government agreed to 21 regions for *NAP* investment. The number of *NAP* regions was later increased to 22 for easier delivery. Due to the size of some of these regions and because four *NAP* regions cross over one or more State/Territory boundaries, 34 regional or sub-regional bodies were identified.

For *NHT2*, the Australian continent was divided into 56 regions, based on catchments or geographic regions [Figure 3.3], with one regional body per region. *NAP* regions are overlaid on the *NHT2* regions [p.49].

Ministers were advised that regional delivery of *NHT2* was to be integrated with the *NAP* where possible. However, [the map on p.49] shows that the regions do not align. Nevertheless, regional bodies were required to develop a single plan, based on the *NHT* regions that would cover both *NHT* and *NAP* investment. This made the *NAP* regions somewhat redundant in terms of program implementation, although

the boundaries do influence funding allocations. One regional body commented on the effect of this in their response to the Australian National Audit Office's survey:

The catchment has 20 per cent of the area under NAP catchment. However [the] NAP provides about 75 per cent of total funds resulting in a complete imbalance of dollars versus expectations.

The incongruence between the *NHT2* and *NAP* regional boundaries has created complexity and confusion. It also makes measuring and reporting on progress against the plans more challenging. However, *NAP* will not continue after 30 June 2008, and the ongoing focus will be on *NHT* regions. The Australian National Audit Office considers that this will assist in achieving more streamlined program planning, delivery and reporting in the future.

Source: (Australian National Audit Office 2007-08, pp.48-50)

This thesis argues that the misalignment of the *NAP* was a major factor in creating even more formidable barriers to knowledge transfer in the *NHT2* program. In WA Landcare and NRM, this further weakened key community engagement in social learning pathways for achieving sustainable NRM at regional to local scales (Figure 3.4). Such misalignment was thus a significant impediment to this major program in terms of developing its capacity to help local Landcare and NRM communities become more independent partners in sustainable NRM. This thesis also argues, however, that it was unintentional because of cumulative external pressures. Firstly, these developments occurred in the context of ongoing problems associated with the establishment of Bilateral Agreements and their implementation via the SAPs (see above). Secondly, therefore, planners and policymakers involved in identifying better ways of implementing the *NAP*, in *NHT2*, were perhaps caught up in this process. They were, for example, under additional political and popular pressure to fast-track policy development. These experts did not spend the time in consultation with the relevant regional and local communities to identify and rectify potential misalignments between *NAP* and NRM regions during the early stages of *NHT2/NAP* implementation. Little time was spent in reflection: looking back to see that the crux of the matter is about (1) governance and learning, (2) governing bodies, regional and local communities working better together to improve these processes and thus (3) making better choices for implementing the *NHT2/NAP* regional approach.

In summary, Figure 3.4 illustrates how *NHT2*, bolstered by the *NAP*, made it much more difficult for the regional catchment councils in WA (e.g. the *SCC* and the *ACC*) to help their respective local Landcare communities engage in social learning for achieving sustainable

NRM. Both regional catchment councils and their respective local Landcare and NRM communities were unable to meet the extra demands and expectations placed on them. Therefore, the regional catchment councils were less able to help their respective local Landcare communities adapt to participate in this more sustainable regional/INRM planning approach as independent partners. Community engagement in social learning though facilitated through *NHT2* and *NAP* was now being contained at regional levels. Moreover, this process was being further contained at local community levels, as each group began to feel more isolated in an increasingly complex and fast-changing policy environment. Each region and their respective local sub-catchment groups therefore began to focus even more on improving nature conservation within their respective domains. This had the effect of impeding the flow of information between these local community groups especially and hence nature conservation across wider areas (Figure 3.4). Re-establishing such information flows is necessary for building the partnerships that drive a social learning process that is critical for achieving sustainable NRM policy development and implementation in Australia internationally (Chapter 2).

NHT3 would have addressed such growing disconnects in sustainable NRM policy development and implementation in Australia. More established regional authorities were to be given extra time to plan for and to address these underlying complex issues (Australian National Audit Office 2007-8). However, a Labor Australian government was elected in 2007 and NRM policies again changed, so *NHT3* was not implemented. This Australian Labor government, however, has attempted to redress this situation in sustainable NRM in Australia through its major environmental program, *Caring for Our Country*.

3.1.4: *Caring for Our Country*

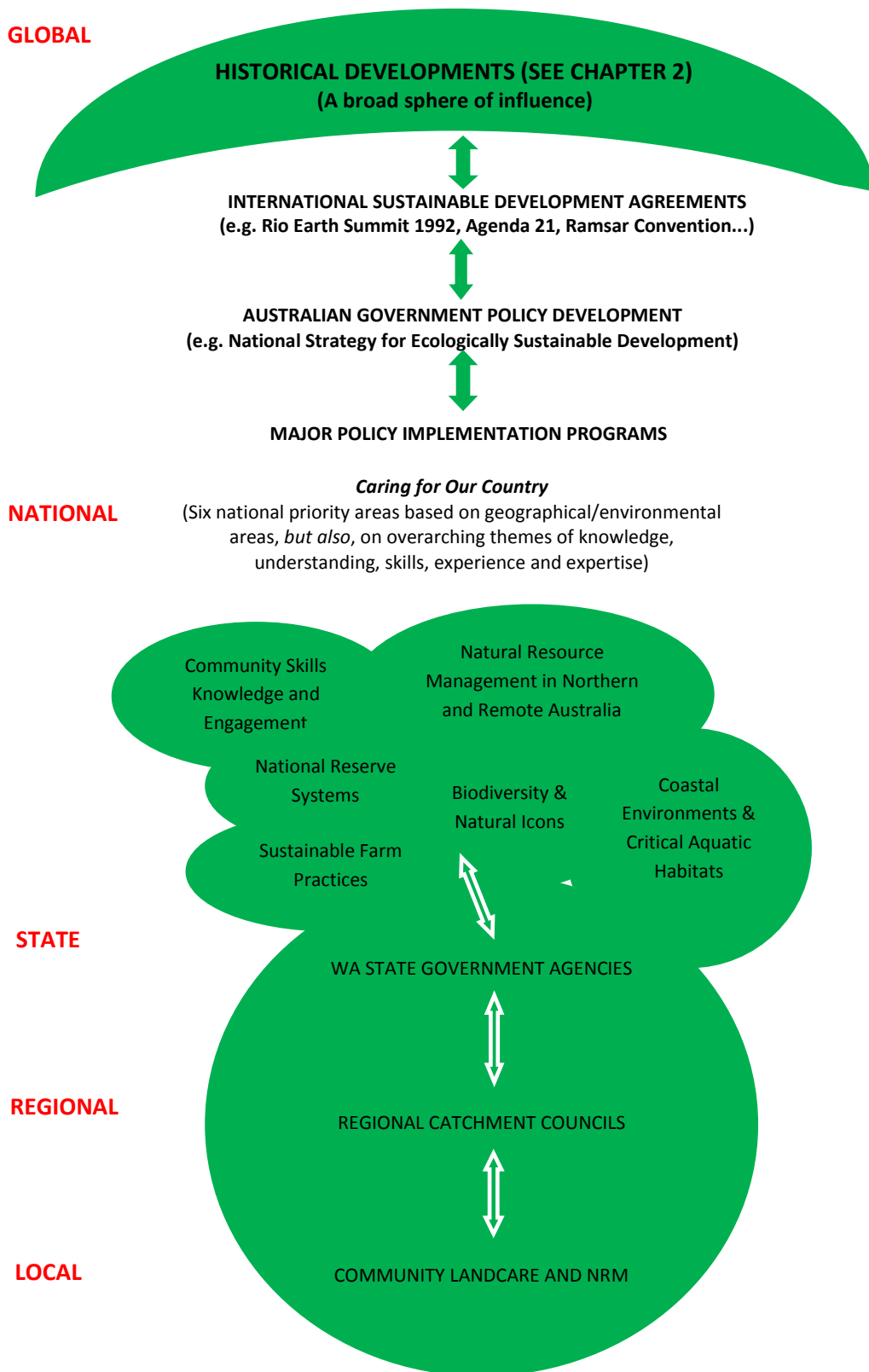
Caring for Our Country established six new priority areas: Community Skills, Knowledge and Engagement; Natural Resource Management in Northern and Remote Australia; National Reserve Systems; Biodiversity and Natural Icons; Coastal Environments and Critical Aquatic Habitats; and, Sustainable Farm Practices. Landcare was now incorporated into the Sustainable Farm Practices priority area. Priority areas were implemented through a more streamlined network of facilitators with clearly defined roles. *Caring for Our Country* also established the *Monitoring, Evaluation, Reporting and Improvement (MERI)* strategy to help better determine the successes of all these priority areas. A dearth of such reporting has

been a significant impediment to achieving more sustainable NRM policy development and implementation in practice.

[The] inability to report [such major program] outcomes was mainly due to the absence of consistently-valid data and lack of agreement on performance indicators, which limited the quality and robustness of the reporting process. This finding formed the basis for the development of the *Monitoring, Evaluation, Reporting and Improvement [MERI]* strategy and process under *Caring for Our Country* (Australian Government 2012b, p.125)

The *MERI* strategy is explained in Chapter 7. However, by way of introduction, the diagrams and explanations used in this part of the chapter can help to contribute towards the development and implementation of the *MERI* strategy and thus the aims and objectives of *Caring for Our Country*; in particular, towards the development and implementation of one of this major program's overarching priority areas: Community Skills, Knowledge and Engagement. In 2012, despite its successes this priority area still faces some significant ongoing challenges (Chapter 7).

As a basis for such examination, Figure 3.5 illustrates the (ideal) implementation process for *Caring for Our Country* in the context of WA Landcare and NRM. It provides an illustration of what this latest major sustainable NRM program aims to achieve in improving community engagement in social learning pathways in sustainable NRM.



NB: Whole circles denote ideal information flows between relevant participant groups.

Figure 3.5: Ideal Implementation of Landcare through *Caring for Our Country* (WA 2007-2012) Based on Community Engagement in Social Learning Pathways for Achieving Sustainable NRM

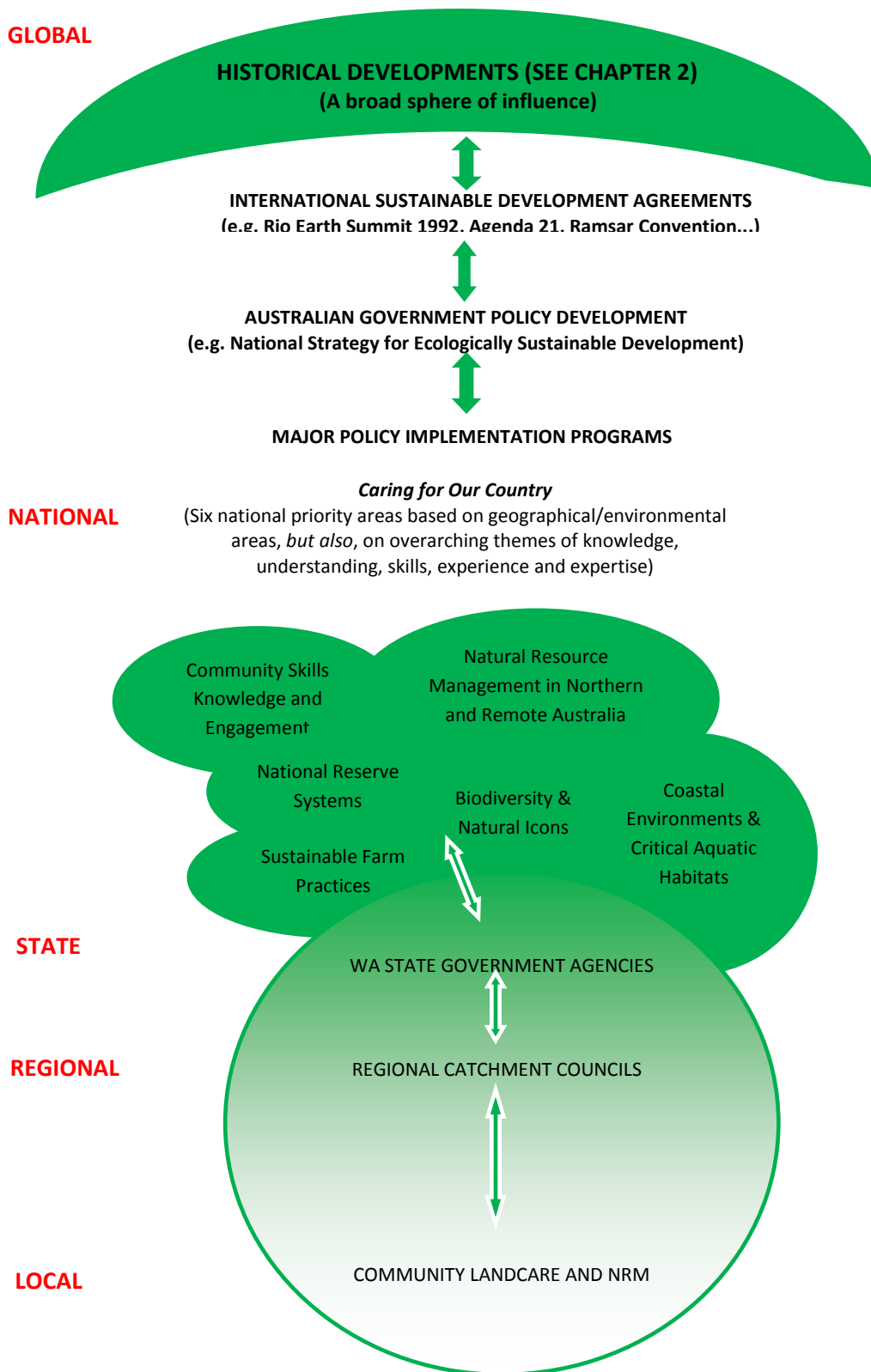
A major five year review of *Caring for Our Country* was completed in 2012 (<http://caringforourcountryreview.com.au/document/index/1>). Table 3.2 provides a summary of the key findings of this report that are most relevant to this thesis.

Table 3.2: Caring for Our Country Effectiveness Report: Relevant Key Findings

PRIORITY AREAS		FEEDBACK		PAGES
Priority Areas	Positive Feedback	Negative Feedback		
Monitoring and Evaluation (MERI)	<ul style="list-style-type: none"> Helped regional organisations improve business efficiency and provide them with better value for money outcomes. Helped regional organisations to develop more sophisticated data, information and spatial mapping. Supported community groups to undertake more rigorous analyses. 	<ul style="list-style-type: none"> Too compliance orientated; not used well as an optimal feedback loop to help share information with stakeholders to improve program performance. Focus on outcomes and targets exclude broader benefits, which may include social, economic, health and cultural outcomes. Most communities struggle with the model; they think it too complex; that a university education is required to effectively understand and engage with it. 		47-49
Sustainable Farm Practices	<ul style="list-style-type: none"> Successful demonstrations: trial sites; extension (including new methods); capturing on-farm innovation; project coordinators. Farmer to farmer strategies work well - e.g. use of mentors. 	<ul style="list-style-type: none"> More creative awareness raising and dissemination of information needed Better communication of research and innovation. Underutilized industry organisations and private industry expertise. Greater promotion of collaborative approaches and strengthening of stakeholder networks. More technical support to farmers needed to help them with decision-making. Value more the wider roles of business. Better integrate adoption of sustainable farm practices with productivity benefits. Develop stronger links between bottom-up approaches from farmers to national outcomes. Better align farm business and environmental systems time frames in pilot projects. 		68-72
Community Skills, Knowledge and Engagement	<ul style="list-style-type: none"> NRM organisations generally providing leadership, valuable knowledge and ongoing engagement of stakeholders in regional prioritisation and decision making. 	<ul style="list-style-type: none"> Difficult to monitor and evaluate: cannot attribute successes to this priority area alone, as knowledge etc. gained through all priority areas; no baseline data collected in previous programs (see above); what to measure completely contingent on composition of a community at that time. Overwhelming concern that funding for this priority area had to be linked to biophysical targets; limits opportunities to engage with the broader community! So, need to provide stand-alone funding for this - to engage a range of communities over the long term and to maintain continuity. Need to employ people from local area with relevant expertise to engage communities in this area. Indigenous groups feel that their ecological knowledge and understanding as an important element of cultural diversity is still not appreciated and thus factored into funding. 		74-77

Source: Adapted from (Australian Government 2012b, pp.47-77)

Table 3.2 shows that in terms of “Monitoring and Evaluation (MERI)” and “Community Skills, Knowledge and Engagement” (the priority areas that are most relevant to this thesis) *Caring for Our Country* has been most successful at building on the strengths of the past *NLP* and *NHT* programs at the regional catchment council level. In terms of *Caring for Our Country*'s community engagement in social learning pathways for achieving sustainable NRM (Figure 3.5), this major program has better facilitated such learning between the relevant Australian and WA State government bodies and the regional catchment councils. These councils are better able to manage data, coordinate projects and address complexity at this level or scale. However, Table 3.2 also shows how *Caring for Our Country* has still not been able to address fully the more complex problem situations that emerged during implementation of the *NLP*, *NHT1* and *NHT2* and *NAP* (see above). It shows that in terms of further facilitating community engagement in social learning pathways for sustainability in WA, to reach the local Landcare and NRM community level this major program still has some way to go (Figure 3.6 illustrates how such information flows might look, given the shortcomings of *Caring for Our Country*).



NB: Part shaded circles depict how actual information flows between relevant participant groups might look.

Figure 3.6: Actual Implementation of Landcare through *Caring for Our Country* (WA 2007-2012) Based on Community Engagement in Social Learning Pathways for Achieving Sustainable NRM

Figure 3.6 illustrates how *Caring for Our Country* has yet to help effectively implement substantive policy ideas in local Landcare and NRM communities to: (1) better engage these communities in social learning with a view to improving governance, (2) help them participate better in sustainable NRM as confident independent partners fulfilling their desire to contribute towards achieving sustainable NRM, and (3) release and scale up potential for developing and implementing *Caring for Our Country*. Based on the broad idea that the new sustainable agricultural stream is about evolution not revolution (Australian Government 2012a) *Caring for Our Country* proposes the following actions over the next five years:

1. Funding ... for increasing the skills and capacity of community groups, without the need for an associated biophysical target or outcome.
2. Support for leadership activities, community capacity development, innovation, communication skills development, governance training, as well as small on-ground projects.
3. Specific support for the community to share its learnings (sic) and successes with its members. This could include funding for forums, websites, traditional media or facilitated online conversations and webinars. Innovative use of technology such as social media will also be encouraged.
4. Assistance with the creation of networks or support to strengthen existing networks.
5. Support for field days or conferences show-casing innovative sustainable agriculture practice and associated Landcare activities.
6. Funding for scholarships designed to support 'industry champions' and 'knowledge brokers'.
7. Support for activities that contribute to better volunteer management, retention and succession.
8. Assistance for award programs that recognise and celebrate NRM volunteers or outstanding commitment to sustainable agricultural practice
9. Specific support ... to encourage the participation of young people, Indigenous Australians, women and people from culturally diverse backgrounds in NRM activities as they relate to the sustainable agriculture stream.

Source: (Australian Government 2012b, p.4)

In summary, this thesis seeks to contribute towards improving implementation of *Caring for Our Country* and its efforts to address the sort of complex social-ecological issues explored

thus far in this chapter. This thesis seeks to achieve this through examining the methodological learning and social learning data collected in local rural and urban WA Landcare and NRM contexts. As a basis for this examination, and thus further applying or “sharpening the focus” of the thesis heuristic, Part Two of this chapter examines the regional and local Landcare and NRM contexts in which data for this thesis were collected.

3.2 Part Two: Regional and Local Landcare Community Engagement Projects and Programs in Western Australia

This chapter describes the geographic location and changes that occurred in federal policymaking in sustainable collaborative NRM, respectively, of *Perth Region NRM* and *Wheatbelt NRM*. It also describes two natural resource management projects in which local communities were engaged in social learning for sustainability. These are:

1. The rural adaptive management based *Living Landscapes* rural nature conservation planning project that was implemented within the then *Avon Catchment Council (ACC)*, and
2. An urban cooperative management sub-regional NRM program that was implemented in the then *Swan Catchment Council (SCC)*.

The four rural *Living Landscapes* communities that participated in this thesis case study - *Dowerin Lakes*, *Gabby Quoi Quoi*, *South Tammin* and *Morbining* - and the two urban communities that participated in the follow-up case study - the *Bannister Creek Catchment Group (BCCG)* and the *Two Rivers Catchment Group (TRCG)* - are introduced in this section.

3.2.1: Regional NRM in Western Australia

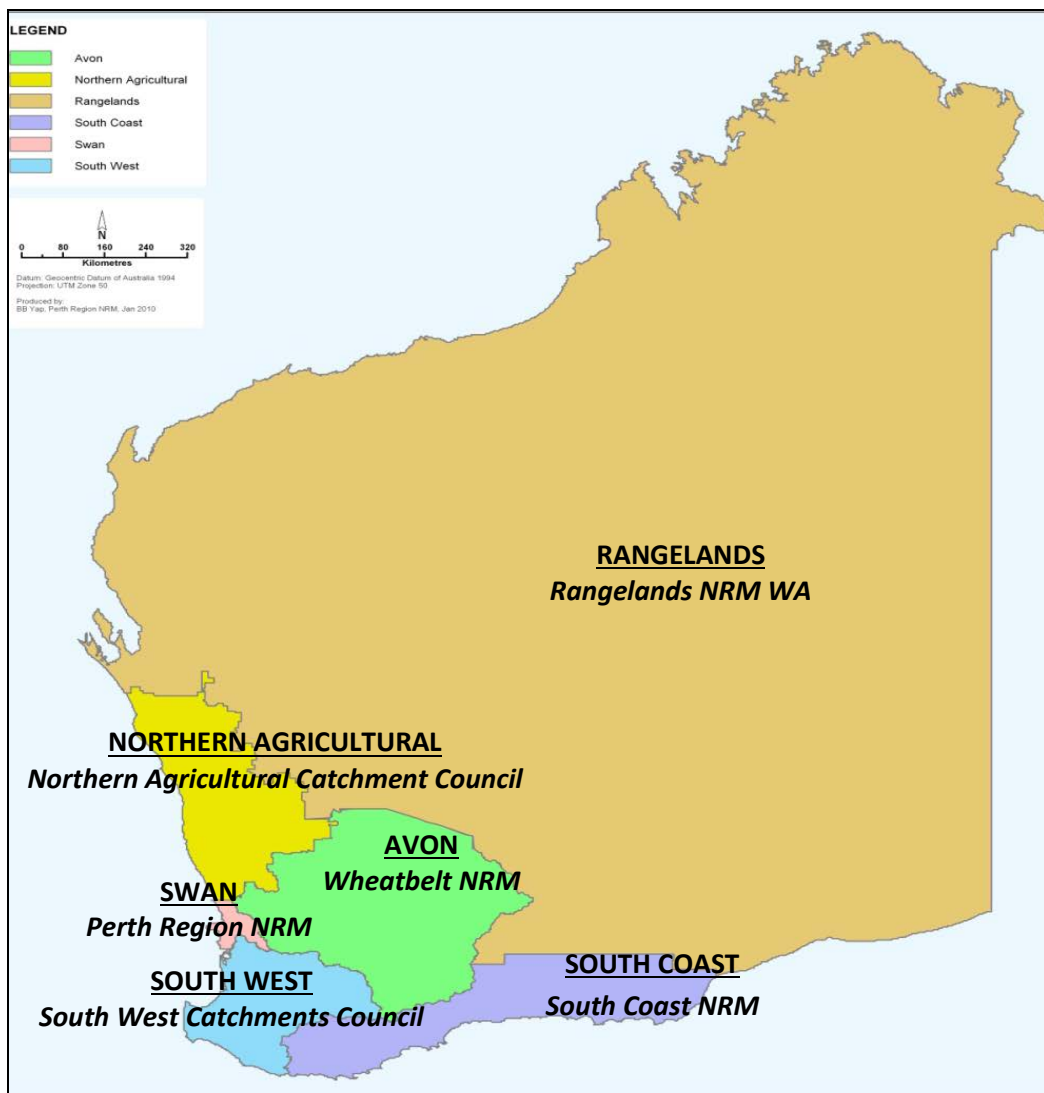


Figure 3.7: Locations of NRM Regions and Regional Catchment Councils in WA

Source: Adapted from *Perth Region NRM (2010, p.11)* and <http://www.nrm.wa.gov.au/nrm-in-wa/regional-groups.aspx>

Figure 3.7 illustrates the boundaries of the NRM regions in WA. The following paragraphs describe a brief history of the regional catchment councils relevant to this thesis, and therefore the regional contexts for the rural *Living Landscapes* and urban sub-regional program community groups surveyed.

Between 1990 and 1996, during the implementation of the *NLP*, both the Swan and Avon catchments (Figure 3.3) were managed as a single catchment by the *Swan-Avon Catchment Council (SACC)*. The *SACC* provided a general advisory service to local Landcare communities and their project managers and administrators at the Shire and LCD level in both

catchments. A Liberal Federal government was elected in 1996. This government further developed a strategically-oriented regional approach to Landcare through *NHT1*. In this new NRM context, the relevant Australian and State government bodies decided that the Swan and Avon catchments should be managed separately. In 2002, the *SACC* was disbanded and replaced by the *Swan Catchment Council (SCC)* and the *Avon Catchment Council (ACC)*. The decision to separate the Swan and Avon catchments was made on the basis of each catchment's differing land uses in ecological rather than in social terms. The *SCC* has since been renamed *Perth Region NRM* and to better achieve the goals of *Caring for Our Country* it has been given more autonomy (*Perth Region NRM 2010*, pp.11-13). The *Perth Region NRM*, then, enters into more substantive consultation with the local Landcare communities and sub-catchment groups within its remit to negotiate the development of community engagement structures that were more local community-focused than those of *NHT1* and *NHT2*. Figure 3.8 illustrates how this was achieved.

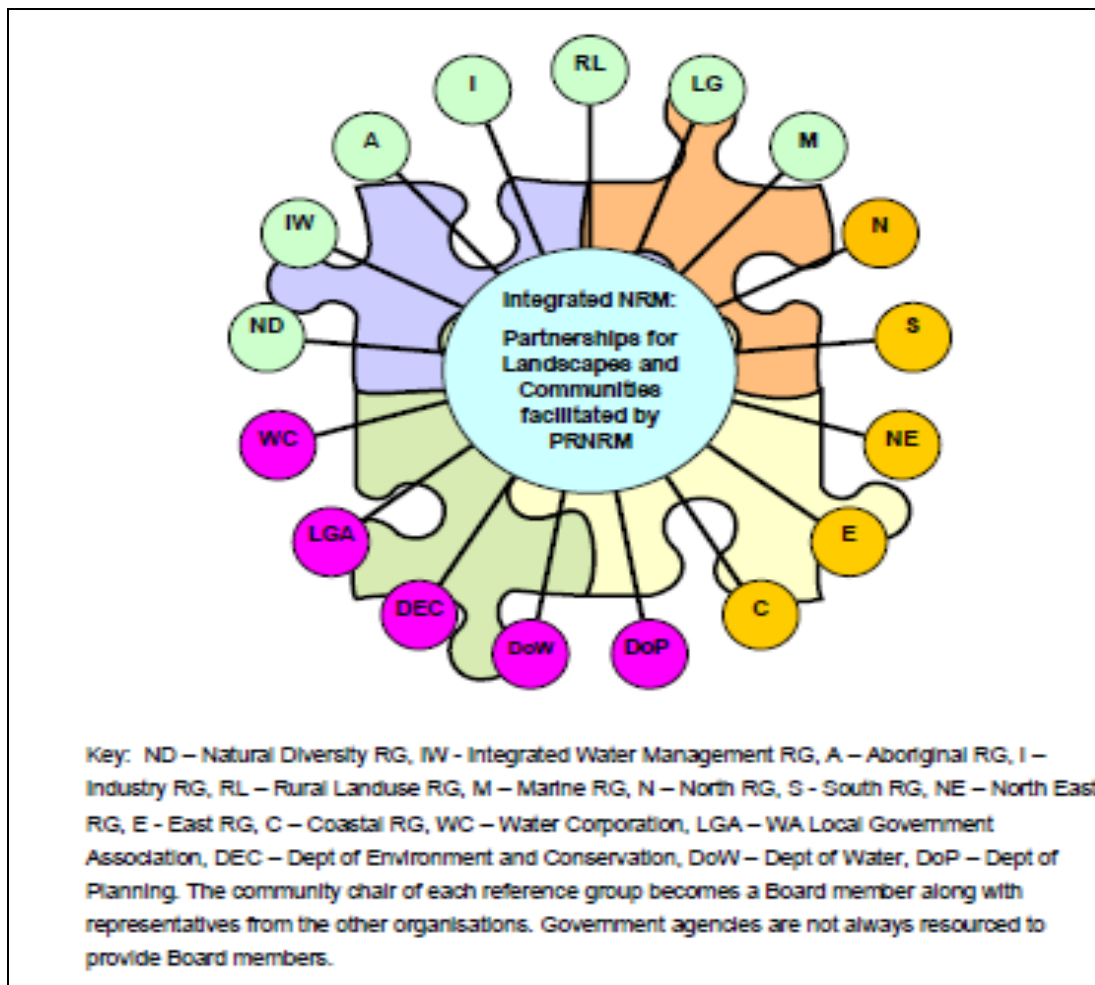


Figure 3.8: Perth Region NRM Local Community Engagement Structure

Source: Perth Region NRM (2010, p.16)

Figure 3.7 shows that the local community engagement structure adopted by the *Perth Region NRM* comprised:

- A board (a community chair from each reference group).
- Five key state and local government agencies that had representation on a Management and Audit Committee.
- Seven *theme-based* reference groups, which, during *NHT2*, had been the driving force behind the delivery of on-ground programs.
- Five *newly included* geographic reference groups representing the five sub-regions.

The addition of the five geographic subregional reference groups to the formal planning process constituted a major change in terms of making the delivery of regional NRM much more local community and local governance focused. During *NHT2*, this community engagement structure was similar to that illustrated in Figure 3.7, but, did not include the

geographic subregional reference groups. During *NHT2*, the key drivers in NRM planning were the theme-based reference groups. In consultation with state and local government agencies and organisations these groups would set the agenda for relevant on-ground action. While the sub-regional groups (e.g. in this thesis the South sub-region) were involved in this community engagement process they were not formally included from the outset of this planning process. These sub-regional groups were normally only consulted after the formal plans had been made at the regional level. This presented a number of problems - clarifying priority NRM issues, clearly identifying gaps in programs and in local project development and duplication - which the addition of the geographic reference groups has helped to address (*Perth Region NRM 2010*, p.17). The *Perth Region NRM*, then, offers an example of how the *Caring for Our Country* program is attempting to better facilitate community engagement in social learning for achieving sustainable NRM.

The *Wheatbelt NRM* shares a similar history to that of the *Perth Region NRM*. There were, however, some major differences between the *SCC* and the *ACC* in the ways that their respective local programs were implemented. This was primarily because the then Avon catchment (the size of Tasmania) was so much larger than the Swan catchment, and contained some very distinctive land use differences. The *ACC* (unlike the *SCC*) was structured into three ecologically-based conservation zones. These were: Avon Arc; Avon Wheatbelt; and Avon Pastoral (Figure 3.9).

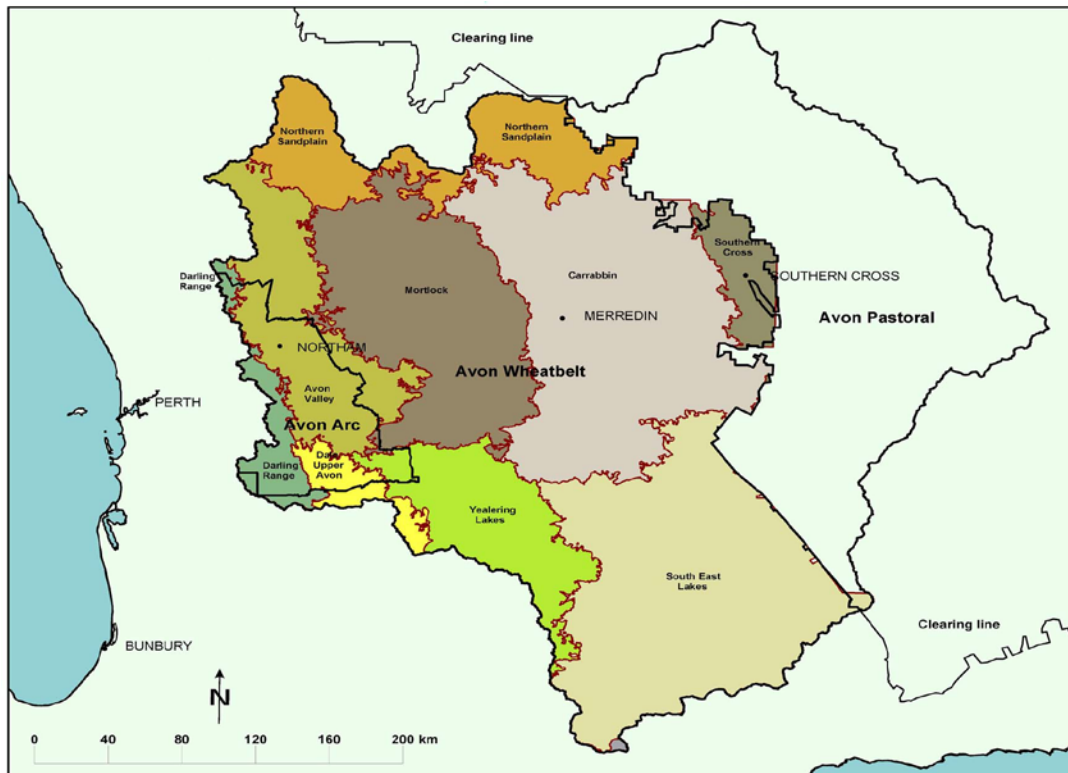


Figure 3.9: ACC Broad Conservation Zones (Black) and Geomorphological Areas (Red)

Source: *Wheatbelt NRM*

http://www.wheatbeltnrm.org.au/resources/Avon_River_Basin_Land_Resources_02.jpg

The primary mechanisms for the on-ground implementation of the ACC's priorities were Regional Development Programs (RDPs), 'to provide for integration of actions at a landscape scale to address the 20 year resource condition targets for the region' (*Wheatbelt NRM* 2010-2013, p.17). RDPs, like the reference groups in the former SCC, were theme-based. This structure did not really facilitate the development of the strong partnerships necessary for sustainable landscape-scale NRM. Therefore, from 2007, the *Wheatbelt NRM*, like the *Perth Region NRM*, began to develop more geographic or place-based community engagement structures for improving the on-ground implementation of regional NRM. The *Wheatbelt NRM* established three sub-catchment reference groups, Avon, Lockhart and Yilgarn, similar to those established by the *Perth Region NRM* (Figure 3.10).



Map scale not provided

Figure 3.10: Wheatbelt NRM Region and Geographic Sub-catchment Reference Groups

Source: Wheatbelt NRM Strategic Plan (2010-2013, p.6)

Three sub-catchment reference groups (representing individuals) have been established to interface with the program and project planning endeavours and to provide a mechanism for community concerns and interests to be raised with the Board of Management (*Wheatbelt NRM 2010-2013, p.3*).

The geographical delimitation of the areas covered by these groups was based on the flows of the major water courses that run through the entire region and connect all of its communities. This meant that local Landcare communities that once were categorised under theme-based zones and RDPs as statistical outliers now had a much greater say in regional NRM planning.

Perth Region NRM and *Wheatbelt NRM* guide and support community engagement in social learning in WA Landcare in order to implement major NRM programs, most recently - *Caring for Our Country*. Within each regional area, though, it is the on-ground local community projects and programs that are most critical in ensuring that these big policy ideas and guiding strategies are successfully implemented. However, despite making progress in this area these projects and programs have yet to engage local participant communities in this core learning process as more independent partners in sustainable NRM. To further explore this issue the following section describes the adaptive management-based *Living Landscapes* nature conservation planning project, which was implemented between 1998 and 2005 with the overarching aim of achieving such community engagement.

3.2.2: The *Living Landscapes* Rural Nature Conservation Planning Project

The *Living Landscapes* adaptive management-based (Chapter 1) nature conservation planning project ‘encourages land managers to think beyond the paddock and beyond the farm to a wider understanding of how their land fits into the landscape and contributes towards the environment, the economy and the social fabric of the broader community’ (Greening Australia 2004, p.4). It is based on an evolutionary process for engaging, supporting and building community via shared outcomes, partnerships and relationships, capacity building, action-learning based on experiential learning/learning-by-doing, and is ‘premised on the requirement for ecological sustainability’ (Greening Australia 2004, pp.4-5). The broad aim of the *Living Landscapes* nature conservation planning project was:

To assist community groups to develop landscape management practices which protect biological diversity within an economically viable and sustainable land-use system (Frost *et al* 1999, p.4)

This broad aim was based on the assumption:

[T]hat this process will begin to ensure that land use practices are not responsible for further loss of species from the local landscape. Most importantly though, is the capacity this [*much broader* landscape-scale] project has to adapt to *local* contexts and so remain relevant to *local* landscapes [my emphasis] (Frost *et al* 1999, p.4)

Living Landscapes is based on the concept of Evolving Sustainable Systems: ‘a conceptual model that reflects an evolving environment of learning and experiences defined by geographic boundaries’ (Frost 1998, cited in Frost *et al* 1999, p.7) (Figure 3.11).

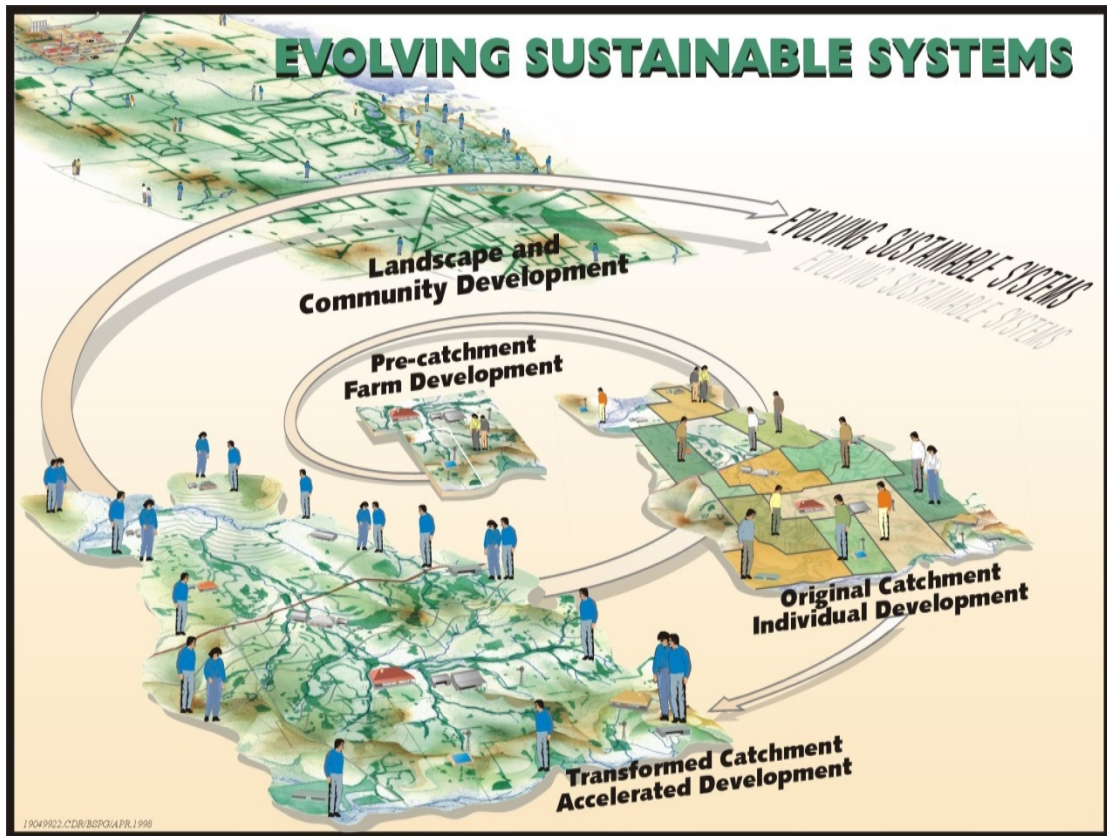


Figure 3.11: Evolving Sustainable Systems Conceptual Model

Source: Frost (1998, cited in Frost *et al* 1999, p.8)

Focusing on the issues of community engagement in social learning for achieving sustainable NRM, during the “pre” and “original” catchment phases there was little or no such community engagement in WA. Indeed, there was overall ‘little collaborative work, either planned or undertaken, to address the needs of the landscape, including salinity and loss of ecological health’ (Frost *et al* 1999, p.7). That is, while farmers were addressing salinity the focus was on-farm (Chapter 2) and not at the broader landscape scale. One might have witnessed such situations prior to the 1980s and certainly prior to Landcare. As a consequence of improving local community engagement processes and availability of locally relevant information ‘the “original catchment” evolves to become the “transformed catchment”’. The relevant features of this phase, *inter alia*, are ‘a cumulative catchment knowledge base and extended community involvement’ (*ibid.*). Landcare and the *NLP* would have great impact on such developments (Figure 3.1). Indeed, the focal species-experiential learning methods employed by the *Living Landscapes* project would have been a significant part of this process (see below). During the “transformed catchment” phase, much more substantive sociological changes occur as individual farmers in WA begin to

'extend their horizons of concern from their own farms to consider the needs of the wider catchment and indeed landscape' (*ibid.*). With respect to improving community engagement in social learning for achieving sustainable NRM though:

In particular, emerging from the transformed catchment is social capital, shared knowledge, group action and new partnerships. These are the foundations from which a group will begin to explore new challenges, such as nature conservation, and consider issues beyond those that brought the group together in the first place (*ibid.*).

Arguably, this phase has lasted from late 1980s to the present day. "Landscape and community development" is the final phase of evolution. It is the result of the 'transformed catchment merging into the landscape and the boundaries becoming diffuse' (*ibid.*). The concept of *Living Landscapes* lies within this phase. It is this phase that is of particular relevance to the aims and objectives of this thesis. That is:

A multiplicity of complex issues, particularly nature conservation and rural community development, are considered by the group in this phase. An emerging issue in this landscape and community development catchment is the introduction of a wider range of opinions, values and ideas. The challenge, as a result, and one that *Living Landscapes* has had to acknowledge, is twofold. The first is that planning process must have the capacity to incorporate an increasing number and range of perspectives into existing plans and priorities. The second is that there must be scope in the process to relate regional recommendations and ideas back to the farm, for it is at this scale that implementation occurs (Frost and Metcalfe 1999; Rowley and Brewin 1999, cited in Frost *et al* 1999, pp.7-8).

As already discussed in this chapter and in Chapter 2, while making progress towards achieving such goals *Living Landscapes* along with similar projects and programs could not achieve this end-state in practice (discussed further later in this chapter).

Living Landscapes facilitated greater participation of its local Landcare/sub-catchment NRM groups (described below) in strategic planning from the time of the project's inception and through its implementation period. *Living Landscapes* was unique at the time; similar projects, while engaging local communities in sustainable NRM, did not engage them as substantively in the planning process (Frost *et al* 1999). To achieve this in practice *Living Landscapes* combined the more technical focal species nature conservation planning process (Lambeck 1999; 1997) with the more sociological experiential learning process (Kolb 1984). More broadly, *Living Landscapes* sought to engage local WA farming communities in social learning for achieving sustainable NRM. While the success of the project in terms of its capacity to engage its participant communities in such learning was not monitored or evaluated, comparing and contrasting the initial *Living Landscapes* report

(Frost *et al* 1999) with final summary reports (Smith and Penter 2006; Greening Australia 2004) does provide a broad indication of the project’s success. This broad assessment is summarised in terms of the relevant on-ground methods and activities used to engage these groups in this core learning process.

The *Living Landscapes* project engaged five local Landcare/sub-catchment groups in social learning for achieving sustainable NRM - Gabby Quoi Quoi, Dowerin Lakes, Wallatin Creek, South Tammin and Morbinning. However, the Wallatin Creek group withdrew from the project not long after its inception (Smith and Penter 2006; Greening Australia 2004; Frost *et al* 1999). These groups were located in the Central Wheat Belt of WA which, at that time, came under the auspices of the ACC (now the *Wheatbelt NRM*). They straddled two major land categories - ‘Mortlock’ (including the East and West Mortlock Rivers) and the Avon Arc (including the Avon River) (Figure 3.9). Figure 3.12 shows the locations of these sub-catchment groups (including Wallatin Creek) within the Central Wheat Belt of WA.

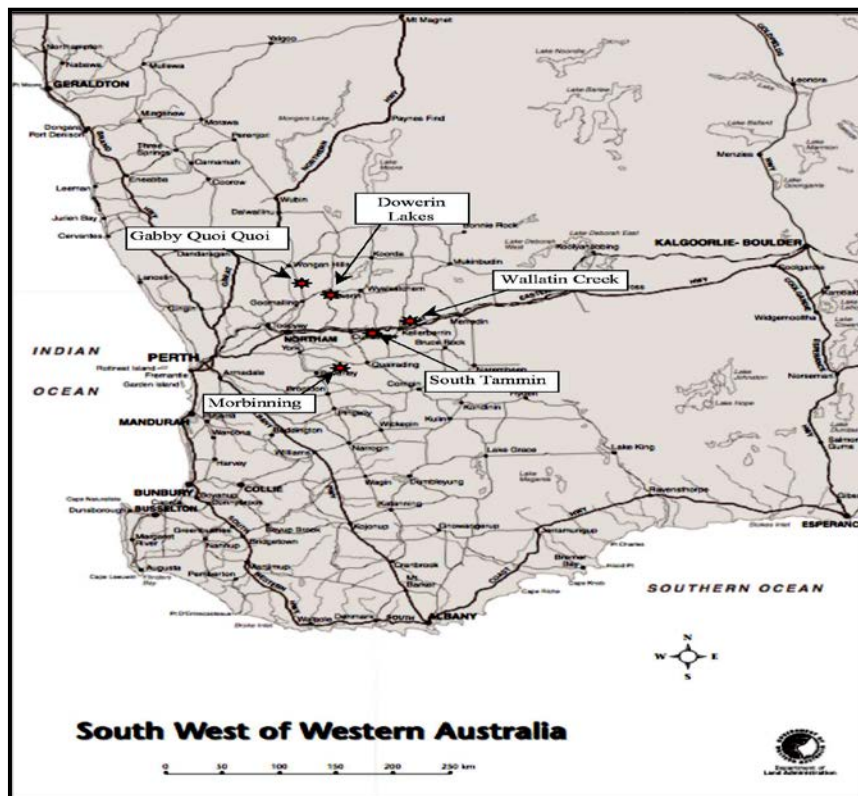


Figure 3.12: Locations of the *Living Landscapes* Sub-Catchment Groups (Central Wheat Belt, WA)

Source: (Smith and Penter 2005, p.1)

Plates 3.1-3.14 that follow provide a general overview of Central Wheat Belt topography, land use, land degradation, land and riparian revegetation. They provide a visual snapshot of the area in which *Living Landscapes* was implemented, and the sort of work undertaken by the participant sub-catchment groups listed above. (Unless otherwise indicated, ground level photographs were taken in the Mortlock catchment. The Gabby Quoi Quoi sub-catchment group is located in this area).

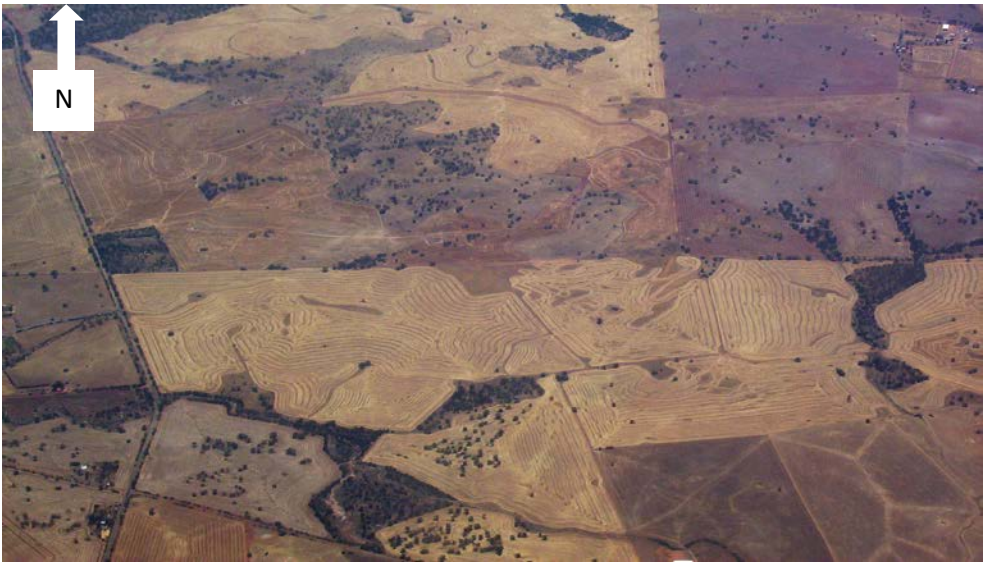


Plate3.1: WA Wheat Belt, Northam Area, General Aerial View Showing Extent of Arable Land, Remnant Natural Vegetation and/or Revegetation

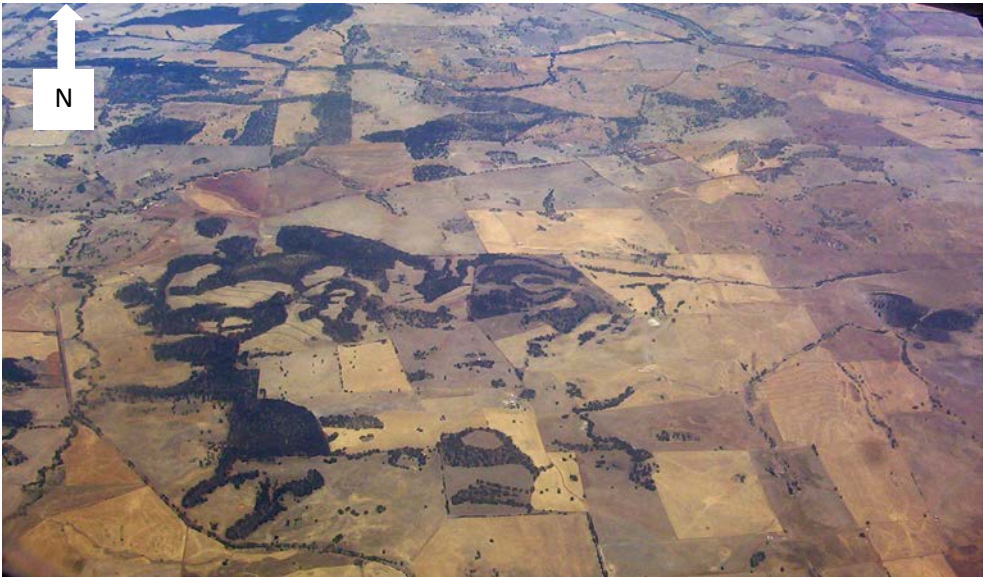


Plate3.2: WA Wheat Belt, Northam Area, General Aerial View Showing Extent of Arable Land, Remnant Natural Vegetation and/or Revegetation

Photos: Graham Thompson (February 2005)



Plate3.3: WA Wheat Belt, Mortlock Catchment, Ground View of Arable Land, Remnant Natural Vegetation and/or Revegetation

Source: Agriculture Western Australia (No Date)



Plate3.4: WA Wheat Belt, Mortlock Catchment, Ground View of Arable Land, Remnant Natural Vegetation and/or Revegetation

Source: Agriculture Western Australia (No Date)



Plate3.5: WA Wheat Belt, Dowerin Town Site, Aerial View of Surrounding Arable Land, Remnant Natural Vegetation and/or Revegetation and Natural Salt Lakes (Distance)

Source: Agriculture Western Australia (No Date)



Plate3.6: WA Wheat Belt, Ground View of a Natural Salt Lake Characteristic of the Dowerin Area

Source: Agriculture Western Australia (No Date)



Plate3.7: WA Wheat Belt, Ground View of Mortlock Catchment, Severe Gully Erosion

Source: Agriculture Western Australia (No Date)



Plate3.8: WA Wheat Belt, Ground View of Mortlock Catchment, Waterlogging

Source: Agriculture Western Australia (No Date)



Plate3.9: WA Wheat Belt, Aerial View of Mortlock Catchment, Wind Erosion

Source: Agriculture Western Australia (No Date)



Plate3.10: WA Wheat Belt, Ground View of Mortlock Catchment, Salinity

Source: Agriculture Western Australia (No Date)



Plate3.11: WA Wheat Belt, Mortlock Catchment, Riparian Revegetation

Source: Agriculture Western Australia (No Date)



Plate3.12: WA Wheat Belt, Mortlock Catchment, Bank Revegetation

Source: Agriculture Western Australia (No Date)



Plate3.13: WA Wheat Belt, Mortlock Catchment, Riparian Revegetation

Source: Agriculture Western Australia (No Date)



Plate3.14: WA Wheat Belt, Mortlock Catchment, Riparian Revegetation

Source: Agriculture Western Australia (No Date)

Table 3.3 provides brief historical and geographical descriptions of the *Living Landscapes'* participant community groups to show the extent of their prior engagement in nature conservation via Landcare (i.e. in "green Landcare") and in some case before Landcare.

Table 3.3: Living Landscapes Sub-Catchment Groups: Overview and Assessment of Prior Levels of Engagement in Nature Conservation via “Green” Landcare

SUBCATCHMENT GROUPS				
	South Tammin	Gabby Quoi Quoi	Morbinning	Dowerin Lakes*
Year Formed	1989	1989	1989	1991
Farming Families (Nos.)	16	24	20	No Data
Geographical Information	<p>Location and Size: SW portion of the Shire of Tammin in WA; 26,000Ha.</p> <p>Terrain: Average 250m above sea-level; broad flat valley in south; more breakaways in north towards the Great Eastern Highway, some up to 300m above sea level.</p> <p>Annual Rainfall: 350mm - 80% falls between April and October</p>	<p>Location and Size: Straddles the Shires of Goomalling and Wongan Hills in WA; 20,784Ha.</p> <p>Terrain: Broadly sloping from upper catchment in east with breakaways (350m above sea-level) to lower catchment in west and a broad flat valley, (250m above sea level). GQQ Creek drains east-west into the Mortlock River.</p> <p>Annual Rainfall: 350mm - 80% falls between April and October.</p>	<p>Location and Size: In the Shire of Beverly, 24Kms east of the town of Beverly in WA; 25,673Ha.</p> <p>Terrain: Undulating - between 200m and 350m above sea-level east to west, with Country Peak just over 350m above sea-level in centre. Main drainage channel, Morbinning Gully, flows from Yenyening Lakes (SE) to the the Avon River (NE).</p> <p>Annual Rainfall: 360mm - 80% falls April-October.</p>	<p>Location and Size: In the Shire of Dowerin in WA; 20,000Ha.</p> <p>Terrain: Broad flat valleys with over 70Ha of natural wetland: 57Ha fresh water lakes; 16Ha saline water lakes with Samphire vegetation.</p> <p>Annual Rainfall: 350mm - 80% falls between April and October.</p>
Land Degradation Problems and Motivation to Form Sub-Catchment Groups	<ul style="list-style-type: none"> • Soil acidification • Soil structure decline • Water erosion • Water logging • Rising water tables • Salinisation <p>Wind erosion and decline of natural vegetation</p>	<ul style="list-style-type: none"> • Soil acidification • Soil erosion from wind and water • Rising water tables • Salinisation • Waterlogging • Maintenance of soil structure • Decline in native vegetation 	<ul style="list-style-type: none"> • Soil acidification • Non-wetting soils • Soil structure decline • Water erosion • Siltation of water courses • Waterlogging • Wind erosion • Salinisation • Decline of native vegetation 	<ul style="list-style-type: none"> • Same as others but especially salinisation: extensive natural fresh and saline lakes in the area; many of the fresh water lakes becoming salt contaminated.
Extent of Prior Engagement in Nature Conservation via Landcare (i.e. in “Green Landcare”)	<p>Very High: Significant nature conservation work already undertaken by independent farmers. Reserves already established (e.g. Gardner Reserve in south). Tammin Alcoa Landcare Education Centre established. Partnerships developed with WA Education Department, Shire of Tammin, Alcoa, and Agriculture Western Australia. Selected as Alcoa demonstration group. Most Landcare demonstrations now at a mature stage.</p>	<p>High: Had been active in revegetation as individual farmers in Landcare. This was recognised by Alcoa. Then, in a three way partnership with Agriculture Western Australia, the group agreed to accelerate their development to also become a demonstration group for other catchments. Many Landcare demonstrations are now at a mature stage.</p>	<p>Moderate: Through Landcare have successfully combined productivity issues with land conservation initiatives. Tried a number of approaches to increase diversity of their farm enterprises. Though engaged in nature conservation, the focus is very much on agricultural production. Alcoa recognised this commitment. In a three way partnership with Agriculture Western Australia, they also agreed to become a Landcare demonstration group. Demonstrations are at different stages of maturity.</p>	<p>Low to Moderate: Much less practical experience in ‘Green Landcare’. However individual farmers have participated in Landcare. Moreover, notwithstanding this inexperience, farmers show a deep commitment to nature conservation; to want to get involved (p.16; see also pp.28-36). Not recognised by Alcoa. No demonstration catchments.</p>

*No Landcare Vision information available for the Dowerin Lakes group. Dowerin Lakes information is from Frost *et al* (1999).

Sources: Alcoa 1996a, 1996b, 1997; Frost *et al* 1999; Greening Australia 2004; Smith and Penter 2006

Table 3.3 uses the stages of maturity of their respective demonstration catchments as broad benchmarks to indicate the extent of their past involvement in nature conservation or “green Landcare”. It shows at a glance that the South Tammin sub-catchment group has had the most extensive (suggested “very high”) levels of prior experience in nature conservation via Landcare. That is, although the main motivation for all groups to become involved in Landcare was to improve primary production (Frost *et al* 1999), Table 3.3 shows that South Tammin had made most in-roads towards including broader nature conservation issues as part of this process. Arguably, such progress is a legacy of the Shire of Tammin’s extensive involvement in improving land management in the area that can be traced to the 1940s (Coles and Hammond 2004). Table 3.3 shows that Gabby Quoi Quoi and Morbinning sub-catchment groups also had prior experience in “green Landcare” but not as extensive as South Tammin. The table suggests that the in-roads that Gabby Quoi Quoi made into “green Landcare” were “high” compared with those of Morbinning that were more “moderate”. Table 3.3 suggests lastly that while the Dowerin Lakes’ farmers had had very little or no prior experience in nature conservation or in “green Landcare”, they show a deep interest in the relevant issues and now want to become involved in the nature conservation side of Landcare. Indeed, such levels of commitment, with or without past practical experience, formed part of the essential criteria for becoming involved in the *Living Landscapes* project in the first place (Frost *et al* 1999, p.16, pp.28-36). Table 3.3 suggests that involvement of the Dowerin Lakes sub-catchment group in *Living Landscapes* was driven mainly by such community desire. This group’s involvement in *Living Landscapes* was more bottom-up than the other three groups, which, with their prior partnership-building experiences with Agriculture Western Australia and Aloca, were more involved in (top-down) project pre-planning (Frost *et al* 1999; see also the *BCCG* below and later in this thesis). Figure 3.13 outlines the implementation of the *Living Landscapes* project in this learning context.

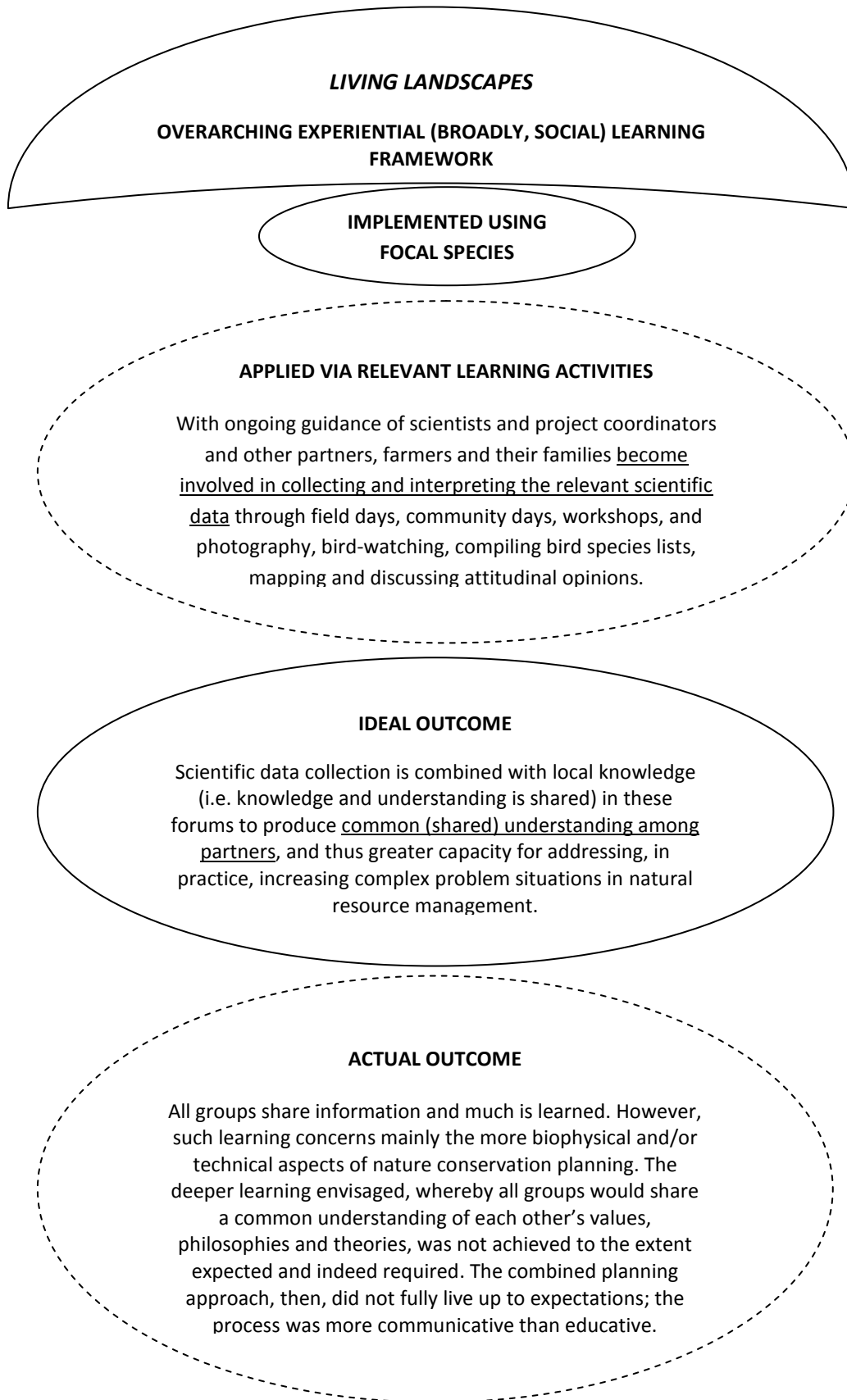


Figure 3.13: Implementation of *Living Landscapes* via the Combined Focal Species-Experiential Learning Nature Conservation Planning Approach

Figure 3.13 outlines how *Living Landscapes* communicated well with, or better “spoke the language of”, sub-catchment groups and through this process engaged participants in social learning (especially about the biophysical, technical and planning processes in nature conservation on the farm). Therefore, *Living Landscapes* was an educative as well as communicative project. However notwithstanding this success, *Living Landscapes* still could not engage its participant sub-catchment groups in social learning to the point where they were able to share their relevant knowledge and understanding to develop stronger (independent) partnerships with those groups responsible for managing the natural environment at larger scales. As such, *Living Landscapes* could not achieve its ideal goal of developing common understanding amongst these groups necessary for addressing more complex problem situations (Pahl-Wost 2007; also Chapters 1 and 2). This suggests that during the development and implementation of *NHT1* and *NHT2* some fundamental issues regarding local community engagement methods have been overlooked. Perhaps this occurred “in the rush” to implement these new policy ideas. Section 3.2.3 further develops this analysis in the urban Landcare and NRM context for this thesis.

3.2.3: A Swan Catchment Council (SCC) South Sub-Regional NRM Program

During 2006-2007, the period of urban data collection for this thesis, the cooperative management based *SCC* implemented *NHT2* across metropolitan Perth via its five sub regions - North, North East, South, East and Coastal Marine (see below). These sub-regions were responsible for engaging local Landcare communities in social learning to help the *SCC* and thus *NHT2* contribute towards achieving sustainable NRM policy development and implementation. In the South sub-region (of interest in this thesis) the *Southeast Regional Centre for Urban Landcare (SERCUL)* was the main sub-regional body overseeing the facilitation and coordination of such community engagement. The two local Landcare communities (henceforth sub-catchment groups) of interest in this thesis - the *Bannister Creek Catchment Group (BCCG)* and the *Two Rivers Catchment Group (TRCG)* - were supported in this way by *SERCUL*. *SERCUL*, an independent non-government NRM organisation, was formed earlier in 2003 within the Swan catchment and during the transition from *NHT1* to *NHT2*. It comprises a committee of community members, local governments, state agencies and staff who monitor and implement regional NRM programs, to bring ‘together the community, business and government to develop and implement projects that improve the health of our waterways and other ecosystems’ <http://www.sercul.org.au/index.html>. Since 2007 *SERCUL* has come under the auspices of

Perth Region NRM and Caring for Our Country. Figure 3.14 shows the geographic location of *SERCUL's* main office. The map also shows the relevant local government areas and that *SERCUL* lies within the City of Canning.

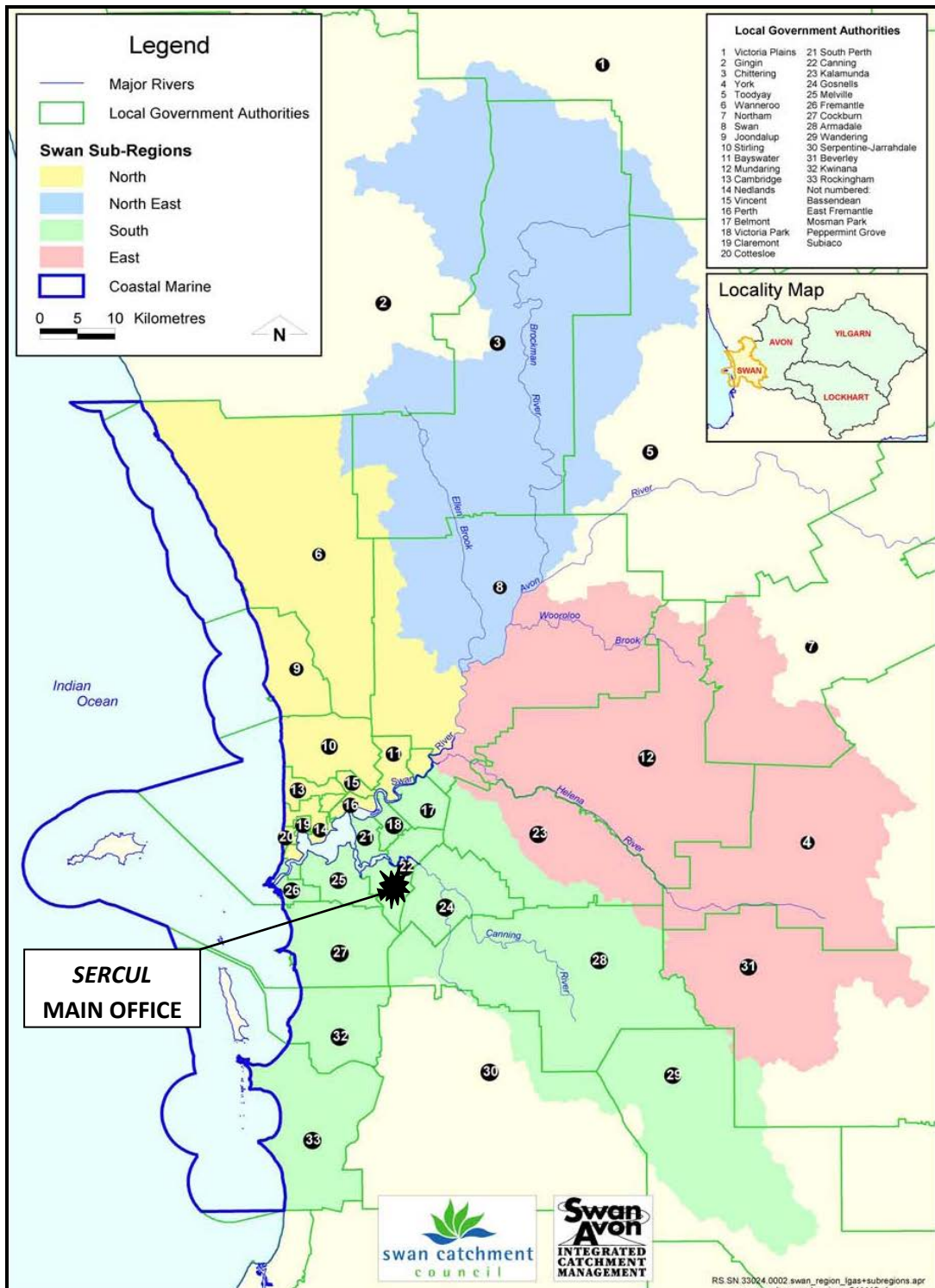


Figure 3.14: Location of *SERCUL*'s Main Office in the Swan Catchment

Source: Compiled From Map Data help at *SERCUL* Main Offices

Figure 3.15 shows the location of *SERCUL* in relation to the sub-catchments that fall within its remit. *SERCUL* main office lies within the Bannister Creek sub-catchment and in close proximity to the Two Rivers sub-catchment. This is significant because *SERCUL* was

established not long after the formation of the *BCCG* and the *TRCG*. In many ways they co-evolved, with members of these sub-catchment groups working together to establish *SERCUL*.

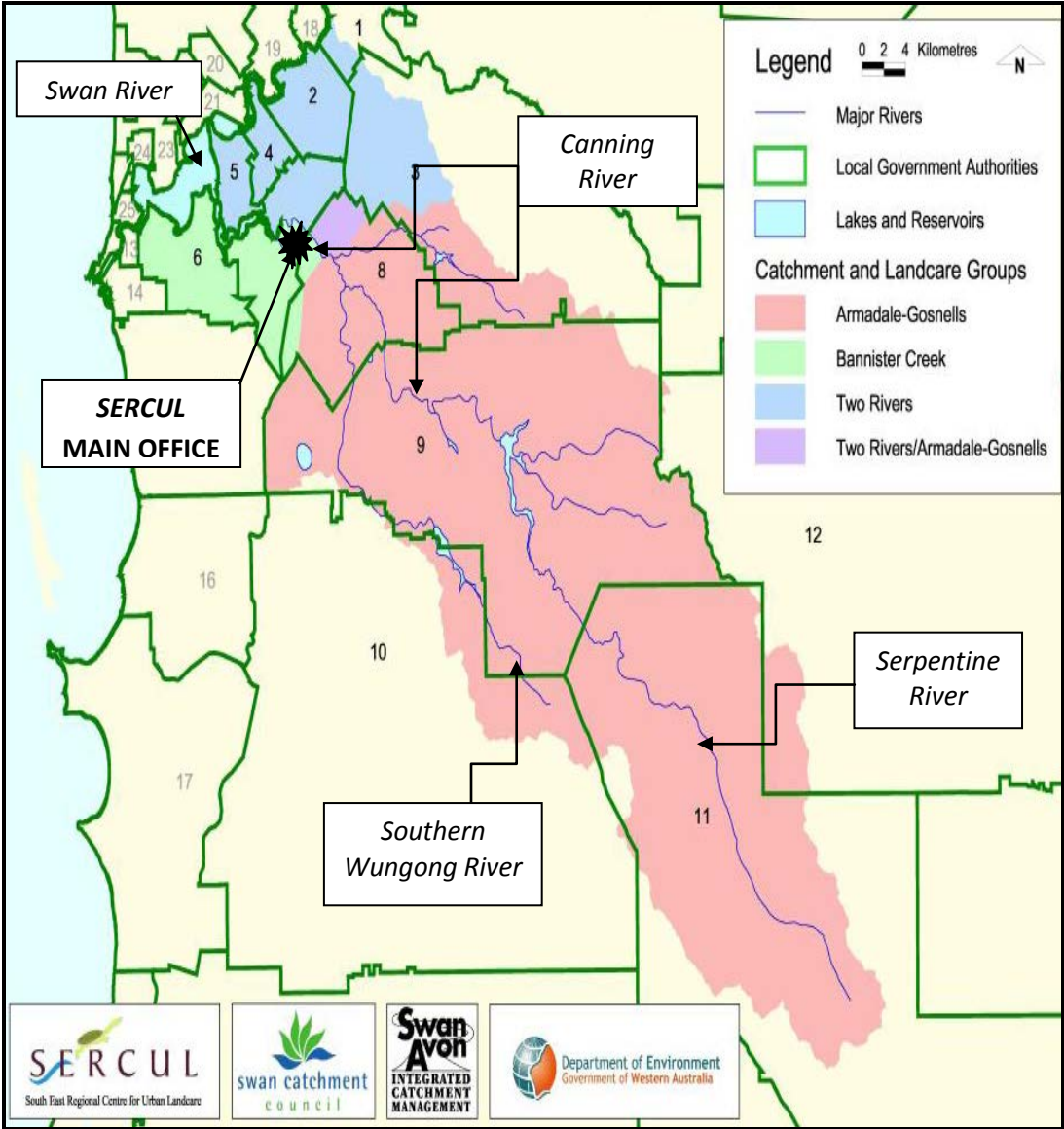


Figure 3.15: Location of *SERCUL*'s Main Office in the SCC South Sub-Region

Source: Compiled From Map Data held at *SERCUL* Main Offices

SERCUL helped to implement the *SCC* strategies in the South sub-region through its four main program areas: Natural Diversity; Sustainable Production; Water Program; Community Support and Education (Figure 3.15).

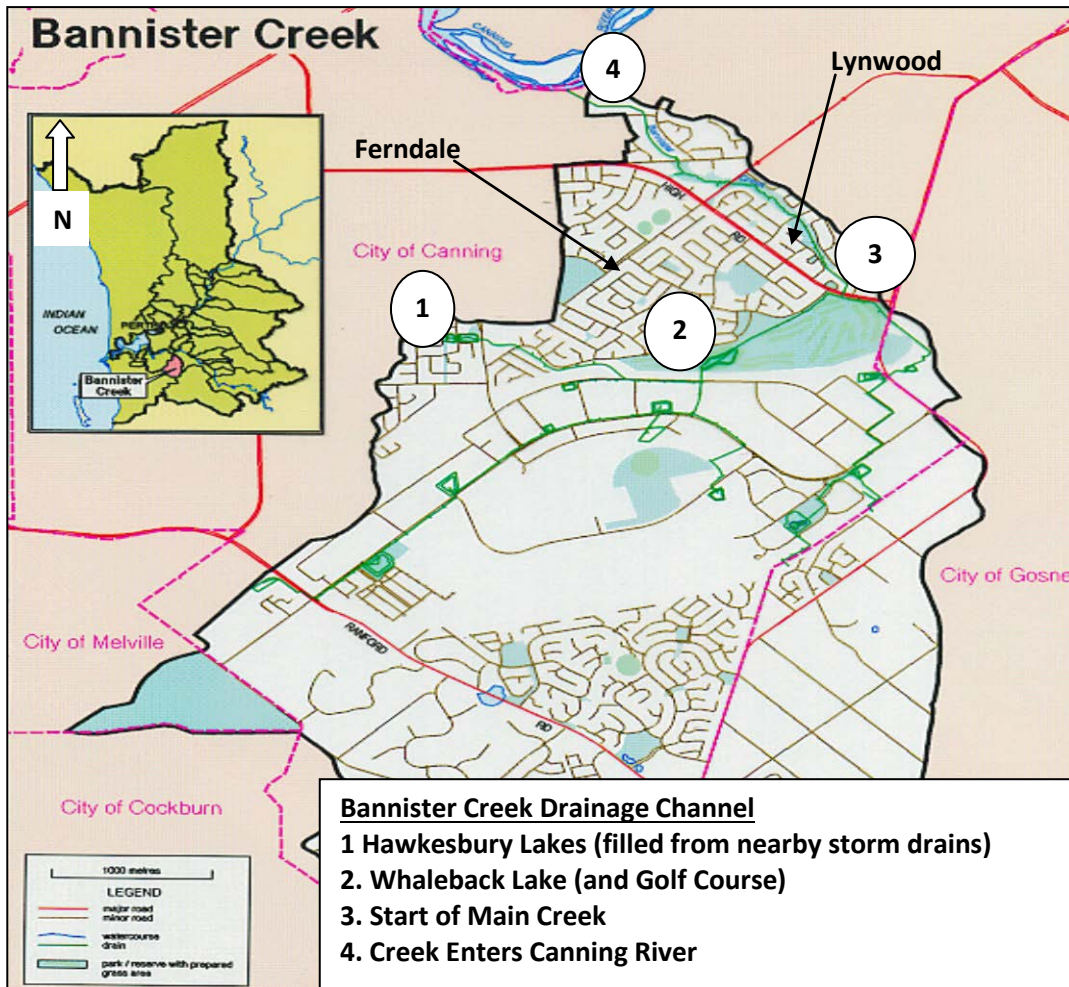


Figure 3.16: SERCUL Main Program Areas

Source: <http://www.sercul.org.au/whoweare.html>

SERCUL's programs dovetailed into the then SCC's broader theme-based programs (Figure 3.8) and thus into the former NHT2 national program. Through its main program areas, SERCUL facilitated the engagement of a number of local Landcare communities/sub-catchment groups in social learning to achieve SCC's broader sustainable NRM goals and thus this regional body's national commitments in this field. The remaining paragraphs describe the historical developments and community engagement capacities of the BCCG and the TRCG.

The *BCCG* was formed in 1997 following local community protest and action over the pollution of Bannister Creek (Fisher 1999; 1998). It is located in the southern sub-region of the Swan catchment (Figure 3.13) in the suburbs of Lynwood and Ferndale. It is largely in the local government area of the City of Canning and extends into the City of Gosnells (Figure 3.17).



Map scale not provided

Figure 3.17: Bannister Creek Sub-Catchment and Drainage Channel

Source: Compiled From Map Data held at *SERCUL* Main Offices

As Fisher (1998) explains, the decision to make the *BCCG* a formal catchment group followed the expression of concerns by the residents of Lynwood and Ferndale between 1991 and 1996 about pollution events in the creek. The formation of the *BCCG* in May 1996 (incorporated July 1997) was very much driven by the local community. The local residents' concerns were twofold, pollution of the waterway and the perceived lack of consultation on the part of the authorities - in particular the then Department of Conservation and Land

Management (CALM). This led to the formation of a formal residents association, *BCCG*, with the objective of seeking a more consultative and cooperative approach to decision-making in relation to Bannister Creek. This move proved to be very effective as a catalyst for the more sustainable management of Bannister Creek and the surrounding catchment (Fisher 1999). By 2000, implementation of the *Bannister Creek Reserve Management Plan* commenced and the local community, with the support of *BCCG*, played a much more significant role in this process. The *BCCG* motivated many local residents to become involved in cooperative regional natural resource management. Plates 3.15-3.17 show the sort of work undertaken by the *BCCG*. They depict three stages of the *Living Streams* project Phase One. (See between points 3 and 4 in Figure 3.17. The entire length of Bannister Creek will resemble Plate 3.17 when all phases are complete.)



Plate 3.15: Bannister Creek Prior to *Living Streams* (Circa late 1990s)



Plate 3.16: Bannister Creek during *Living Streams* Phase One (Circa early 2000s)

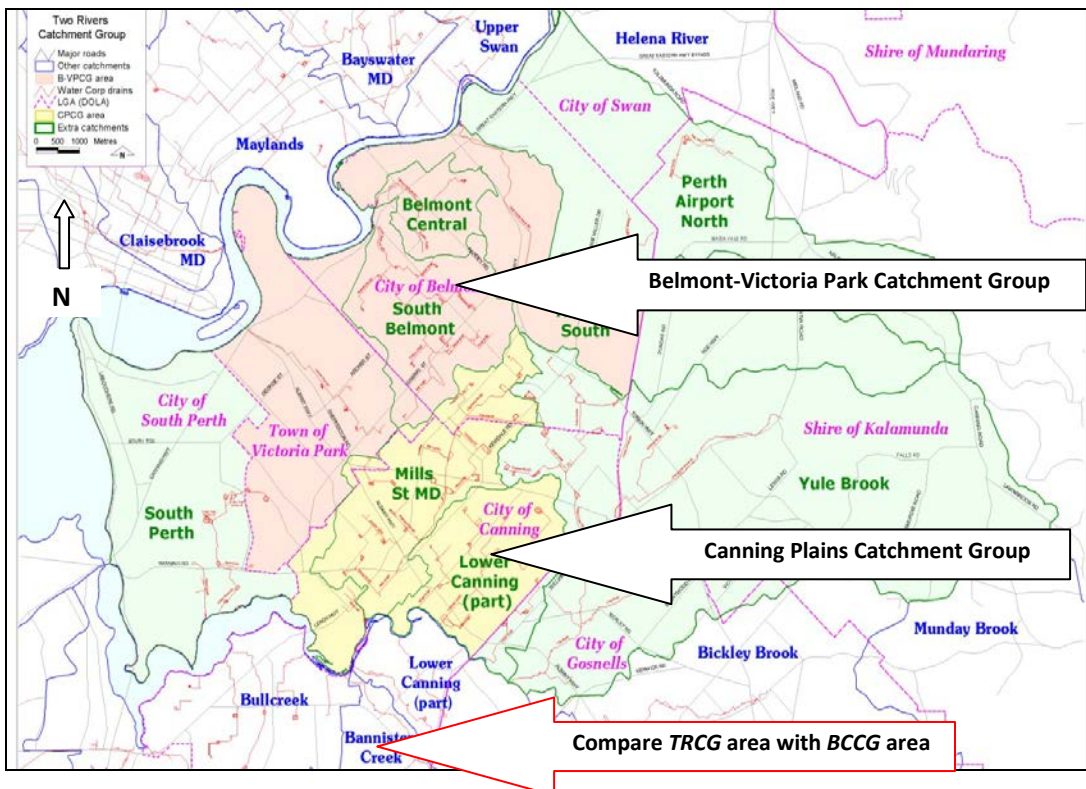


Plate 3.17 Bannister Creek on Completion of *Living Streams* Phase One (Circa 2006/7)

Photographs Source: Data Held at SERCUL Main Office

The formation of the *BCCG* was like the Dowerin Lakes sub-catchment group involvement in *Living Landscapes*, a bottom-up endeavour. The formation of the *TRCG*, though, like the involvement of South Tammin, Gabby Quoi Quoi and Morbinning in *Living Landscapes*, was perhaps more the result of top-down planning.

The *TRCG* was formed, in 2003, as the result of a strategic planning decision to amalgamate two former catchments Belmont-Victoria Park and Canning Plains (Figure 3.18).



Map scale not included

Figure 3.18: *TRCG* Extended Area
Source: Compiled from Map Data Held at SERCUL Main Offices

Figure 3.18 illustrates the former Belmont-Victoria Park and Canning Plains catchment groups which form the core of the *TRCG*. It also shows that the remit of the *TRCG* extends further to the east, to include the Shire of Kalamunda, and west, to include the City of South Perth. The larger *TRCG* was formed because the formerly separate Belmont-Victoria Park and Canning Plains' catchment groups were deemed by the relevant governing bodies to be too focused on improving the natural environment of the Canning River. An amalgamation of the two catchments was thought by these groups to be a better means of managing both the Canning and the Swan rivers. A further rationale was that the local Landcare communities within both former catchments would stand more chance of receiving relevant federal funding. The relevant governing bodies thus considered that the natural environment in these areas, and thus in the entire Swan catchment, could better be managed over the longer term through this amalgamation. Members of these once separate catchment groups went ahead and formed the *TRCG* (personal communication, Chair *TRCG*, 2006; data held at *SERCUL* main office). Plates 3.18 and 3.19 show the results of work completed in the Two Rivers catchment with the help of the *TRCG*.



Plate 3.18: Garvey Park Biodiversity Project December 2001

Source: Data Held at *SERCUL* Main Office



Plate 3.19: Garvey Park Biodiversity Project January 2004

Source: Data Held at *SERCUL* Main Office

Figure 3.19 summarizes how the *BCCG* and the *TRCG*, with the support of *SERCUL*, engaged their respective members in social learning for achieving sustainable NRM. In so doing, and in light of the previous overview of the *Living Landscapes* project, it begins to shed more light on what *SERCUL* and the *BCCG* and *TRCG* were unable to achieve under the auspices of *NHT2* and the then *SCC* community engagement structure (see Figure 3.8, minus the geographic reference groups). It provides an indication of how community engagement in social learning for achieving sustainable NRM and the associated improvements to the natural environment were “contained” locally (Part 1).

SERCUL PROGRAMS

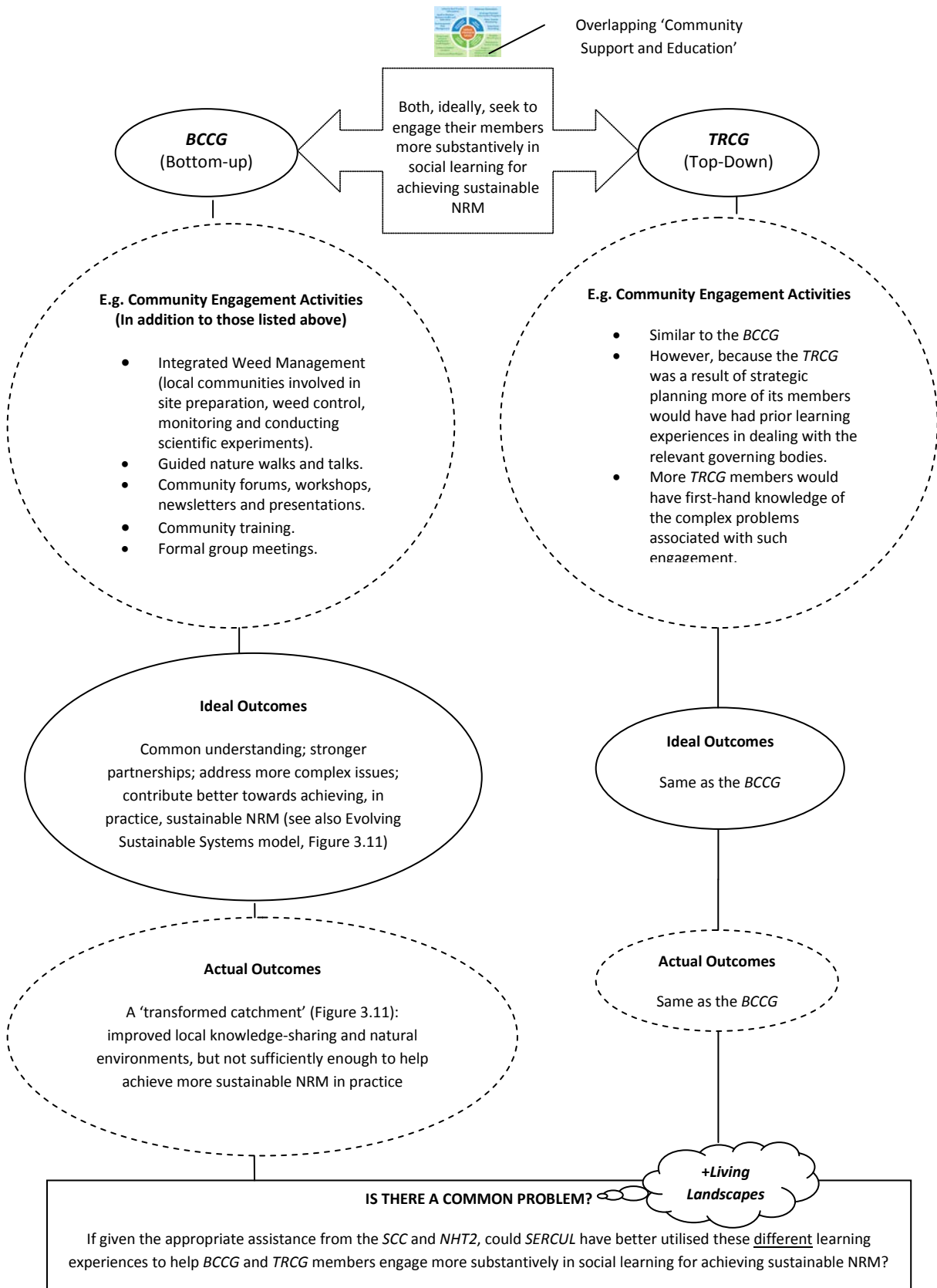


Figure 3.19: Engaging the BCCG and the TRCG in Social Learning for Achieving Sustainable NRM under the SCC and NHT2 (2003-2007)

Figure 3.19 shows how *SERCUL* helped the *BCCG* and the *TRCG* to engage their community members in social learning for achieving sustainable NRM using very similar on-ground methods and activities. These have proved very popular among these communities and NRM practitioners alike and, indeed, have been very effective at achieving associated improvements to the local natural environments. However, like *Living Landscapes* (Figure 3.13), Figure 3.19 also shows that despite their successes these groups were unable to help engage their members more substantively in this learning process: to help better procure the levels of common understanding, independence and complex problem solving capabilities required for achieving sustainable NRM in practice. Comparing Figure 3.19 with Figure 3.13, one can begin to identify a possible underlying reason for the impediments to achieving sustainable NRM in practice (Chapter 2). This comparison provides a basis for analysing data collected in this thesis.

3.3 SUMMARY

This chapter has shed light on some of the more complex local community engagement/social learning issues in sustainable NRM policy implementation in WA/Australia. Using the heuristic framework developed for this thesis, it highlighted past successes and shortcomings in this area that may have been overlooked “in the rush” to implement policy ideas and achieve sustainability. The chapter showed firstly how well the *NLP* tapped into local knowledge and understanding of salinity and its management in particular, to inform Landcare policy development. However, it also showed how, based on this success, *NLP* policymakers, planners and managers may have placed too much emphasis on the capacity of these communities to embrace change towards more strategic ICM-based Landcare. In so doing, the *NLP* perhaps focused too much on the wants and needs of local communities and not enough on how to engage them in understanding their place in Landcare at much greater geographical and temporal scales: where they fit and how they can better contribute in this broader context. The *NLP* may have thus created a “silo effect” in terms of generating the necessary social learning pathways. The chapter examined secondly the implementation of *NHT1* in WA and how this program may have inadvertently exacerbated this situation.

One of the main aims of *NHT1* was to try and help local Landcare communities participate as more autonomous independent partners in ICM-based Landcare. The examination of *NHT1* showed how such good intentions or ideas were perhaps not implemented as well as

they might have been. It shows how on the one hand *NHT1* governing bodies may have capitalized on the growing desire of local communities for more independence when engaging in Landcare - evidenced through their readiness to form new sub-catchment groups - that ICM-based Landcare offered. (Indeed, the shortcomings of the *NLP* may have contributed towards the development of these feelings). However, this examination also showed how governing bodies may have also placed too much emphasis on such local agency. Again, these bodies may have provided too little of the right kind of support in transition towards becoming independent partners in bigger picture Landcare. Therefore, instead of local Landcare communities becoming more effective independent partners in bigger picture ICM-based Landcare, they were perhaps left feeling more isolated or abandoned in this fast-changing and increasingly strategically-focused policy area. In terms of community engagement in social learning pathways, *NHT1* had shifted away from creating a “silo effect” towards creating more of a “top heavy” effect. Here, pathways at the national policymaking level were strengthened as policy ideas were shared better between the new geographically/environmentally based program areas, while these processes locally were weakened. This examination of *NHT1* has thus shown how implementation of *NHT1* perhaps ran counter to one of its main aims and core ideas.

The chapter examined thirdly *NHT2/NAP* and how this program attempted to address such issues through implementing the even more strategic nationally coordinated regional approach. This examination demonstrated how the *NAP* helped to ensure that the respective regions (through the newly formed regional governing bodies/catchment councils) were guided by well-defined national goals in this policy area. The *NAP* was also enshrined in law and so the regions were provided with additional statutory authority in order to help them achieve their sustainable NRM goals. However, it also showed how the new *NHT2* and older *NAP* regions were misaligned, causing complexity and confusion during implementation. This examination showed how such misalignments may have contributed towards limiting the capacity of newly formed regional bodies, themselves in need of more help and advice in transition, to do this very job: to better help their respective local Landcare communities engage in bigger picture Landcare as more independent partners. It showed, then, how these new regional bodies began to feel isolated, and how local Landcare communities began to feel even more isolated, as *NHT2/NAP* was rolled out. As the sharing of policy ideas and hence the associated learning pathways became more consolidated, implementation of these ideas at regional and local

scales and associated learning pathways became more fragmented and weaker. This examination of *NHT2/NAP* has thus shown how local Landcare communities may have finally come to share relevant NRM knowledge and understanding mainly among themselves: how the “driving force” for achieving more sustainable NRM policy development in practice was perhaps contained at this scale. This examination also outlined how the issue of ineffective monitoring of programs and projects was brought to light during this period, perhaps because of these ongoing sustainable NRM policy implementation problems. *Caring for Our Country*, introduced in 2007 by the then newly elected Australian Labor government sought to address such learning related issues.

Importantly, given the heuristic used in this thesis, *Caring for Our Country* did not reject outright the regional model. Instead, it sought to improve implementation of the regional model through its six priority areas and associated specialist facilitators. Moreover, in an endeavour to help ensure that unlike previous programs *Caring for Our Country* would be implemented effectively at all levels, this program focused on improving monitoring and evaluation in its six priority areas through its *Monitoring, Evaluation, Response and Improvement (MERI)* program. The examination of *Caring for Our Country* in this chapter suggested that the overarching priority area of “Community Skills, Knowledge and Engagement” and the monitoring thereof are especially relevant in terms of addressing the shortcomings of previous programs. It also outlined though that while *Caring for Our Country* has helped regional bodies better execute their responsibilities, thus consolidating learning pathways at this level, local implementation/learning pathways remain weak by comparison. Part Two of this chapter examined more closely the two WA regions and local community engagement projects. Both were implemented in this changing sustainable NRM policy environment. This examination thus provides a firm basis for further investigation in this thesis.

Part Two described two very different projects in terms of their geographic locations, historical developments, participant communities and management principles on which they are based. It also described what they had in common. Both used very similar popular on-ground community engagement methods. Both experienced similar levels of difficulty in engaging participant communities in social learning taking into account the different levels of experience in Landcare, especially with respect to their involvement in governance-related issues. A preliminary comparative analysis then raised questions about how these

methods might be better deployed to utilize these different experiences - to help improve community engagement in social learning for achieving sustainable NRM as described in Chapter 2. Could monitoring this process via the *MERI* program help facilitate this process? These questions form a basis for further investigation of the evolving learning methodology used in data collection and analyses and in developing the rudiments of the monitoring tool outlined in Chapter 1.

CHAPTER FOUR

Methodology and Methods

This chapter further explains the methodological approach and the data collection methods used in his thesis. Section 4.1 examines the case study and action research methodologies with regard to the rural case study data collection and preliminary analyses of these data. The methodological issues raised motivated the PhD researcher to develop the rudiments of a combined survey method that might be used by sustainable NRM researchers and practitioners to evaluate community engagement in social learning in this field. Section 4.2 then describes the methods used to collect data in the rural Central Wheat Belt and then in urban metropolitan Perth. This puts the issues raised in the examination of the case study methodology into a relevant “real world” context. From these combined theoretical and practical experiences an evolving learning methodology (Hooshangi *et al* 2013) was developed as the basis for the proposed collaborative monitoring tool (see Chapter 1.4.2). Section 4.3 presents a tabular summary of these experiences based on four interrelated issues: leadership, collaboration, feedback and generalisations. The tabular summary links this chapter with Chapter 5.

4.1 CASE STUDY and ACTION RESEARCH METHODOLOGIES

This thesis uses two case studies to examine how community engagement in social learning occurs in sustainable NRM projects. There is a substantive literature on the value of employing case-study methods in the social sciences. (On case studies Winter 2011; Thomas 2011; Mills *et al* 2010; Yin 2009; Simons 2009; Gerring 2007; Hancock and Algozzine 2006; George and Bennet 2005. Within the broader social science research literature: Creswell 2013; Seymour 2012; Depoy and Gitlin 2011; Bickman and Rog 2009; Outhwaite and Turner 2007; Barnartt and Altman 2001. With respect to the social learning issues explored in this thesis: Franklin and Blyton 2011; Huber 2007). Case studies can be used to incorporate systematic observation, experiment, theoretical considerations and analyses. Case studies can also enable highly descriptive research. Researchers can immerse themselves in particular situations (environments, communities, societies and/or

cultures for example) and collect data using a variety of techniques such as participant-observation and structured and semi-structured interviews. The resultant field notes may then provide the basis for deeper contextual analyses. A case study therefore:

Investigates a contemporary phenomenon within its real-life context; when the boundaries between the phenomenon and context are not clearly evident; and in which multiple sources of evidence are used (Yin 1989, p.23, cited in Corcoran *et al* 2006).

Case studies are recognised as one of the best ways to conduct inductive and qualitative research as they can provide the researcher with the opportunity to investigate complex issues. For example, they are a very useful first step in identifying a range of issues or variables that can be quantified in a subsequent quantitative survey. Case studies however may be limited in terms of developing general theories (Corcoran *et al* 2004).

While case study methods are very informative, the potential for them to be transformative - to transform practice and bring about institutional/systemic change - is still to be demonstrated (Corcoran *et al* 2004). Corcoran *et al* (2004) suggest that the reasons for the unfulfilled transformational potential of case studies may be threefold. Firstly, case studies do not problematize practice. Rather, case study reports tend to identify good practice and bad practice, and generalizations are often made on these bases. In reality, what is seen as good or bad practice may vary in accordance with one's status, views, values and philosophies, thus rendering notions of good and bad much more problematic. Case studies, then, tend to set up 'a number of dichotomies of practice' (p.7). Secondly, while success stories are likely to be reported, the data collected in support of such success and information on failures are often not made available for public critique - a practice that can fail to address more complex underlying problems. Lastly, information on the theoretical approach to the methodology and the data collection methods are not usually made available to the wider community. In short, while such dualism persists (i.e. while division exists concerning what, how and who to inform) the potential for case studies to communicate important findings beyond the research community/academe, and thus to be transformative, cannot be fully realised.

Schiele and Krummaker (2011) have conducted a recent examination of this problem of dualism in case study research in management and governance that is relevant to this thesis. These authors interrogated consortium benchmarking - where practitioners as co-researchers facilitate research that is relevant to both research and practice. They then compared 'consortium benchmarking with multi-case research and then [identified] five

aspects either not accounted for or neglected in traditional multi-case research' (p.1137). These aspects are all very much related to improving knowledge transfer or, in this thesis, improving community engagement in social learning for sustainability. The five aspects are:

1. Including practitioners as co-researchers
2. Being team based
3. Using different sources of evidence
4. Focusing on best practice
5. Stimulating meta discourses which are likely to produce knowledge relevant for both academics and practitioners

(Op. Cit. p.1142)

Barratt *et al* (2011) examine similar issues in operations management. Research into making case studies more transformative and examining and addressing problems of dualism through improving knowledge transfer is extant, especially in management and governance research, and, relatedly, in sustainable NRM research and practice (Broderick 2008; Mackenzie *et al* 2012).

These researchers, and others, such as Fendt and Kaminska-Labbe (2010) have also considered the value of incorporating elements of action research in overcoming the shortcomings of case studies described above, particularly in terms of generating institutional change. Reason and Bradbury (2001) provide a suitable definition of action research in this context:

[Action research is] a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview which we believe is emerging at this historical moment. It seeks to bring together action and reflection, theory and practice, in participation with others, in pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities (cited in Garmann Johnsen *et al* 2007, p.1).

Action research defined thus could facilitate the communication of deeper knowledge and understanding, and is, arguably, a better option for data collection when a transformative outcome is desired. Action research, though, has often been criticised (Schiele and Krummaker 2011), for its lack of academic rigour, and, consequently, for being more a process of consultation than a *bona fide* research methodology (Blichfeldt and Andersen, 2006). To illustrate these concerns, for action research, and in indeed for case study research, Table 4.1 shows some key differences between the two methodologies in terms

of their capacity to facilitate community engagement in social learning for achieving sustainable NRM.

Table 4.1: Case Study and Action Research Methodologies: Key Differences in their Capacities to Facilitate Community Engagement in Social Learning for Achieving Sustainability NRM

CASE STUDY RESEARCH	ACTION RESEARCH
<ul style="list-style-type: none"> • Begins with researchers’ interest in a particular phenomenon. • Phenomenon specified by researcher prior to investigation. • Collaboration is less critical to success. • Less collaboration reinforces independence of researchers. • Gives researchers more control over processes and outcomes. • More academic freedom. • Findings primarily targeted at the academic community. • Researchers are more aware of and discuss among themselves the relationships between initial frameworks and empirical findings. • Easier to make generalisations. • Can choose contexts that facilitate analytical generalisations (e.g. abstractions based on empirical material). 	<ul style="list-style-type: none"> • Greater roles are offered to participants in defining issues and concerns. • Phenomenon is also defined by participants. • Collaboration is more critical to success. • More collaboration diminishes researchers’ ability to control processes and outcomes and freedom to pick and choose problems. • Gives Researchers less control over processes and outcomes • Less academic freedom. • Findings fed back to participants as a matter of obligation. • Researchers do not declare and discuss intellectual framework of ideas they bring to bear on their projects. • Not easy to generalise. • Context specific.

Adapted from Blichfeldt and Andersen (2006)

As illustrated in Table 4.1, while the case study methodology is limited in terms of its capacity to engage both academic researchers and practitioners in social learning for achieving sustainable NRM, and thus in its ‘potential to transform practice’ (Corcoran *et al* 2004, p.7), action research is likewise limited. That is, action research is limited in its capacity to engage academics and practitioners in such learning to make a wider and deeper contribution to theory (Blichfeldt and Andersen 2006). In focusing on the capacities of each methodology to facilitate community engagement in social learning for achieving

sustainable NRM, it is apparent that notions of dualism are not confined to case studies but are a problem for both approaches. To help overcome these limitations, the best aspects of both case study and action research methods have recently combined to form an integrated case study and action research methodology. This is occurring mainly in the fields of management and governance research and practice.

For example, Fendt and Kaminska-Labbe (2010) in their extensive review of action research examine the value of ‘design-driven action research’ – ‘a research methodology aimed at answering a particular type of research problem: the design’ (Andriessen 2006 cited in Fendt and Kaminska-Labbe 2010, p.225). They examine how to implement this research technique through applying the notion of pragmatic adequacy. That is, instead of following the traditional scientific approach of developing a theory and then a model to prove the theory in the real world of experience, they consider the following steps: (1) develop a theory; (2) develop a model to test the theory, but also, in consultation with practitioners as co-researchers, consider the design of that model and its impact on praxis; and then (3) test the theory in the real world of phenomena, but also consider the impacts of such research on actual things or objects or artefacts (see pp.224-228) – e.g. people, places, goods, services etc. The authors suggest that such design-driven action research, guided by pragmatic adequacy, as opposed to more traditional case study research that is guided by ‘ontological adequacy’ (p.228). Such design-driven action research can strengthen more traditional scientifically-based case study research; improve shared learning and thus overcome the problems of dualism (Table 4.1) in order to make this research methodology relevant to both researchers and practitioners (Hooshangi *et al* 2013). Section 4.2 describes the data collection methods used in this thesis to achieve similar goals.

4.2 DATA COLLECTION METHODS

The information sheets together with the associated “Consent Form for Participants” for both the rural and urban surveys were included at the beginning of these surveys (see Appendix 1 for the initial rural case study survey; see Appendix 3 for the modified urban survey)³. The ways in which information was presented and consent was received before implementing the follow-up qualitative interviews differed between the rural and the urban studies. The reasons for this were largely logistical as described below. These guides are

³ The thesis title on these forms - *Down to Earth Aiming High: Developing Essential Learning Qualities in Community Engagement Projects for Improving Ecological Health* - was the working title for this thesis.

included at the beginning of the respective follow-up “Questions as a Basis for Further Discussion” (see Appendix 2 for the rural study; see Appendix 4 for the modified urban study). With reference to the interviews with catchment council managers and chairs, information about the study was presented and consent was received via telephone conversations, email correspondence and personal communication. “Questions as a Basis for Further Discussion” were also sent to these interviewees prior to these meetings (see Appendix 5). All data collected during research were stored on a dedicated computer with access to the researcher only. Data were held under lock and key in an office reserved for Humanities postgraduate students at Curtin University. These measures complied with the terms specified in the *Joint NHMRC/AVSS Statement and Guidelines on Research Practice* under the section headed “Data Storage and Retention”. Section 4.2.1 further describes how this study complied with these ethical standards.

4.2.1: Preliminary Discussions

The process of complying with ethical standards really began with preliminary discussions that were held prior to commencing the initial rural study in mid-2004. These were held with: a scientist and practitioners/project managers from Greening Australia in October 2002; a relevant sustainable NRM scientist from the Commonwealth Scientific Industrial Research Organisation (CSIRO) in October 2002 and again in December 2002; with *Living Landscapes* project participant communities during a social event - a “camp out” - in November 2003; with *Living Landscapes* project participant communities, scientists and practitioners during the *Living Landscapes* forum held at CSIRO Perth in February 2004; and with the *Living Landscapes* project coordinator and an independent environmental consultant held in Fremantle in February 2004. These discussions were important ethically because they provided an opportunity for the PhD researcher to explain his ideas to these communities and to receive feedback that could help in research design. More importantly, though, it also provided opportunities for interviewees (the *Living Landscapes* project practitioners and participant communities in particular) to participate in planning for this PhD project from the outset. This approach was in keeping with the scientific aims and objectives and the underpinning philosophy and spirit of *Living Landscapes*. Broadly, *Living Landscapes* sought to establish common ground between scientists, governing bodies and local rural communities in an endeavour to achieve nature conservation in agricultural production (Frost *et al* 1999). These preliminary discussions led to the PhD researcher working closely with the *Living Landscapes* project coordinator.

The *Living Landscapes* project coordinator has a farming background and had been involved in the planning and implementation of *Living Landscapes* from the outset. The coordinator had thus spent much time working with farmers on nature conservation issues and knew them and the broad study area very well. The PhD researcher on the other hand was relatively new to this area. Clearly, then, it would be very difficult from both social and logistical perspectives for “someone from the outside” to make contact with farmers and organize their participation in this PhD research project. Under these circumstances, the initial and ongoing advice of the *Living Landscapes* coordinator concerning the design of surveys and follow-up interviews, when and how they would be implemented was and would be invaluable. The initial rural case study survey and associated ongoing fieldwork were designed and planned in close consultation with the *Living Landscapes* project coordinator. An environmental consultant in Fremantle was also involved in designing the final draft of the initial rural case study survey. This consultant provided invaluable technical advice on how best to structure the initial rural survey. Notwithstanding such assistance designing the structure of this survey and its implementation proved especially problematic. These problems are summarized below.

There were three major interrelated issues. The first was an appropriate knowledge base. What, exactly, should farmers be learning when engaged in social learning for improving nature conservation on the farm and through this achieving sustainable NRM? For example, there are many aspects of nature conservation planning and sustainable NRM that farmers should learn more about in addition to the usual hands-on biophysical aspects, such as the psychological, social, economic, cultural, and/or aesthetic aspects. To what extent have local communities been helped to acquire this additional knowledge? The second concerned *how* such knowledge can be improved through community engagement processes and methods. For example: How well have participant local communities been helped to share such knowledge with others responsible for implementing sustainable NRM at much greater geographical scales? How well have they been helped to maintain this process over time? How well have local participant communities been helped in all the above aspects of community engagement/social learning compared with other similar sources of community engagement/social learning? The third issue concerned the design of a survey that could be easily understood by participant communities, in order to facilitate their participation.

Following a series of informal discussions and survey drafts, the PhD researcher, *Living Landscapes* coordinator and environmental consultant settled on a format (Appendix 1). This survey is much longer than the draft surveys and, as such, took some time to complete. This choice seems counter intuitive. However, the shorter draft surveys were organized on the basis of a “general awareness” of the knowledge and community engagement/social learning processes before and after the *Living Landscapes* project was conducted. These designs had merit but were considered too vague and somewhat cluttered. The PhD researcher, *Living Landscapes* coordinator and environmental consultant felt that a survey based on this format would cause confusion among participants. The final survey was organized, instead, on the basis of five proposed and much more distinct major knowledge fields in social learning: Land, Wildlife, Money, Picture (The Visual Landscape) and People (Personalities, Traditions, Government) (Appendix 1). Questions pertaining to community engagement/social learning processes - on the actual sharing of knowledge in space, over time and compared to other sources were included in each of these sections. There was thus a trade-off. Although the final survey could potentially, evaluate the complex process of community engagement in social learning and was better partitioned or sub-divided to facilitate implementation, it was much longer and would therefore take more time to complete.

A pilot survey was considered. However, given the logistics associated with implementing this survey over such a wide geographical area, with few resources, and the difficulties associated with getting farmers together given their limitations on time, this was not feasible. A joint decision was thus made between the PhD researcher, *Living Landscapes* coordinator and environmental consultant to implement the final draft as it stood. With the ongoing help and advice of the *Living Landscapes* project coordinator with respect to organizing dates, times and venues, this initial rural case study survey was implemented at close of business following the participant sub-catchment groups’ quarterly Landcare meetings (see Section 4.3.2). Most important here was the presence of the *Living Landscapes* coordinator at each of these sessions. In the absence of a pilot study, the coordinator helped the PhD researcher explain the survey, and the broader nature and importance of this kind of social research, to groups of farmers most used to engaging in the biophysical hands-on aspects of nature conservation planning in agriculture. This included running through the information sheets and consent forms.

As with a pilot study many lessons were learnt from implementing this rural survey. These learning experiences led the PhD researcher to consider modifying the initial case study survey such that it might be used in sustainable NRM research *and* practice. This learning was extended through working out how best to present results for the benefit of these researchers and practitioners. In many ways this process is no different from that of a well-designed pilot study. Indeed, improving the rural survey along these more traditional lines was a main aim. However, the key difference at this juncture concerned the underlying intention of the researcher. In case study research - and perhaps in research generally - the focus, even when improving a survey to better engage respondents, is on “the research” (Hooshangi *et al* 2013 Chapter 1). In this case study, the researcher, through the methodological learning experiences outlined above was motivated to modify the rural survey such that it could be used by sustainable NRM practitioners from the outset of a relevant project and on an ongoing basis. The PhD researcher, then, held the view that such a survey might facilitate the collection and the sharing of more complex data; strengthen the nexus between sustainable NRM research and practice; solve some related complex problems, and, through this process, contribute towards developing and implementing improved sustainable NRM policies. In essence, the researcher, at this stage, sought ways of combining case study and action research methods.

This motivation to follow such lines of enquiry was strengthened as opportunities arose to conduct a similar urban study. This urban study became, in effect, a *de facto* pilot study of the proposed collaborative monitoring tool - the implementation process of which is outlined in Chapter 1. The PhD researcher is fully aware that, to make these ideas workable in practice, would require extensive ongoing research and on-ground trials. Moreover, this research would need to be conducted in collaboration with GIS, IT and/or computer software researchers, and with potential end users such as catchment councils, to develop “a product” for use in research *and* practice (Appendix 6). How further development along these lines might be approached is discussed in Chapter 7. The remainder of this chapter describes the data collection process.

4.2.2: Quantitative and Qualitative Data Collection

Table 4.2 provides an initial snapshot of quantitative and qualitative data collection in both rural and urban locations.

Table 4.2: Locations of Rural and Urban Sub-Catchment Groups and their Participation in Quantitative and Qualitative Data Collection

		RURAL STUDY				URBAN STUDY	
		Gabby Quoi Quoi	South Tammin	Morbining	Dowerin Lakes	BCCG	TRCG
INITIAL SURVEYS	Locations	Konnongorring Hall	Tammin Landcare Education Centre	Morbining Hall	Farmer's Property	Postal Surveys	Postal Surveys
	Numbers of Participants	8	10	10	5	14/82	12/59
	Dates	30-7-04	2-9-04	22-9-04	8-03-05	19-5-06	
	Times	8am-10am	3pm-6pm	4pm-7pm	2pm-4pm	am	
FOLLOW-UP INTERVIEWS	Locations	Farmer's Property and By Email	Tammin Landcare Education Centre	N/A	By Email	SERCUL Main Office	City of Canning Local Government Offices
	Numbers of Participants	3	5	N/A	1	6	10
	Dates	4-10-05	25-10-05	N/A	N/A	7-2-06	14-3-07
	Times	10am-1pm	5pm-8pm	N/A	N/A	7pm-10pm	7pm-9pm

Note: This table provides a brief overview of locations, timelines and numbers of respondents. It acts as a guide for this chapter. How farmers engaged in this survey is described more fully in the following subsections

4.2.2.1: Rural Data Collection

The initial rural case-study survey (Appendix 1) was administered as part of each sub-catchment groups' regular quarterly Landcare meeting schedule. Further to explanations provided in Section 4.2.1, this meant that farmers were able to participate at a time and place of their choosing and without the scheduling of additional meetings. Meeting with the groups in this context also provided good opportunities to explain the survey, and the broader research objectives, in situations where farmers felt most comfortable. Both the PhD researcher and *Living Landscapes* project coordinator felt that by administering the survey in these contexts farmers might feel more confident about asking questions and/or engaging in associated informal discussions prior to during and/or after the survey. See Table 4.2 for locations and the number of farmers completing this survey questionnaire. Farmers sat around tables in small groups to complete the survey (see Plates 4.1 and 4.2).



**Plate 4.1: Initial Rural Case Study Survey of the South Tammin Sub-Catchment Group
(Tammin Landcare Education Centre)**

Photo: Graham Thompson



**Plate 4.2: Initial Rural Case Study Survey of the Morbinning Sub-Catchment Group
(Morbinning Hall)**

Photo: Graham Thompson

Farmers completed the survey in approximately forty-five minutes. Subsequent discussions with some farmers eventuated following completion of the initial survey in each location.

These discussions shed more light on issues raised in the survey, and about how the survey format might be improved. This also enabled the PhD researcher to build rapport with those farmers who participated in follow-up interviews.

Follow-up interviews were conducted with three Gabby Quoi Quoi members and five South Tammin members, at a farmer's property and again at the Tammin Landcare Education Centre respectively. Less successful attempts were made to organise follow-up interviews with Dowerin Lakes and Morbinning members. Only one *Dowerin Lakes'* farmer participated via email, by responding to the questions used as a basis for further discussion in the follow-up interviews (Appendix 2). These questions were also sent to this farmer via email. There was no response from Morbinning farmers. The reasons for this were unclear. However, at the time, Dowerin Lakes' farmers were involved in repairing severe storm damage on their farms, and the wife of the Chair of this group had just given birth. The Chair of the Morbinning group, during an informal follow-up phone call, said that he thought the initial survey was enough and that the rest of the group would be unlikely to participate in follow-up discussions. The following paragraph describes, briefly, how follow-up interviews with Gabby Quoi Quoi and South Tammin groups were organized and administered.

Firstly, those Gabby Quoi Quoi farmers who expressed the necessary interest in the initial surveys were contacted by telephone and by email, and were asked if they would like to attend a follow-up interview. The researcher was then invited by one of the farmers to conduct the interviews at his property. Three of the eight farmers who participated in the initial survey decided to participate in this interview. Two farmers participated together in the interview at the farmer's property, and one farmer responded later by email to a broad set of questions that were used to guide the interview at the farmer's property. Interviewees were first reminded of the aims and benefits of the research, and their rights, as presented to them in initial survey. Permission was then sought to record the discussion and to compile written notes. All Interviewees gave their permission. These data were stored with the initial survey results. The *Living Landscapes* project coordinator was not present at these interviews. By now, the participant farmers had met the researcher and were aware of the objectives of the research. This interview was conducted over a two hour period. Follow-up interviews were arranged, similarly, with South Tammin farmers. These interviews were also conducted at the Tammin Landcare Education Centre. Following

initial contact by telephone and by email with the Chair of the sub-catchment group, the researcher was invited to conduct the interview at the centre. This interview was also conducted on completion of the group's quarterly Landcare meeting, so that more time could be spent discussing the data collected and the issues that were raised in the initial quantitative survey. Five farmers remained on completion of formal Landcare business to participate in this follow-up interview. Participant farmers also gave their permission for the discussion to be recorded. Written notes were also compiled. These data were also stored as described above. The *Living Landscapes* project coordinator was in attendance for part of the interview because of a work-related pre-commitment. This interview was also conducted over a two hour period.

4.2.2.2 Urban Data Collection

Following modifications to the initial rural case study survey format with the assistance of relevant *SERCUL* staff, similar quantitative surveys and follow-up interviews were organized for the *BCCG* and *TRCG* (Appendix 3). However, the total membership of each of these groups and thus the numbers of potential survey respondents far exceeded those participating in the *Living Landscapes* project. Therefore, despite the limitations described in the following subsection, initial quantitative surveys were distributed by mail. Lists of members of the *BCCG* and the *TRCG*/potential respondents were obtained with the help of *SERCUL* staff. Copies of the modified urban survey together with an explanatory covering letter (Appendix 3) and prepaid reply envelope were then sent by post to the home addresses of the respective group members. Replies were received by post at the Faculty of Humanities main office at Curtin University over the two to three month period following distribution. Data were stored as described above. Subsequently, and following further consultations with the relevant *SERCUL* staff and Chairs of the *BCCG* and *TRCG*, follow-up interviews were organized on a similar basis to those conducted in the rural locations.

As with the rural follow-up interviews, brief questionnaires based on initial analyses of the quantitative survey responses were prepared (Appendix 4). These were to be used by participants as general guidelines and for making written comments during the discussions. As with the rural follow-up interviews, participants were reminded of the aims and benefits of the research and their rights as described in the initial quantitative survey. Again, with prior permission of the participants both the *BCCG* and the *TRCG* interviews were also recorded on audio tape and written notes were compiled (see Plate 4.3).



Plate 4.3: Urban Case Study Follow-Up Discussion with the Two Rivers Catchment Group (City of Canning Offices)

Photo: Graham Thompson

4.2.2.3 Limitations

There were limitations associated with the implementation of these methods. These are listed below:

1. Organization and Timing

Organizing and administering the rural surveys and interviews was most difficult. While the *Living Landscapes* project coordinator assisted greatly with this process - fitting in with farmers' quarterly Landcare meetings - these meetings were held at different dates and times throughout the year. Consequently, administering these surveys and follow-up interviews took place over a period of about eighteen months. Unexpected events also contributed towards this delay. For example, a bountiful harvest meant extra work for farmers. Unseasonal storms saw some farmers working many extra hours repairing fencing and tracks that were damaged and/or inundated by severe flooding. Some farmers had additional family commitments.

Organization and administration of the urban surveys and follow-up interviews was easier. The help of *SERCUL's* regional coordinator, who was also Chair of the *BCCG*, and the *TRCG* Chair, who also worked at *SERCUL*, was invaluable in this respect. However, there were still some logistical problems. For example, there were greater numbers of postal surveys to organize. Moreover, as expected with postal

surveys, the response rate and the types of responses in these initial surveys were not as good or as detailed as the initial rural surveys. Responses were also slow to be returned over a three month period. It was some time before the next suitable *BCCG* and *TRCG* quarterly general meetings. The whole urban data collection process was thus completed over a nine month period from May 2006 until February 2007 (Table 4.3).

2. Attendance and Participation

Attendances at quarterly Landcare meetings can and do vary. This means that response rates at these meetings also varied. The researcher relied, then, on there being good attendance. While attendances at the respective Landcare meetings were quite high, on average around 80% of maximum attendances, full attendances at these meetings were not achieved. Of more concern were the responses and response rates of those in attendance.

A few farmers in attendance refused to participate in the initial surveys and left early. Most notably, one farmer at the Gabby Quoi Quoi Landcare meeting clearly expressed disinterest in the survey, that it was not relevant to him and that he had other work to do. There were also discrepancies in the part of the initial survey where respondents indicated their preferences for participation in follow-up interviews. Farmers who indicated that they would like to participate in follow-up interviews later changed their minds. Others who turned up to the follow-up interviews had not participated in the initial surveys. This happened most notably at the South Tammin follow-up interviews. Finally, despite repeated attempts to organize follow-up interviews, some groups chose not to participate; for example, the Morbinning and Dowerin Lakes groups already described.

These limitations impacted on the survey results and subsequent data analyses. However, notwithstanding these limitations significant data were obtained. Moreover, the learning gained during this data collection process was invaluable for the PhD researcher in developing the evolving learning methodology. This learning was also critical in establishing follow-up interviews with the respective regional catchment council officials. This process is described in the following section.

4.2.3: Interviews with *Perth Region NRM* and *Wheatbelt NRM* Managers and Chairs

Interviews with local communities and discussions with relevant advisors and practitioners began to highlight the differences and similarities between the rural and urban groups. This reflective learning process informed a set of specific questions for both the chairpersons and senior managers at *Perth Region NRM* and the *Wheatbelt NRM* officials (Appendix 5). Questions were thus designed to elicit broader regional community perspectives concerning the issues and the perspectives of the executive or of those persons responsible for the day-to-day running and administration of these organisations. Broadly, the questions asked were:

1. What did the terms community, community engagement, capacity building and 'sharing knowledge and understanding' mean to *Perth Region NRM* (formerly the *Swan Catchment Council*) and *Wheatbelt NRM* (formerly the *Avon Catchment Council*) managers?
2. How were these concepts implemented in practice?
3. What monitoring and evaluation tools/processes were being used by the regional councils?

The following subsection describes the interview process.

4.2.3.1: Regional Catchment Council Interview Process

Firstly, copies of the questions were sent to the chairperson and executive officers of the *Perth Region NRM* and the *Wheatbelt NRM*. This gave them time to examine the questions and make any appropriate comments concerning the subject matter prior to the interviews taking place. Interview dates and times were then arranged with *Perth Region NRM* and *Wheatbelt NRM* representatives (Table 4.3).

Table 4.3: Interview Schedule

		PERTH REGION NRM	WHEATBELT NRM
EXECUTIVE OFFICERS	Venue	Midland Office	Northam Office
	Date	21-3-07	1-6-07
	Time	10am-12noon	10am-12noon
CHAIRPERSONS	Venue	Curtin University	Curtin University
	Date	27-4-07	25-9-07
	Time	2pm-3.30pm	10am-12noon

The interviews thus took place in a mix of formal settings (regional offices) and more informal settings (Curtin University). These interviews were not audio or video recorded; however written notes were taken. These notes were later transcribed and copies sent to the regional council representatives for their verification. The updated notes are the ones used in this thesis. These interviews were successful in terms of the relevant information that they provided; however there were limitations, as described in the following subsection.

4.2.3.2: Limitations

As with the local community surveys and interviews, the timing of the regional catchment council interviews was problematic and delayed data analyses. Interviews took place over a six month period. There were difficulties in arranging interviews with the Chief Executive Officers (CEOs) of both councils. The aim was to interview the CEOs along with the chairpersons. It was expected that these interviews would have provided a similar overarching view of the issues examined in this thesis from an organizational perspective. However, due to the work commitments of these individuals, and despite repeated requests, they were unavailable for interview. Consequently, less senior executive officers were interviewed. Despite these limitations the interviews yielded much useful information.

4.3 SUMMARY

Case study researchers reflect on their practice and take on board such criticism when improving their research methods. Reflective learning is nothing new in case study research. However, a case study researcher will often step outside of the community, and the problem under investigation, to reflect on how best to improve on the delivery of their case study methods, and, to analyse the data collected. Furthermore, the initial reporting and/or dissemination of any proposed solutions based on their research findings are also discussed and developed. Sustainable NRM practitioners are not privy, straight away, to these more substantive case study findings. They will often access this information later; for example, via subsequent reports, workshops and other on-ground community engagement methods and activities. However, through these processes, more substantive case study findings are often not reported (Schiele and Krummaker 2011; Fendt and Kaminska-Labbe 2010; Barratt *et al* 2011; Garmann Johnsen *et al* 2007; Blichfeldt and Andersen 2006; Cocoran *et al* 2006). Consequently, substantive information (deeper learning) relevant for achieving more sustainable NRM in practice can be missed (Mackenzie *et al* 2012; Broderick 2008). Through reflecting on such matters, in situ, while collecting data, this thesis has sought to address these impediments to the bridging of sustainable NRM research and practice (Table 4.4).

Table 4.4: Summary of Steps Taken towards Developing an Evolving Learning Methodology (ELM) as a basis for the Proposed Collaborative Monitoring Tool

DUAL PROBLEMS	1. CASE STUDY DESIGN PROCESS	PAGES	2. CASE STUDY-ACTION RESEARCH	PAGES	3. COLLABORATIVE MONITORING TOOL	PAGES
a) LEADERSHIP Who comes first, researchers or participants?	Began with my own research interests and case study design (2002). Researcher as leader.	N/A	Explained my research interests to relevant agencies and organizations during preliminary discussions (late 2002). Discussed them further with practitioners and communities (2003-2004). Considered this leadership issue.	129-130	Towards end of rural survey and during preliminary analyses of results (in consultation with SERCUL) developed modified urban survey/rudiments of collaborative monitoring tool (Appendix 3 and 4; see also Appendix 6) and implemented this survey/tool (2005-2007). SERCUL and catchment group chairs in joint leadership roles, in planning for urban survey, but with the researcher as main facilitator/coordinator. This leadership scenario deemed to work better in practice.	125-129
			Began to involve <i>Living Landscapes</i> project coordinator in planning for this research project, e.g. in design and implementation of rural survey (Appendix 1 and 2) and associated fieldwork (2004). Proposed joint leadership.	131-134		138-142
b) COLLABORATION To collaborate or not with participant communities?	Considered collaborating with research partners, but working mainly by myself on draft case study design (2002). No formal collaboration with “the researched” as yet.	N/A	Raised awareness of these collaboration issues during preliminary discussions with CSIRO and Greening Australia (end of 2002). Finding common ground between participants a major issue here. Found some common ground in terms of <i>Living Landscapes</i> project and PhD research objectives.	129-130	Developed urban survey/rudiments of a collaborative monitoring tool <i>with a view</i> (Chapter 1, p.14) to further strengthening such common ground in practice (2005-2007). Developed basis for “driving” ELM-based collaborative monitoring tool.	125-129
			Working with <i>Living Landscapes</i> project coordinator and then SERCUL (2004-2007). Sought further to establish this common ground.	131-134 138-140	Interviews with <i>Perth Region NRM</i> and <i>Wheatbelt NRM</i> representatives (Appendix 5) confirm that finding such common ground is a key collaboration issue for governing bodies (2007). Confirmed the need for such tools.	138-140 140-142
c) FEEDBACK To inform academic or non-academic communities?	Intention was to inform initially the research community, with participant communities to access results on completion of research (e.g. via papers, reports, presentations, forums etc. written and/or set up by the researcher) (2002). Leaves a gap in a key communications feedback loop?	See 125-129	Gradually became more aware that improved ongoing feedback of relevant information is a priority for researchers, practitioners and communities. Discussed with all groups how best to facilitate ongoing feedback of from outset (2002-2007). Considered ways of closing gap/making more effective this communications feedback loop through improving case study survey design.	125-129 138-140	Developed rudiments of an urban survey/collaborative monitoring tool with a view to it providing greater opportunities for all to critique it and participate in its ongoing development and implementation from the outset (2005-2007). NB: Also in this context designed tables for this reporting these data (see Chapter 5 and in Appendix 6) (2005-2007). Developed a possible way of closing gap in a key communications feedback loop in practice.	125-129 138-142
d) GENERALIZATIONS To generalise, but to whom and how?	Considered how better to make findings interesting, accessible and relevant to the wider community in the ways listed above (2002). Applying traditional case study methodology and methods.	See 125-129	Became more aware of the importance of generalizing research findings (e.g. using an appropriate narrative) during preliminary discussions, camp-out and forum (2002-2004). First considered better generalizing research findings through improving traditional case study survey methods.	130-131	Developed rudiments of an urban survey/collaborative monitoring tool that can collect relevant data and tables that can better report findings/share these data (Chapter 5; Appendix 6) in and across different sustainable NRM contexts (2005-2007). Developed a possible way of generalizing research findings better in practice.	125-129 138-142

Table 4.4 summarizes the steps taken during data collection to develop the rudiments of the ELM-based collaborative monitoring tool proposed in Chapter 1. Organized on the basis of four main issues - leadership, collaboration feedback and generalization - it provides direction for examining how community engagement in social learning might be improved on-the-ground through monitoring, and more broadly in sustainable NRM. Table 4.4 summarizes how this might occur through “the researcher” becoming more a part of the community engagement/social learning problem under investigation and, through this process, strengthening the nexus with “the researched”. Step 3 focuses on the final outcome of this process: the modified urban survey which forms the basis of data collection for the proposed collaborative monitoring process and tool. Step 3 also outlines how these community engagement/social learning survey results might be communicated in table format. These results/tables are presented in Chapter 5.

CHAPTER 5

Results

This chapter presents the results of the initial rural and modified urban case study surveys that collected quantitative data (Appendices 1 and 3). (Relevant qualitative data - Appendices 2, 4 and 5 - are reported in Chapter 6 thesis discussion and Chapter 7 monitoring tool feasibility study). This chapter has two main objectives. The first objective of this chapter is to provide an indication of how well the rural adaptive management-based *Living Landscapes* project and urban Landcare groups in the context of a cooperative management-based regional approach engaged their respective communities in social learning for achieving sustainable NRM. These data are presented as tables. The second and related objective, is to demonstrate how similar data might be reported and communicated in these table formats in the proposed collaborative monitoring tool should it be further developed and implemented. (It is important to stress that these are rudimentary table designs.) The limitations of the findings from this research are therefore described first in this chapter.

5.1 A SUMMARY of the MAIN LIMITATIONS

This section summarizes the main limitations of the tables used to report data in this chapter. These limitations relate to the statistical significance of quantitative data collected and how these data are presented in tables and subsequently compared and contrasted. The reasons for choosing a table format, over graphs or charts for example, are considered first.

The central idea behind the development of the proposed collaborative monitoring tool is to: (1) collect and convey as much substantive data as possible in the simplest way possible (2) facilitate the sharing of these data and thus strengthen the nexus between sustainable NRM researchers and practitioners (3) address the community engagement/social learning issues examined in this thesis, and, with further development, (4) other related complex social-ecological issues. Tables were considered by the PhD researcher to be the best way of reporting these quite comprehensive data sets as simply and as effectively as possible.

While other formats such as graphs and charts were tried the data that appeared on them was either too cluttered (i.e. when combined in a small number graphs or charts) or curtailed (i.e. when spread over many graphs or charts). Given the objectives of this thesis, such pictorial representations would have been very useful ways of reporting and communicating data sets. However, to achieve this effectively would have required the use of more powerful tools, such as GIS and related computer software for example (see Chapter 7 and Appendix 6). Data reported in these tables thus include: numbers of survey respondents, average response rates and weighted averages based on proportionate Likert scale responses. The PhD researcher envisaged that these tables might be suitable for simultaneous use by researchers as a basis for further and more in-depth research *and* by practitioners in reporting the successes and/or shortcomings of relevant projects and that they might act as a “fulcrum” for simultaneous data sharing and analyses from the outset of relevant monitoring and evaluation programs. As stated, these ideas are very experimental and as such there are a number of limitations to consider from the outset. These limitations concern the statistical significance of data reported and thus the capacity of these tables to contribute towards developing any conclusive findings.

Of concern are firstly the differences in table configurations that report rural and urban data. The tables that report rural data are (in line with the associated survey) larger and more complex than tables reporting urban data. Tables reporting urban data are (in line with the modified urban survey) much smaller and simpler. Therefore, while these table modifications were also a necessary part of developing the rudiments of the proposed collaborative monitoring tool, they imposed limitations on (a) the survey results (b) comparative analyses of these results and thus (c) what can be concluded from them. However, notwithstanding these differences, the types of questions asked and broad survey structures based on designated aspects of social learning and geographical and temporal scales are similar (see Chapter 4 and Appendices 1, 3 and 6). This means that although the results, comparative analyses and associated findings are inconclusive, they still provide a sound basis for further study.

Of concern secondly are the limitations associated with population sample sizes and the use of weighted averages. Averages and weighted averages are used and are most effective, in the main, when population sample sizes are large. When population sample sizes are small, as in this thesis, *range* (the size of the smallest interval which contains all

the data) or *variance* (how far a set of numbers is spread out from the mean, or expected value) are more useful as indications of statistical dispersion of small data sets. *Range* is perhaps most useful in representing the dispersion of small data sets because it only depends on two of the observations. It is also measured in the same units as the data. *Variance* is useful but all data points are required for measuring their distribution. These parameters were in the end not used in this thesis. Incorporating the associated formulae *to function effectively in the tables chosen* was problematic and in the end beyond the scope of this thesis. Simpler *averages* and *weighted averages* were used instead. While less meaningful in terms of their capacity to contribute towards developing conclusive findings, averages and weighted averages still yielded useful data as a basis for comparative analyses both in this thesis and for further study. Moreover, with further research, it might be possible to apply simple averages and weighted averages more effectively.

Indeed, in this light, while *weighted averages* are used in the main for representing the opinions of large population sample sizes their use for representing the opinions of small population sample sizes cannot be precluded. For example, it is useful to know the *variance* and *standard deviation* about the *arithmetic mean*. Similarly, it is also useful to know the *variance* and *standard deviation* about the *weighted mean* (e.g. those represented in the tables in this chapter). However, this requires the use of more complex formulae, which, as indicated, would be difficult to incorporate in the table configurations used in this thesis. Furthermore in this respect, in small population samples sizes an *unbiased estimator* is used to calculate *variance*, further complicating statistical calculations. Briefly, an *unbiased estimator* tests whether a rule for calculating a parameter (e.g. the weighted averages used in these tables) is biased towards an expected value (e.g. towards ideal mean/average like 2.5 children per family) or is unbiased yielding a true value (e.g. perhaps 2 or 3 children per family in reality). In terms of actual assessment: 0=unbiased/yields a true value; positive numbers >0=increasing bias towards expected value. These statistical calculations, though beyond the scope of this thesis, might be considered in the ongoing development and implementation of the proposed collaborative monitoring tool - i.e. in collaboration with the relevant technical expertise (see Chapter 7 and Appendix 6).

Thirdly, in most tables the overall respondent sample sizes for each sub-catchment group (i.e. the number of respondents completing the surveys, denoted by an upper case "N" next to community group names) is the same as the actual numbers of respondents who

answered specific questions or part-questions within the survey (denoted by a lower case “n” as these numbers can and do vary). However, in some tables there are discrepancies between these quantities, either because respondents were not required to answer some questions or they chose not to respond. These discrepancies may cause some confusion with respect to the calculation of weighted averages. As a point of clarification, then, the denominator in weighted average calculations is always (“n”) - i.e. the actual numbers of respondents answering the questions or part-questions within the surveys - not the overall respondent sample sizes for each sub-catchment group; unless of course both quantities are the same (see Appendix 6).

Finally, in an endeavour to render weighted averages more meaningful and to address some of the limitations described above, Table 5.1 assigns *a range of values* and associated descriptors to add value to the weighted average percentages calculated in the respective tables. These descriptors are based on those used in the evolving sustainable systems model developed by Frost (1999). Within the parameters of the limitations already described, they attempt to quantify how well the rural *Living Landscapes* project, and then the respective urban Landcare groups, engaged their participant communities in social learning for achieving sustainable NRM. Thereby, the conceptual model becomes, in effect, a working model that might be used in the ongoing development and implementation of the proposed collaborative monitoring tool. This notion becomes clearer as one works through this chapter and subsequent chapters in conjunction with the “how-to” manual in Appendix 6. Table 5.1, then, provides only rudimentary descriptors/values as a basis for further discussion/study (see also Chapters 6 and 7 and Appendix 6).

Table 5.1: Suggested Weighted Average Categories, Values and Associated Descriptors

Categories	Values	Descriptors	Notes
Very High	80%-100%	<p><u>Landscape and Community Development</u></p> <p>All relevant parties engaged in more substantive social learning for achieving sustainable NRM in Australia (see Notes 1-3).</p> <p>Deeper knowledge and understanding of more complex social-ecological problem situations (Pahl-Wostl 2007; Chapter 1) is shared very effectively at <i>and</i> between various levels and scales.</p> <p>Long-term and more sustainable landscape-scale solutions being developed. GIS could illustrate biophysical connections that are being made in the landscape (see Note 4).</p>	<p>1. Examples are rural and farm related and applied to <i>Living Landscapes</i>, but could be applied in other NRM contexts (e.g. urban).</p> <p>2. The proposed tool monitors a much deeper social learning processes, as opposed to learning related to biophysical, technical and planning issues, which are easier to quantify. Engaging participants in this level of learning is much more difficult to achieve. The values for each category reflect such difficulty. For example, 60% would be a more “moderate” value in conventional assessments, but is deemed a “high” value here.</p>
		<p><u>Transformed Catchment and Accelerated Development</u></p> <p>Some relevant parties engaged in social learning for achieving sustainable NRM in Australia, but at a more fundamental level.</p> <p>Deeper knowledge and understanding of more complex social ecological problem situations shared mainly <i>at</i> particular levels and scales (e.g. at the local community level). (See Note 5).</p> <p>Bases for achieving sustainable landscape-scale NRM solutions being developed.</p>	
High	60%-79%	<p><u>Original Catchment and Individual Development</u></p> <p>Learning centres primarily on biophysical, technical and/or planning issues, but is catchment focused.</p> <p>Local farming communities with the help of agencies beginning to engage in social learning and to extend their horizons thus.</p>	<p>3. The evolving sustainable systems conceptual model diagram is useful, also, for illustrating these values, and the tracking thereof, at much finer scales. For example, the overall <i>Living Landscapes</i> project weighted average (74%) is placed at the apex of the ‘transformed catchment’ illustration; this might indicate that the project was on the cusp of helping its participants to engage in social learning for more sustainable landscape-scale natural resource management. If the value was lower <i>in this range</i> (e.g. 65%), this figure might be placed at the base of the illustration, indicating that a project is beginning to engage participants in social learning at a level that is applicable for a ‘transformed catchment’.</p> <p>4. Given the advances in communications technology (e.g. in GIS), it may be possible to customise or re-illustrate this conceptual model to show, for example, the <i>actual</i> vegetation types planted in and/or species reintroduced to a particular local area or region, and thus, the actual levels of connectivity in the landscape that may accompany deeper social learning and complex problem-solving.</p>
Moderate	40%-59%	<p><u>Pre-Catchment Development</u></p> <p>Learning centres on biophysical, technical and planning issues and is locally focussed (see Note 6).</p> <p>Increasing awareness of the need to share such knowledge and understanding with other local communities - i.e. at a catchment level.</p>	
Low	20%-39%	<p><u>On-Farm Development</u></p> <p>Learning centres on biophysical, technical and planning issues and is farm-based.</p>	<p>5. Such ‘containment’ means that while many improvements are being made to the natural environment, across an entire catchment, communication is such that progress is impeded; biophysical connections that show, ultimately, that more sustainable collaborative and landscape-scale NRM is being achieved are still not being made.</p> <p>6. Perhaps sub-divide ‘on-farm’ and ‘pre-catchment’ categories and values.</p>
Very Low	0%-19%		

5.2 RURAL CASE STUDY SURVEY RESULTS for the LIVING LANDSCAPES PROJECT

Table 5.2 summarizes the comments that farmers' made in the relevant sections of the initial rural survey (Appendix 1). It provides a snapshot of some of the broader criticisms of *Living Landscapes* that are relevant to this thesis. Table 5.2 thus also provides some guidance, indeed impetus, for achieving the thesis objectives.

Table 5.2: Farmers' Initial Comments Concerning the Effectiveness of *Living Landscapes*

	PEOPLE	LAND	WILDLIFE	MONEY	PICTURE
DOWERIN LAKES		<i>'Limited time together, difficult understanding complex interrelationships'</i>			
GABBY QUOI QUOI		<i>'Living Landscapes' came onto the Landcare scene late in Landcare activities. Most ideas are common sense if conservation minded'</i>	<i>'I'm not into sharing my thoughts'</i> <i>'I do not want to put LL out of business'</i>		
MORBINNING	<i>'Morbinning catchment group and Landcare do it well'</i>		<i>'There are groups of Landcare and community groups that already share such information'</i>	<i>'The catchment group and Landcare already provides me with this opportunity'</i>	<i>'The catchment group and Landcare give me this opportunity'</i> <i>'Not relevant to my survival as a farmer. My property is my life; what I do on the property is private unless it affects an adjoining neighbour or anyone else'</i>
SOUTH TAMMIN	<i>'Of no benefit'</i>	<i>'I believe there would be no benefit'</i>		<i>'I do not think it would be of any benefit on our farm'</i>	<i>'There would be no benefit'</i> <i>'I have already observed the impacts on the landscape so my feelings have not changed'</i>

NB: See Appendix 6 for explanations of the designated social learning "aspects" in this table (i.e. "People", "Land", "Wildlife", "Money" and "Picture").

The remainder of this section presents the results of the initial rural case study survey. These results begin to lend support to the broad thesis argument that, despite the achievements and successes of *Living Landscapes* it seems to have helped “contain” community engagement in social learning (broadly defined) to the local community level (Chapters 1-3). These results therefore shed more light on possible reasons for farmers’ comments (Table 5.2). Moreover, presenting these results in the given tables also provides - along with the initial surveys (Appendix 1) - a preliminary overview of how similar data might be reported and communicated via the proposed collaborative monitoring tool should it be further developed (see Chapter 7 and Appendix 6).

5.2.1: Facilitating Community Engagement in Social Learning for achieving Sustainable NRM in Broad Terms

This subsection provides an initial snapshot of how well *Living Landscapes* engaged its participant sub-catchment groups in social learning for achieving sustainable NRM (Appendix 1, see Section 1 of the survey). It thus begins to provide an idea of how well this project applied its focal species-experiential learning methods and activities (Lambeck 1997; Chapter 3). Table 5.3 shows first how well *Living Landscapes* engaged its participant sub-catchment groups in all five designated social learning aspects. However before examining these data, and in light of the limitations described earlier, it is useful to describe the table configurations (see Appendix 6).

Firstly, responses for the social learning aspect “People” are aggregate scores. That is, respondents were required to answer three related questions for this aspect: for “Personalities”, “Government” and “Tradition” - see Page 348. These results are subsequently unpacked in Table 5.4. Secondly, the Likert scale values for each of these related questions have been weighted, added together and averaged to provide overall weighted average values. Table 5.3 thus provides overall weighted averages for: (1) each social learning “aspect” (2) each participant community and (3) the *Living Landscape* project. Thirdly given their limitations, these weighted averages cannot at this stage provide *accurate measures* of how well respondents thought that *Living Landscapes* had engaged them in social learning for achieving sustainable NRM. However, they can provide *broad indications* of how well *Living Landscapes* may have achieved this goal as a basis for further discussion and study. Fourthly, in Table 5.3 and in all subsequent tables weighted averages are ranked in order: (1) by sub-catchment group - high to low/1-to-4 going down the page - and (2) by social learning aspect - high to low/a-to-e going across the page.)

Table 5.3: Facilitating Community Engagement in the Five Designated Social Learning Aspects: Sub-Catchment Group Assessments (Appendix 1: Q1a. See in table for survey page numbers)

SUB-CATCHMENT GROUPS	DESIGNATED SOCIAL LEARNING ASPECTS					TOTALS
<i>N=Total Sample Sizes</i> <i>n=Actual Number of Respondents Answering Associated Questions</i>	a. Picture (p.332)	b. Wildlife (p.304)	c. Land (p.290)	d. Money (p.318)	e. People (p.346)	(N=35)
1. DOWERIN LAKES(N=5; People N=15)						
Strongly Agree (100%)	4	1		2	3	10
Agree (75%)	1	4	5	3	7	20
Unsure (50%)					3	3
Disagree (25%)					2	2
Strongly Disagree (0%)						0
Number (n)	5	5	5	5	15	35
Average Response	100%	100%	100%	100%	100%	100%
Weighted Average	95%	80%	75%	85%	68%	81%
2. MORBINNING (n=10; People n=30)						(N=70)
Strongly Agree	2	4	2	3	4	15
Agree	7	4	6	5	17	39
Unsure				1	8	9
Disagree	1	1	2	1	1	6
Strongly Disagree						0
Number (n)	10	9	10	10	30	69
Average Response	100%	90%	100%	100%	100%	98%
Weighted Average	75%	81%	70%	75%	70%	74%
3. GABBY QUOI QUOI (N=8; People N=24)						(N=56)
Strongly Agree	4	2	3	2		11
Agree	3	3	4	4	9	23
Unsure	1	2		2	12	17
Disagree		1	1		3	5
Strongly Disagree						0
Number (n)	8	8	8	8	24	56
Average Response	100%	100%	100%	100%	100%	100%
Weighted Average	84%	69%	78%	75%	56%	72%
4. SOUTH TAMMIN(N=10; People N=30)						(N=70)
Strongly Agree	3		2		3	8
Agree	5	8	5	7	17	42
Unsure	2	1	3	1	7	14
Disagree		1				1
Strongly Disagree				2	3	5
Number (n)	10	10	10	10	30	70
Average Response	100%	100%	100%	100%	100%	100%
Weighted Average	78%	68%	73%	58%	64%	68%
LIVING LANDSCAPES (N=33; People N=99)						(N=231)
NUMBER (n)	33	32	33	33	99	230
AVERAGE RESPONSE	100%	97%	100%	100%	100%	100%
WEIGHTED AVERAGE	83%	75%	74%	73%	65%	74%

Table 5.3 indicates that *Living Landscapes* may have engaged its participant sub-catchment groups in social learning for achieving sustainable NRM, overall, to a “high” level (i.e. the *Living Landscapes* project weighted average=74%; such values and associated descriptors are described in Table 5.2 and further discussed in Chapter 7; see also Appendix 6). However, the results tables have been designed to elicit some of the more complex (and often hidden) problems concerning this community engagement process. Table 5.3, therefore, also indicates that *Living Landscapes* may have been:

1. Most successful at helping the Dowerin Lakes sub-catchment group to engage in social learning for achieving sustainable NRM (i.e. the Dowerin Lakes sub-catchment weighted average=81%, indicating a “very high” level of success - Table 5.2).
2. Least successful at helping the South Tammin sub-catchment group to engage in social learning for achieving sustainable NRM (i.e. the corresponding sub-catchment weighted average for South Tammin=68%, indicating a “high” level of success - Table 5.2).
3. Most successful in engaging all four sub-catchment groups in learning about the impacts of nature conservation planning on the visual farming landscape (i.e. the *Living Landscapes* project weighted average for the social learning aspect “Picture” = 83%, indicating a “very high” level of success - Table 5.2).
4. Least successful in engaging all four sub-catchment groups in learning about how interrelated social-institutional-governmental relationships can affect planning for nature conservation in farming (i.e. the *Living Landscapes* project weighted average for “People”=65%, indicating a “high” level of success, but trending towards more ‘moderate’ levels - Table 5.2).
5. Most successful, again, at engaging the Dowerin Lakes sub-catchment group in learning about the impacts of nature conservation planning on the visual farming landscape (i.e. Dowerin Lakes sub-catchment weighted average for “Picture”=95%, indicating an “exceptionally high” level of success).
6. Least effective at helping the Gabby Quoi Quoi sub-catchment group to engage in learning about how interrelated social-institutional-governmental relationships can affect planning for nature conservation in farming (i.e. the Gabby Quoi Quoi sub-catchment weighted average for “People”=56%, indicating a “moderate” level of success - Table 5.2).

Table 5.3 therefore indicates that there may have been some important differential learning experiences among the four sub-catchment groups or local farming communities that participated in *Living Landscapes*, which were perhaps overlooked in previous (less formal or less systematic) assessments of the project (see Smith and Penter 2006). That is, while such publications, justifiably, report the successes of *Living Landscapes* and thus of its

focal species-experiential learning methods and activities (see also Frost *et al* 1999, and, following completion of the project, Greening Australia 2004 and Smith and Penter 2006), this project was not systematically monitored and evaluated from the outset. These initial results beg the following related question. Was *Living Landscapes* unable to achieve, arguably, its most desired outcome of common understanding (e.g. between its local participant communities and those responsible for achieving sustainable NRM at greater scales) because:

1. the project was not systematically monitored and evaluated, especially with regard to the community engagement in social learning process, from the outset of the project, and
2. such local level differential learning experiences were not identified, understood and addressed well enough from the outset of the project?

To answer these questions Table 5.4 provides more detail of *Living Landscapes'* success with the community engagement process. It provides a broad indication of how well *Living Landscapes* may have engaged all four sub-catchment groups in learning about the impacts of interrelated social-institutional-governmental relationships in rural nature conservation planning (i.e. in the "People" aspect). (NB: As in Table 5.3, N=Total Sample Sizes; n=Actual Numbers of Respondents Answering Associated Questions. This system is used in Table 5.4 and in all subsequent tables in this chapter).

Table 5.4: Facilitating Community Engagement in the “People” Aspect of Social Learning for achieving Sustainable NRM: Sub-Catchment Group Assessments (Appendix 1: Q1a, Q1b, and Q1c, p.346)

SUB-CATCHMENT GROUPS	“PEOPLE” LEARNING ASPECT SUB-CATEGORIES			TOTALS
1.MORBINNING (N=10)	a. Personalities	b. Government	c. Traditions	(N=30)
Strongly Agree (100%)	1	1	2	4
Agree (75%)	7	5	5	17
Unsure (50%)	2	3	3	8
Disagree (25%)		1		1
Strongly Disagree (0%)				0
Number (n)	10	10	10	30
Average Response	100%	100%	100%	100%
Weighted Average	73%	65%	73%	70%
2.DOWERIN LAKES (n=5)				(N=15)
Strongly Agree	2		1	3
Agree	2	3	2	7
Unsure	1	1	1	3
Disagree		1	1	2
Strongly Disagree				0
Number (n)	5	5	5	15
Average Response	100%	100%	100%	100%
Weighted Average	80%	60%	65%	68%
3.SOUTH TAMMIN (n=10)				(N=30)
Strongly Agree	1	1	1	3
Agree	6	8	3	17
Unsure	2	1	4	7
Disagree				0
Strongly Disagree	1		2	3
Number (n)	10	10	10	30
Average Response	100%	100%	100%	100%
Weighted Average	65%	75%	53%	64%
4.GABBY QUOI QUOI (n=8)				(N=24)
Strongly Agree				0
Agree	5	2	2	9
Unsure	2	5	5	12
Disagree	1	1	1	3
Strongly Disagree				0
Number (n)	8	8	8	24
Average Response	100%	100%	100%	100%
Weighted Average	63%	53%	53%	56%
LIVING LANDSCAPES (N=33)				(N=99)
NUMBER (n)	33	33	33	99
AVERAGE RESPONSE	100%	100%	100%	100%
WEIGHTED AVERAGE	70%	63%	61%	65%

NB: Results for each of the remaining four designated aspects of social learning can also be examined individually; for example, results for “Picture” are also examined in subsequent sections in this chapter.

Table 5.4 provides more detail of how well *Living Landscapes* may have helped its participant sub-catchment groups to engage in the social learning aspect “People”, in relation to three associated learning sub-categories: “Personalities” – how peoples’ personalities can affect relationships between individuals involved in planning for nature conservation in farming; “Traditions” – how relationships between farming communities and other communities with different ways of life can affect such planning; and, “Government” – how relationships between farming communities and governing bodies can affect planning (see also Appendices 1 and 6). These results for “People” further indicate that *Living Landscapes* may have been:

1. Most successful at helping to engage all four sub-catchment groups in learning about how relationships between individuals, families and/or local groups can affect planning for nature conservation in farming; (i.e. the *Living Landscapes* project weighted average for “Personalities”=70%, indicating a “high” level of success).
2. Least successful at helping to engage all four sub-catchment groups in learning about the bigger picture “People” issues of “Tradition” and “Government” (i.e. the *Living Landscapes* project weighted average for “Government” = 63% and for “Tradition”=61%, indicating a shift towards a more “moderate” level of success).
3. Most successful at helping to engage the Dowerin Lakes sub-catchment group in learning about “Personalities” (i.e. the Dowerin Lakes sub-catchment weighted average for “Personalities”=80%, indicating a “very high” level of success).
4. Least successful at helping the Gabby Quoi Quoi sub-catchment group to engage in learning about “Government” and “Tradition” (i.e. the Gabby Quoi Quoi sub-catchment group weighted average for “Government” and for “Tradition”=53%, indicating, a more “moderate” level of success).

These results thus add more detail to the results presented in Table 5.3. However, they also indicate why *Living Landscapes* might have been unable to achieve its most desired goal of common understanding. That is, Table 5.3 can shed light on the community engagement history and thus on the prior learning experiences of the four participant sub-catchment groups with respect to their involvement in Landcare and more recently in sustainable NRM, information that more systematic monitoring and evaluation of community engagement in social learning for achieving sustainable NRM might have brought to light.

One possible explanation for such differential local learning experiences is the different prior community engagement experiences of the Dowerin Lakes sub-catchment group in

both Landcare and in sustainable NRM compared to the other three groups. Members of all four sub-catchment groups had prior Landcare experience. They gained this experience most recently through *Living Landscapes*, through their existing sub-catchment groups and previously as independent farmers through prior Landcare initiatives. However, the Dowerin Lakes sub-catchment group had considerably less prior experience ‘of projects and *partnerships* of this intensity [my emphasis]’ (Frost *et al* 1999, p.17), certainly compared to South Tammin (e.g. see Coles and Hammond 2004), but also compared with Morbinning ‘one of the first catchment groups to form in the state’ (Alcoa 1996a, p.2), and to Gabby Quoi Quoi where ‘individual farmers had been active in revegetation’ (Alcoa 1996b, p.1). Therefore, much of the extensive prior community engagement and partnership-building experience of these groups, in Landcare and in sustainable NRM, is reflected in their selection as Alcoa demonstration groups. Gabby Quoi Quoi, then, was very much a part of this early community engagement and partnership-building history; Dowerin Lakes was not.

Tables 5.3 and 5.4 thus provide some *prima facie* evidence to suggest that *Living Landscapes* helped the “least experienced” Dowerin Lakes group to engage most effectively in social learning for achieving sustainable NRM and, especially, in learning about its visual aspects (i.e. about “Picture”). This is perhaps not surprising because *Living Landscapes* focal species-experiential learning methods and activities were very visually oriented and hands-on (Chapter 3). Conversely, these tables show that *Living Landscapes* helped Gabby Quoi Quoi, and perhaps the other more experienced groups, less effectively to engage in such learning, and especially in learning about the bigger picture social-institutional-governmental aspects (i.e. in “People”/“Tradition” and “Government”). Given their prior extensive partnership experiences, then, perhaps these groups (and especially Gabby Quoi Quoi) were ready for more than visually-based hands-on learning. Perhaps they were expecting *Living Landscapes* to implement and/or modify its focal species-experiential learning methods and activities accordingly. This proposition informs preliminary analyses of the subsequent results presented in this chapter.

5.2.2: Facilitating the “Scaling-Up” of Community Engagement in Social Learning for achieving Sustainable NRM

Results in this subsection provide a broad indication of how well *Living Landscapes* may have helped its participant sub-catchment groups to share each designated aspect of social learning with those groups responsible for achieving Landcare and sustainable NRM at greater geographical and temporal scales (e.g. with relevant governing bodies). As such,

collectively, they provide a broad indication of how well *Living Landscapes* might have helped these groups to, in effect, (1) “scale-up” their acquired social learning (i.e. the learning reported in Tables 5.3 and 5.4) and (2) contribute towards achieving more sustainable NRM policy development and implementation (Chapter 3) and thus (3) towards addressing the postulated hiatus between the two (Chapter 2). In so doing, this subsection further examines the differential learning experiences identified in Subsection 5.2.1. It thus raises questions about whether *Living Landscapes* might have better utilized such differential learning experiences to achieve common understanding.

Table 5.5 provides, firstly, a snapshot of how well *Living Landscapes* engaged its participant communities in shared learning. However, as with the previous tables some further explanations of how it is configured is provided first. In Table 5.5 attempts have been made to move beyond providing indications of the factual knowledge gained through social learning (i.e. to move beyond assessing “what” participants should have learnt in this context through *Living Landscapes*; see Chapter 4 re preliminary discussions and also Appendix 6). This was achieved in the previous tables. In Table 5.5 and in subsequent tables attempts have been made to also provide a broad indication of how well *Living Landscapes* helped its participant groups to develop some (of their) important underlying learning qualities that can drive community engagement in social learning. This is why the associated questions focused on respondents’ “perceptions”, “feelings” and “awareness” of how well *Living Landscapes* was helping them to engage in social learning, as well as on their related factual knowledge. The reason for so doing is that these learning qualities can impact on the motivation levels of participant local community groups; on whether they want to carry on acquiring relevant factual knowledge and/or to engage with, for example, governing bodies to “scale-up” community engagement/social learning processes. (Of course, the converse is also true: governing bodies, too, have and must develop their knowledge bases and learning qualities and are thus subject to the same sorts of fluctuations.) Community engagement in social learning for achieving sustainable NRM, is a two-way process (Chapters 2 and 3). However, it is important to *begin* this process at the local community level (Chapter 1), which, of course, is what projects like *Living Landscapes* set out to achieve. These learning qualities are thus also “assessed” in Table 5.5 and in subsequent tables (i.e. in tables that try and assess “the how” in community engagement/social learning/sustainable NRM).

Table 5.5: Facilitating the Sharing of Designated Social Learning Aspects: Sub-Catchment Group Assessment (Appendix 1: Q2. See in table for survey page numbers)

SUB-CATCHMENT GROUPS	DESIGNATED SOCIAL LEARNING ASPECTS					TOTALS
1.DOWERIN LAKES (N=5)	a. Picture (p.335)	b. Land (p.293)	c. Wildlife (p.307)	d. People (p.351)	e. Money (p.321)	(N=25)
Strongly Agree (100%)	5	4	1	1	2	13
Agree (75%)			2	3	2	7
Unsure (50%)		1	2	1	1	5
Disagree (25%)						0
Strongly Disagree (0%)						0
Number (n)	5	5	5	5	5	25
Average Response	100%	100%	100%	100%	100%	100%
Weighted Average	100%	90%	70%	75%	80%	83%
2.GABBY QUOI QUOI (N=8)						(N=40)
Strongly Agree	3	2	5	1		11
Agree	2	4	1	4	5	16
Unsure	1			3		4
Disagree	1	2	2		3	8
Strongly Disagree						0
Number (n)	7	8	8	8	8	39
Average Response	88%	100%	100%	100%	100%	98%
Weighted Average	75%	69%	78%	69%	56%	69%
3.SOUTH TAMMIN (N=10)						(N=50)
Strongly Agree						0
Agree	6	5	8	6	4	29
Unsure	3	4	2	4	5	18
Disagree	1	1				2
Strongly Disagree			1		1	1
Number (n)	10	10	10	10	10	50
Average Response	100%	100%	100%	100%	100%	100%
Weighted Average	63%	60%	70%	65%	55%	63%
4.MORBINNING (N=10)						(N=50)
Strongly Agree	2	2				4
Agree	3	5	6	4	6	24
Unsure	3	3	3	5	3	17
Disagree	2					2
Strongly Disagree			1	1	1	3
Number (n)	10	10	10	10	10	50
Average Response	100%	100%	100%	100%	100%	100%
Weighted Average	63%	73%	60%	55%	60%	62%
LIVING LANDSCAPES (N=33)						(N=165)
NUMBER (n)	32	33	33	33	33	164
AVERAGE RESPONSE	97%	100%	100%	100%	100%	99%
WEIGHTED AVERAGE	75%	73%	70%	66%	63%	69%

Table 5.5 indicates overall that *Living Landscapes* may have been quite successful at helping all participant sub-catchment groups to share their acquired knowledge and understanding with groups from outside their local areas (i.e. the *Living Landscapes* project weighted average=69%, indicating a “high” level of success overall -Table 5.2). However, this table also shows that *Living Landscapes* helped Dowerin Lakes farmers the most to share such learning, to a “very high” level (i.e. the sub-catchment weighted average for this group=83%). Moreover, the project helped this group to share their acquired knowledge and understanding of the impacts of nature conservation planning on the visual landscape with groups from outside their local area to maximum effect (i.e. the Dowerin Lakes sub-catchment weighted average for “Picture”=100%). The Dowerin Lakes farmers’ responses to the question concerning “Land” (90%), which asked how well the project had helped them to share their knowledge and understanding of farming practices that help nature conservation, indicates, similarly, that *Living Landscapes* had a “very high” level of success with this particular group. Surprisingly, though, given their previous results (Tables 5.3 and 5.4) this group’s sub-catchment weighted averages are also higher for the remaining social learning aspects, including “People” (75%). These results indicate initially that *Living Landscapes* also helped the Dowerin Lakes sub-catchment group - the group with the least prior relevant experiences (Subsection 5.2.1) - most effectively to share the knowledge and understanding they had acquired with those from outside their local area. Table 5.5 indicates, again, that the remaining three sub-catchment groups - those with more prior Landcare experiences - felt that they did not benefit as much (i.e. sub-catchment weighted averages for these groups are all in the 60%-70% range).

These results also indicate how *Living Landscapes* may have deployed its on-ground focal species-experiential learning community engagement methods and activities very effectively to engage the Dowerin Lakes sub-catchment group in “Picture”. They indicate that the visually-oriented hands-on local community engagement methods and activities (which often used photography for example) worked/were deployed very well in helping the group with least prior Landcare experience to develop a ‘common understanding’ (Frost *et al* 1999). They also indicate that these methods and activities were used less successfully to engage the other three “more experienced” groups in such shared learning. These more detailed results raise a number of questions concerning the deployment of these popular focal species-experiential learning community engagement methods and activities:

1. Might they have been deployed better to engage also those participant sub-catchment groups with more prior Landcare experience (arguably, those groups who felt that they were more ready to engage in shared learning with outside groups because of their prior partnership-building experiences)?
2. If they were deployed in this way, might the results for “People” and indeed “Money” (perhaps the most difficult areas/aspects of social learning) have been much better for these groups, and, consequently, also for Dowerin Lakes?
3. Is this a reason why *Living Landscapes* was unable to achieve, arguably, its most desired outcome of ‘common understanding’, and thus why the results were not even more favourable?
4. Did *Living Landscapes* planners, managers and indeed participant communities make too many assumptions during the initial planning stages about the capacity of these popular on-ground community engagement methods and activities to engage *all* participants *equally well* in social learning for achieving sustainable NRM?
5. Are these sorts of actions contributing towards “containing” community engagement/social learning/sustainable NRM process locally (i.e. as described in Chapters 1-3)?

In terms of the broader thesis context, then, these results may also shed some light on why and how these otherwise successful adaptive management-based projects have still been unable to “scale-up” such community engagement/social learning beyond the local community level; to develop, and moreover better implement, sustainable NRM policies in Australia and hence globally/historically. More detailed information is provided in Tables 5.6-5.10 that may develop this argument.

Table 5.6 (“Picture”) and Table 5.7 (“People”) show sub-catchment group responses to questions that asked how well *Living Landscapes* had helped them to share the knowledge and understanding they had already acquired with other groups locally (i.e. with “My Family” and with “Other Local Famers”) and with groups responsible for and/or which have a vested interest in managing the natural environment at different social geographical scales (i.e. with groups from “Beyond Local Area”).

Table 5.6: Facilitating the Sharing of “Picture” by Social Geographical Scale: Sub-Catchment Groups’ Assessments (Appendix 1: Q2a (ii), p.336)

SUB-CATCHMENT GROUPS	SOCIAL GEOGRAPHICAL SCALE			TOTALS
1.SOUTH TAMMIN (N=10)	a. My Family	b. Other Local Farmers	c. Beyond Local Area	(N=30)
Strongly Agree (100%)		1		1
Agree (75%)	5	4	4	13
Unsure (50%)			1	1
Disagree (25%)				0
Strongly Disagree (0%)				0
Number (n)	5	5	5	15
Average Response	50%	50%	50%	50%
Weighted Average	75%	80%	70%	75%
2.DOWERIN LAKES (N=5)				(N=15)
Strongly Agree	1	2		3
Agree	4	2	2	8
Unsure		1	1	2
Disagree			1	1
Strongly Disagree				0
Number (n)	5	5	4	14
Average Response	100%	100%	80%	93%
Weighted Average	80%	80%	56%	72%
3.MORBINNING (N=10)				(N=30)
Strongly Agree	2	1		3
Agree	3	3		6
Unsure			4	4
Disagree				0
Strongly Disagree				0
Number (n)	5	4	4	13
Average Response Rate	50%	40%	40%	43%
Weighted Average	85%	81%	50%	72%
4.GABBY QUOI QUOI (N=8)				(N=24)
Strongly Agree				0
Agree	5	5	3	13
Unsure	1	1	2	4
Disagree				0
Strongly Disagree				0
Number (n)	6	6	5	17
Average Response	75%	75%	63%	71%
Weighted Average	71%	71%	65%	69%
LIVING LANDSCAPES (N=33)				(N=99)
NUMBER (n)	21	20	18	59
AVERAGE RESPONSE	64%	61%	55%	60%
WEIGHTED AVERAGES	78%	78%	60%	72%

NB: Only those respondents who “Strongly Agreed” or “Agreed” in the second part of the original case study survey (Appendix 1) were required to answer any further questions. There are therefore discrepancies between the weighted averages in this table and those in the previous Table 5.5 and subsequent Table 5.7. Whether or not then to include an initial snapshot of this shared learning process (Table 5.5) is open to debate. Tables 5.6 and 5.7 do, however, still provide more detailed information concerning the capacity of *Living Landscapes* to help its participant sub-catchment groups to share (“scale-up”) “what” they have learned.

Table 5.6 helps substantiate the overall “high” levels of success for “Picture” provided in Table 5.5. That is, the *Living Landscapes* weighted average for “Picture” in this table (72%) indicates an equally “high” level of success for this project in terms of its capacity to help its participant communities share their acquired knowledge and understanding of visual aspects of nature conservation planning across geographical scales. This assessment is further substantiated when one compares the *Living Landscapes* values for *each* social geographic scale. That is, these values indicate that *Living Landscapes* was most successful at helping participant communities to share such information with: (1) their families to a “high” level (78%), (2) other individuals and groups locally to a “high” level (78%) and (3) groups from outside their local areas to a “high” level (60%). However, this last value for “Beyond Local Area” is also borderline “moderate”. This suggests that, despite its overall success in this area, *Living Landscapes* was still limited in terms of its capacity to help its participant communities to share their knowledge and understanding of “Picture” with groups from outside their local areas. From this more detailed information, then, we can make further suggestions as to the success of *Living Landscapes* in terms of its capacity to help groups share/“scale-up” knowledge gained. Indeed comparing results for each sub-catchment group may assist in this process. These comparisons further indicate that *Living Landscapes* may have been:

1. Very good at deploying its on-ground methods and activities to help Dowerin Lakes share their acquired knowledge of “Picture” locally, thus further supporting the previous results (i.e. both “local” values for Dowerin Lakes - 80% - indicated “very high” levels of achievement. Given previous results for Dowerin Lakes, this result is not surprising.
2. Only moderately successful at deploying these methods and activities to help this “least experienced” group share such knowledge with groups from beyond their local area (56%). Given the “very high” values for this “Picture” aspect of social learning previously recorded for Dowerin Lakes, this result is somewhat surprising.
3. Similarly very good at deploying its on-ground methods and activities to help Morbinning, one of the “more experienced” groups, to share knowledge of “Picture” locally (85% and 80% respectively). Again, given the more “moderate” results for this group previously recorded these “very high” values are also somewhat surprising.
4. Only moderately successful at deploying its on-ground methods and activities to help Morbinning to share knowledge of “Picture” with groups from beyond their local area (50%). Based on the above preliminary analyses, then, this result was also expected. Indeed, this result was expected across all scales for

all of the “more experienced” groups - Morbinning, South Tammin and Gabby Quoi Quoi.

5. Much better than expected at deploying its on-ground methods and activities to help the “most experienced” groups share their knowledge of “Picture” (i.e. given that the weighted average values for South Tammin and Gabby Quoi Quoi across all scales fell within the 60%-80% range).

In summary, these more detailed results problematize “Picture”. That is, in previous tables (i.e. Tables 5.3-5.5 inclusive) the results indicated that *Living Landscapes* may have been most effective at engaging the “least experienced” Dowerin Lakes sub-catchment group to acquire and/or improve relevant factual knowledge - especially of how nature conservation planning affects the visual landscape. These tables also indicated that *Living Landscapes* may have been less effective in this capacity in helping the other “more experienced” groups. These previous tables suggest, then, that the visually-oriented focal species-experiential learning methods and activities used to engage these communities were deployed most effectively to engage the “least experienced” Dowerin Lakes groups in learning about “Picture”. Further to this argument, Table 5.6 also indicated that these methods and activities were deployed with equally good effect to help the Dowerin Lakes group share this acquired knowledge, of “Picture”, *locally*. These tables thus provide some *prima facie* evidence to suggest that *Living Landscapes’* often photography-based focal species-experiential community engagement methods and activities were most suited to this least experienced group. “The match”, then, between the methods and activities deployed (i.e. that many were visually/photography-based) and this particular visually-oriented social learning aspect (“Picture”) suggests that there is some potential for further developing or enhancing community engagement along these lines for “least experienced” Landcare or sustainable NRM groups. However, further examination of the results in Table 5.6 for the remaining three “more experienced” participant sub-catchment groups seems to provide a contradiction of their previous results (i.e. also in Tables 5.3-5.5) which problematizes this developing notion.

Firstly, with respect to Morbinning, previous results for this group in Tables 5.3-5.5 tend to support this developing notion. That is, these prior results for Morbinning, though “high”, were not as high as the results for Dowerin Lakes (the results for Dowerin Lakes were often “very high” to excellent”.) However, more detailed results for “Picture” for the “more experienced” Morbinning sub-catchment group, in Table 5.6, indicate that its members felt

about the same as the “least experienced” Dowerin Lakes group about *Living Landscapes’* capacity to help them share: (1) their acquired knowledge of this social learning aspect locally – feeling similarly very positive at around 80% and (2) such knowledge with others from outside their local area – feeling similarly much less positive at around 50%. And, in contrast to their previous results, South Tammin and Gabby Quoi Quoi group members were more positive about the capacity of *Living Landscapes* to help them share their knowledge of “Picture” at and across all scales (i.e. the relevant results in Table 5.6 for these groups fell within the 60%-80% range). On the one hand, these conflicting results suggest that the developing argument, that *Living Landscapes’* focal species-experiential learning methods and activities were suited most for engaging the “least experienced” groups, should be reconsidered. On the other hand, they also highlight further potential for *Living Landscapes* in this area thus helping to strengthen this argument. That is, they hint that, with further development, *Living Landscapes’* visually-oriented community engagement methods and activities might have been better applied to: (1) engage *all* groups in “Picture” and through this process (2) help *all* groups to share this knowledge with those groups from outside their local areas (e.g. the relevant governing bodies responsible for achieving sustainable NRM at greater scales). Furthermore, this thesis argues that such community engagement might have been a “linchpin” for *Living Landscapes* in its endeavours to achieve its most desired goal of common understanding. The results in Table 5.7 further explain the notion of a “linchpin” and how such community engagement might have been achieved.

Table 5.7: Facilitating the Sharing of “People” (i.e. “Personalities”, “Traditions” and “Government”) by Social Geographical Scale: Sub-Catchment Groups’ Assessments (Appendix 1: Q2a (v), p.352)

SUB-CATCHMENT GROUPS	SOCIAL GEOGRAPHICAL SCALE			TOTALS
1.MORBINNING (N=10)	a. Other Local Farmers	b. My Family	c. Beyond Local Area	(N=30)
Strongly Agree (100%)	1		1	2
Agree (75%)	2	3		5
Unsure (50%)			1	1
Disagree (25%)				0
Strongly Disagree (0%)				0
Number (n)	3	3	2	8
Average Response	30%	30%	20%	27%
Weighted Average	83%	75%	75%	78%
2.DOWERIN LAKES (N=5)				(N=15)
Strongly Agree				0
Agree	2	2	1	5
Unsure			1	1
Disagree				0
Strongly Disagree				0
Number (n)	2	2	2	6
Average Response Rate	40%	40%	40%	40%
Weighted Average	75%	75%	63%	71%
3.GABBY QUOI QUOI (N=8)				(N=24)
Strongly Agree		1		1
Agree	4	3	3	10
Unsure	1	1	2	4
Disagree				0
Strongly Disagree				0
Number (n)	5	5	5	15
Average Response	63%	63%	63%	63%
Weighted Average	70%	75%	65%	70%
4.SOUTH TAMMIN (N=10)				(N=30)
Strongly Agree				0
Agree	4	4	2	10
Unsure			1	1
Disagree	1	1	1	3
Strongly Disagree				0
Number (n)	5	5	4	14
Average Response	50%	50%	40%	47%
Weighted Average	65%	65%	56%	62%
LIVING LANDSCAPES (N=33)				(N=99)
NUMBER (n)	15	15	13	43
AVERAGE RESPONSE	45%	45%	39%	43%
WEIGHTED AVERAGE	73%	73%	65%	70%

Previous results tables for all participant sub-catchment groups (i.e. Tables 5.3-5.5 inclusive) indicated that *Living Landscapes*, through applying its focal species-experiential learning methods and activities, was less successful at engaging these groups in acquiring knowledge about “People”. Of particular concern was the project’s capacity to engage these groups in learning about “Traditions” and “Government”. The results in Table 5.7, however, indicate that, while this might be true, all participant groups felt that *Living Landscapes* did help them to share what “People” knowledge they had gained quite well at and between all scales (i.e. these results, with perhaps the exception of South Tammin’s result for “Beyond Local Area”, fell within the mid-60% to mid-70% range). These results thus beg the following questions with respect to the potential for community engagement in “Picture” being a “linchpin” for *Living Landscapes*: could the project’s visually-oriented (and clearly “Picture”-compatible) community engagement methods and activities have been better developed:

1. with the “People” issues previously highlighted foremost in mind; that is,
2. in such ways as to engage first those “more experienced” groups that are perhaps ready to learn more about “People” (arguably the most challenging social learning aspect), who might then
3. be in a better position to help the “least experienced” groups (e.g. like Dowerin Lakes) to engage in these arguably most difficult “People”-focused aspects, and thus in all other designated social learning aspects processes?

Arguably, then, by modifying focal species-experiential (“Picture”-compatible) methods and activities in this way (in light of the results presented thus far) *Living Landscapes* might have been better able to apply them in helping its participant sub-catchment groups to: (1) acquire and share (and “scale-up”) this knowledge with groups from outside their areas and (2) achieve its most desired goal of common understanding. It is in this way - in bringing groups that operate in sustainable NRM at different scales together - that such community engagement processes might have become a “linchpin” for *Living Landscapes*. The results in Table 5.8 develop this argument.

Table 5.8 reports how *Living Landscapes* compares with other relevant sources in terms of its capacity to help its participant sub-catchment groups to share this learning. The table reports data for “Picture” only. The reason for this is that the results for the four remaining social learning aspects are very similar to the results in Table 5.8.

Table 5.8: Facilitating the Sharing of “Picture” Compared with other Possible Sources of Similar Learning: Sub-Catchment Groups’ Assessments (Appendix 1: Q2a (viii), Page 339)

SUB-CATCHMENT GROUPS	OTHERS POSSIBLE SOURCES of SIMILAR LEARNING					TOTALS
	a. Education	b. Other Conservation Groups	c. Family & Friends	d. Work	e. Landcare	
1.SOUTH TAMMIN (N=10)						(N=50)
Much Better (100%)	2	1				3
Better (75%)	3	2	6	5	4	20
Same (50%)	1			1	2	4
Worse (25%)						0
Much Worse (0%)						0
Number (n)	6	3	6	6	6	27
Average Response	60%	30%	60%	60%	60%	54%
Weighted Average	79%	83%	75%	71%	67%	75%
2.GABBY QUOI QUOI (N=8)						(N=40)
Much Better	1			1	1	3
Better	2	2	2	1	3	10
Same	1		2	2		5
Worse						0
Much Worse						0
Number (n)	4	2	4	4	4	18
Average Response	50%	25%	50%	50%	50%	45%
Weighted Average	75%	75%	63%	69%	81%	73%
3.DOWERIN LAKES (N=5)						(N=25)
Much Better	2			1		3
Better	2	2	5	3	2	14
Same	1	2		1	3	7
Worse						0
Much Worse						0
Number (n)	5	4	5	5	5	24
Average Response	100%	80%	100%	100%	100%	96%
Weighted Average	80%	63%	75%	75%	60%	71%
4.MORBINNING (N=10)						(N=50)
Much Better	2			1		3
Better	1	2	4	2	2	11
Same		1			2	3
Worse	1		1			2
Much Worse				1		1
Number (n)	4	3	5	4	4	20
Average Response	40%	30%	50%	40%	40%	40%
Weighted Average	75%	67%	65%	63%	63%	67%
LIVING LANDSCAPES (N=33)						(N=165)
NUMBER (n)	19	12	20	19	19	89
AVERAGE RESPONSE	58%	36%	61%	58%	58%	54%
WEIGHTED AVERAGE	77%	72%	70%	70%	68%	71%

Table 5.8 indicates that, overall, *Living Landscapes* may have been “Much Better” than other relevant sources of learning - i.e. compared to the capacities of these other sources to help their participants to acquire and share knowledge and understanding of the impacts of nature conservation planning on the visual farming landscapes (i.e. the overall *Living Landscapes* project weighted average for “Picture”=71%). Further supporting this notion, the *Living Landscapes* project weighted averages for the other four associated social learning aspects are very similar to this result. However, while this is another good (“high”) overall result for *Living Landscapes*, there are some interesting differences to consider when comparing these results that can be used to help develop the proposed “linchpin” argument.

The result in Table 5.8 that perhaps has most significance for this developing argument is, not so much the overall Landcare value (68%), but the Landcare value for Gabby Quoi Quoi (81%). This “stand-out” result suggests that members of the Gabby Quoi Quoi sub-catchment group thought that *Living Landscapes* had helped them engage in “Picture” “Much Better” than Landcare. That is, this result goes against the opinions of all other groups. Landcare results for the other three groups all fell within the 60% range. These results indicate that the remaining three groups felt that *Living Landscapes* was “Better” - but not that much better - than Landcare at helping them engage in social learning for achieving sustainable NRM. Comparing these results in the context of the developing “linchpin” argument begs the question:

Given this differentiation across catchment groups, could *Living Landscapes* have better implemented and/or or modified its (“Picture”-focused) community engagement methods and activities by first approaching the Gabby Quoi Quoi sub-catchment group?

To try and answer this question, the following subsection takes a closer look at how well *Living Landscapes* might have engaged its participant sub-catchments in all the above social learning processes over time.

5.2.3 *Living Landscapes* Facilitating Community Engagement in Social Learning for achieving Sustainable NRM over Time

Tables 5.9 and 5.10 indicate how well *Living Landscapes* might have helped its sub-catchment groups to engage in the above community engagement/social learning aspects and processes over the life of the project. As such, they provide a broad indication of the motivations of sub-catchment groups *to want* to continue engaging in social learning for achieving sustainable NRM. Table 5.9, firstly, reports sub-catchment group responses to the broad question concerning *Living Landscapes'* capacity to help its participant sub-catchment groups engage in social learning: (1) at the start of the project, (2) at the time of the survey, and (3) potentially in the future (Appendix 1, Section 3 of the survey). Table 5.9 thus attempts to provide "a helicopter view" of how well *Living Landscapes* engaged its sub-catchment groups in social learning for achieving sustainable NRM over the life of the project.

Table 5.9: Facilitating Community Engagement in all Designated Aspects of Social Learning over Time: Sub-Catchment Groups' Assessments (Appendix 1: Q3, see table for survey page numbers)

SUB-CATCHMENT GROUPS	DESIGNATED SOCIAL LEARNING ASPECTS					TOTALS (N=105)
	a. Picture (p.343)	b. Wildlife (p.314)	c. Land (p.301)	d. Money (p.329)	e. *People (p.360)	
1.DOWERIN LAKES (*N= 15; *People N=45)						
Strongly Agree (100%)	2	3	3	3	3	14
Agree (75%)	11	7	9	11	36	74
Unsure (50%)	2	5	3	1	6	17
Disagree (25%)						
Strongly Disagree (0%)						
Number (n)	15	15	15	15	45	105
Average Response	100%	100%	100%	100%	100%	100%
Weighted Average	75%	72%	75%	78%	73%	75%
2.SOUTH TAMMIN (*N= 30 *People N=90)						
Strongly Agree	3	3	4	1	4	15
Agree	17	18	11	14	40	100
Unsure	6	8	8	3	37	62
Disagree	1	1	1	3	9	15
Strongly Disagree						
Number (n)	27	30	24	21	90	192
Average Response	90%	100%	80%	70%	100%	88%
Weighted Average	70%	69%	69%	65%	61%	67%
3.MORBINNING (*N=30; *People N=90)						
Strongly Agree	6	4	2	2	5	19
Agree	12	13	14	15	36	90
Unsure	5	7	5	7	29	53
Disagree	2				2	2
Strongly Disagree		1	1	1	9	12
Number (n)	25	25	22	25	81	176
Average Response	83%	83%	73%	83%	90%	82%
Weighted Average	72%	69%	68%	67%	58%	67%
4.GABBY QUOI QUOI (*N=24; *People N=72)						
Strongly Agree	5	1	1		1	2
Agree	6	5	7	10	34	62
Unsure	4	3	5	6	17	35
Disagree			2	2	11	11
Strongly Disagree						
Number (n)	15	9	15	18	63	110
Average Response	63%	38%	63%	75%	88%	65%
Weighted Average	77%	69%	62%	61%	60%	66%
LIVING LANDSCAPES (*N=99; *PEOPLE N=297)						
NUMBER (n)	82	79	76	79	279	595
AVERAGE RESPONSE	83%	80%	77%	80%	94%	83%
WEIGHTED AVERAGE	74%	70%	69%	68%	63%	69%

*As for Table 5.4, the total sample sizes (N) have significantly increased in this table because each aspect of social learning for “time” required three questions to be asked. For “People” nine questions were asked. (NB: This is another example of the undue complexity of this initial survey and why it was subsequently modified.)

Table 5.9 indicates that, overall, *Living Landscapes* may have been quite successful at sustaining community engagement in social learning for achieving sustainable NRM over time - from the start of the project, at the time of the survey and, potentially, into the future (i.e. the overall *Living Landscapes* project weighted average for “Time”=69%, indicating a possible “high” level of achievement). Table 5.9 shows again how community engagement in “Picture” might have been the main “motivator” (i.e. the *Living Landscapes* weighted average for “Picture” at 74% was “high” and the highest result for all social learning aspects). These overall results thus support the developing “linchpin” argument. That the results for “People” (63%) were the lowest also helps in this respect. However, despite the group’s overall lowest position in the table, the Gabby Quoi Quoi sub-catchment value for “Picture” (77%) further suggests that this group should have been approached first to initiate any further developments of community engagement in “Picture” in the ways already suggested. (There is, in any community-based initiative, the need for some people with extra drive to manage and/or coordinate business on an ongoing basis. These people/qualities are perhaps needed especially at the beginning of any such initiatives. Were there some members of the Gabby Quoi Quoi sub-catchment group in particular who possessed these qualities, and who would have thus been most suited to initiating the proposed changes to *Living Landscapes* community engagement methods and activities? Might this “more experienced” group, then, have been the main “motivators” in this context, at least initially?) Table 5.10 provides a breakdown of results presented in Table 5.9 (using the social learning aspect “Picture” only, for the reasons already stated) to shed more light on this developing proposition.

Table 5.10: Facilitating Community Engagement in Social learning for achieving Sustainable NRM over Time (“Picture”): Sub-Catchment Groups’ Assessments (Appendix 1: p.343)

SUB-CATCHMENT GROUPS	ENGAGED in SOCIAL LEARNING over TIME			TOTALS
1.GABBY QUOI QUOI (N=8)	a. Currently	b. In 10 years	c. Start of Project	(N=24)
Strongly Agree (100%)	2	2	1	5
Agree (75%)	3	1	2	6
Unsure (50%)		2	2	4
Disagree (25%)				0
Strongly Disagree (0%)				0
Number (n)	5	5	5	15
Average Response	63%	63%	63%	63%
Weighted Average	85%	75%	70%	77%
2.DOWERIN LAKES (N=5)				(N=15)
Strongly Agree	1	1		2
Agree	4	2	5	11
Unsure		2		2
Disagree				0
Strongly Disagree				0
Number (n)	5	5	5	15
Average Response	100%	100%	100%	100%
Weighted Average	80%	70%	75%	75%
3.MORBINNING(N=10)				(N=30)
Strongly Agree	2	2	2	6
Agree	4	4	4	12
Unsure	2	2	1	5
Disagree		1	1	2
Strongly Disagree				0
Number (n)	8	9	8	25
Average Response	80%	90%	80%	83%
Weighted Average	75%	69%	72%	72%
4.SOUTH TAMMIN (N=10)				(N=30)
Strongly Agree	1	2		3
Agree	7	5	5	17
Unsure	1	2	3	6
Disagree			1	1
Strongly Disagree				0
Number (n)	9	9	9	27
Average Response	90%	90%	90%	90%
Weighted Average	75%	75%	61%	70%
LIVING LANDSCAPES (N=33)				(N=99)
NUMBER (n)	27	28	27	82
AVERAGE RESPONSE	82%	85%	82%	83%
WEIGHTED AVERAGE	79%	72%	70%	74%

NB: As with Table 5.4, values in this Table add detail to those values presented in Table 5.9 (see also Appendix 1 Questions on Page 348).

Table 5.10, firstly, supports the results presented in Table 5.9. It indicates that, overall, *Living Landscapes* may have helped its participant sub-catchment groups to engage in “Picture” over the life of the project to a “high” level (i.e. the overall *Living Landscapes* weighted average =74% indicating a “high” level of achievement). However secondly, Table 5.10 provides a better breakdown of the results presented in Table 5.9. It also provides further details of how participant sub-catchment groups’ opinions of *Living Landscapes* might have tracked over time. The Table 5.10 results indicate that, over the life of the project, participant sub-catchment groups’ opinions concerning how well *Living Landscapes* engaged them in social learning for achieving sustainable NRM may have “plateaued”. They indicate that opinions were: (1) “highly” favourable at the start of the project (70%), (2) almost “very highly” favourable currently (79%) - i.e. at the time of the thesis surveys, but (3) again only “highly” favourable about the capacity of *Living Landscapes* to continue on this footing into the future (i.e. this value decreased almost to its same starting value - 72%). Of course, the overall result for *Living Landscapes* is still good. However, these results also signal that participants were beginning to feel less optimistic, or somewhat “flat”, about the project’s future (i.e. in terms of its capacity to continue to engage participant communities in social learning for achieving sustainable NRM as outlined in this thesis). It is in this sense, then, that Table 5.10 indicates that opinions may have at least started to “plateau”. Moreover though, Table 5.10 can shed more light on: (1) why Gabby Quoi Quoi should have been approached first in any ongoing development and implementation of its community engagement methods/activities, and how (2) this might have helped *Living Landscapes* to better capitalise on its participants’ “high”/favourable opinions to (3) help the project move beyond this proposed community engagement/social learning “plateau”.

Table 5.10 indicates firstly that Gabby Quoi Quoi may have been most favourable about *Living Landscapes*’ capacity to engage participants in social learning for sustainable NRM over the life of the project and into the future (i.e. the sub-catchment weighted average for this group=77%). Moreover, this result can be broken down to better indicate how this group’s opinions tracked over time. They indicate that opinions were: (1) the same as the overall *Living Landscapes* project weighted average at the start (70%, indicating “highly” favourable opinions) (2) similar to Dowerin Lakes value for currently (85%, indicating “very highly” favourable opinions) and (3) the same as South Tammin’s value concerning the future (75%, indicating that their opinions were again “highly” favourable). Moreover, these more detailed results now position Gaby Quoi Quoi at the top of the table. While results for

all groups indicate “high” levels of motivation overall, these results further indicate that at least some members of Gabby Quoi Quoi are “very highly” motivated. They lend support to the argument that it is perhaps this group that possesses the requisite levels of drive/motivation over the longer term necessary for further developing and implementing *Living Landscapes* community engagement/social learning methods and activities in the ways suggested above. Moreover, they support the associated argument that this “more experienced” group, or the most relevant people within this group, should have been approached first in this endeavour. Of course, these results do not preclude the involvement of other “more experienced” groups, South Tammin for example which has extensive prior experience in Landcare. And there was no reason why these more experienced groups could not have worked together. The results in Table 5.10 simply suggest that Gabby Quoi Quoi might have taken more of a lead. Furthermore, comparable results for the “least experienced” Dowerin Lakes sub-catchment group suggest that this group may have also possessed nearly the same “very high” levels of “motivation”. Might these results have augured well for *Living Landscapes* in the context of the developing “linchpin” argument; at some point the “most experienced” groups (lead by Gabby Quoi Quoi?) would have needed to, in effect, “dovetail in” with the “least experienced” Dowerin Lakes group; do these similarly positive results suggest a sound basis for success?

Table 5.10 may thus help shed light on the issues raised in Table 5.9 and on how these (increasingly) methodological issues might be addressed. Firstly, the table demonstrates the great potential of “Picture” as a “spark” or a “hook” for engaging such community groups in social learning for achieving sustainable NRM, perhaps especially for the “least experienced” Dowerin Lakes’ sub-catchment group. However, secondly, with respect to how such community engagement might be strengthened, as a “linchpin”, Table 5.10 also helps to identify which of the “more experienced” sub-catchment groups might have been approached first in this endeavour: namely Gabby Quoi Quoi. As such, it helps to identify the group that was, perhaps, most ready for this. Table 5.10 also indicates how the South Tammin and Morbinning sub-catchment groups, respectively, might have been approached subsequently to work out the best ways of helping to achieve such modifications. Comparable results in Table 5.10 for Dowerin Lakes suggest a past platform for success.

In summary, the results and preliminary analyses in this section may provide an indication of why *Living Landscapes*, albeit unintentionally in the current sustainable NRM policy

context, was unable to achieve common understanding between its participant communities and relevant governing bodies. In essence, they provide an indication of how *Living Landscapes* may have “contained” community engagement/social learning processes locally through a lack of focus on relevant governance-related issues. Also, in terms of the bigger picture these results may provide an indication of how this project, and possibly other similar projects, may have been unable to: (1) contribute more effectively towards implementing sustainable NRM policy ideas in Australia (Chapter 3) and (2) through this process better contribute towards reinvigorating an (arguably time-honoured) pragmatic co-evolutionary approach to sustainable NRM (Chapter 2). However, in focusing increasingly on methodological issues this section also begins to provide some guidance as to how such projects might better contribute towards solving these problems. In this light, and in light of the evolving learning methodology applied in this thesis, the opinions of the *Living Landscapes* sub-catchment groups concerning the design and implementation of the initial rural case-study survey (Appendix 1) are also reported in the following section.

5.3 FARMERS' FEEDBACK

This section reports feedback from *Living Landscapes* participant sub-catchment groups' opinions concerning the structure of the initial rural case study survey, how this survey was implemented and how it might be improved (Appendix 1, “Comments, Criticisms and Suggestions for Future Planning”). Table 5.11 provides, firstly, a broad indication of opinions concerning the design and implementation of the initial case study survey (Appendix 1, see “Step 1” of feedback). (NB: To help maintain some consistency with respect to reporting results and their initial analyses, Table configurations in this section are the same as those tables presented in Section 5.2)

Table 5.11: Design and Implementation of the Initial Case-Study Survey: Sub-Catchment Groups' Assessments (Appendix 1: Step1, Q1. p.364)

SUB-CATCHMENT GROUPS	TOTALS
1.MORBINNING (N=10)	
Very Easy (100%)	
Easy (75%)	5
Unsure (50%)	1
Difficult (25%)	3
Very Difficult (0%)	
Number (n)	9
Average Response	90%
Weighted Average	56%
2.DOWERIN LAKES (N=5)	
Very Easy	
Easy	2
Unsure	2
Difficult	1
Very Difficult	
Number (n)	5
Average Response	100%
Weighted Average	55%
3. GABBY QUOI QUOI (N=8)	
Very Easy	
Easy	3
Unsure	2
Difficult	
Very Difficult	1
Number (n)	6
Average Response	75%
Weighted Average	54%
4. SOUTH TAMMIN (N=10)	
Very Easy	
Easy	2
Unsure	1
Difficult	5
Very Difficult	1
Number (n)	9
Average Response	90%
Weighted Average	36%
ALL GROUPS (N=33)	
NUMBER (n)	29
AVERAGE RESPONSE	88%
WEIGHTED AVERAGE	50%

Table 5.11 indicates that, overall, sub-catchment groups were unsure about the survey design and its implementation (i.e. the survey’s overall weighted average=50%). Based on the values and descriptors in Table 5.1, then, this survey design and implementation was achieved with “moderate” levels of success. On a sub-catchment group basis, the opinions of Dowerin Lakes’, Morbinning and South Tammin farmers were all similarly “moderate” (i.e. their weighted averages=56%, 55% and 54% respectively). The South Tammin sub-catchment, however, was much less approving. This group found the survey difficult to complete (i.e. the South Tammin sub-catchment weighed average=36%) Table 5.12 sheds more light on the reasons for these levels of approval.

Table 5.12: Associated Further Comments (Appendix 1: Step1, Q1, p.364)

SUB-CATCHMENT GROUPS	COMMENTS
1.MORBINNING (N=10)	
Easy	‘...very repetitive and ambiguous; perhaps if you were to give out a survey more generated on outcomes and questions on how to improve the systems would be beneficial for all; ‘too touchy-feely’; ‘...fair questionnaire - no real problems...’
Unsure	‘...some questions seemed to run into the next’
Difficult	‘...not sure of the reasons for the questions...’
2.DOWERIN LAKES (N=5)	
Easy	‘...found separation of conservation work, plant and animal impacts artificial. I was late and would have liked to take the booklet home and give items more thought...’
3. GABBY QUOI QUOI (N=8)	
Easy	‘...seemed very repetitive...’
Unsure	‘...very repetitive...’
Unsure-Difficult	‘...half-way between the two...’
Very Difficult	‘...too detailed and hard to follow...’
4. SOUTH TAMMIN (N=10)	
Easy	‘...more streamline and in-block answering’
Unsure	‘...too many questions were too similar...’
Unsure-Difficult	‘...multiple-choice - easy method; seems very repetitive within sections; language easy to understand...’
Very Difficult	‘...separate surveys into modules - and have a discussion between modules; too much repetition...’

Table 5.12 shows comments written by some of the farmers from each sub-catchment group concerning the design and implementation of the initial case-study survey (Appendix 1). Each comment is written next to the farmer’s corresponding broad opinion (see also Table 5.11 and in Appendix 1). The table shows that one of the main reasons for the survey’s overall “moderate” approval rating was the repetitiveness of the questions. Even those farmers who otherwise found the survey “easy” to complete were of the same opinion. Table 5.13 indicates whether and how farmers would prefer to participate in follow-up interviews.

Table 5.13: Preferences for Follow-up Interviews: Sub-Catchment Groups’ Assessments (Appendix 1: Step 2, Q 1 and 2, p.365)

SUB-CATCHMENT GROUPS	PREFERENCES		TOTALS	
	Group	Individually	NUMBER (N=20)	AVERAGE RESPONSE
1. SOUTH TAMMIN (N=10)				
Yes	5	4	9	45%
Unsure	1	1	2	10%
No	4	5	9	45%
Number (n)	10	10	20	
Average Response	100%	100%		100%
2. MORBINNING (n=10)				
Yes	4	3	7	35%
Unsure	2		2	10%
No	3	6	9	45%
Number (n)	9	9	18	
Average Response	90%	90%		90%
3. GABBY QUOI QUOI (N=8)				
Yes	1	2	3	19%
Unsure	2	1	3	19%
No	4	4	8	50%
Number (n)	7	7	14	
Average Response	88%	88%		88%
4. DOWERIN LAKES (N=5)				
Yes	1		1	10%
Unsure		1	1	10%
No	4	4	8	80%
Number (n)	5	5	10	
Average Response	100%	100%		100%
ALL GROUPS (N=33)				
NUMBER (n)	31	31	62	
AVERAGE RESPONSE	94%	94%		94%

Table 5.13 shows that, of all the groups, the South Tammin sub-catchment group was most willing to participate in follow-up interviews, with 45% of respondents indicating that they would prefer to do so individually and/or in a group. (Other ways of engaging in such discussions are highlighted below). Although the sub-catchment weighted average was deemed an inappropriate measure for these responses, this total average response rate indicates, again, moderate overall approval for the idea of participating in follow-up interviews. The remaining three sub-catchment groups are ranked, similarly, in order with an increasing number of respondents indicating that they did not wish to participate in any follow-up interviews, whether on an individual basis or in a group. Only one member of the Dowerin Lakes sub-catchment group indicated that he would be willing to participate in follow-up interviews, and that he would only participate if more members decided to do the same; that is, as part of a wider group. Table 5.13 thus indicates a gradual decrease in approval for participating in follow-up interviews, from “moderate” levels of approval to “very low” levels of approval.

Table 5.14, in keeping with the ethos of the *Living Landscapes* indicates if, and how, farmers might wish to participate in more creative ways in the ongoing development and implementation of this case-study survey and thus, potentially, of the proposed collaborative monitoring tool.

Table 5.14: Preferences for Creative Participation in Survey Development: Sub-Catchment Groups' Assessments (Appendix 1: Step 3, p. 366)

SUB-CATCHMENT GROUPS	CREATIVE OPTIONS					TOTALS	
	a. Photography	b. Oral Histories	c. Film	d. Diaries & Journals	e. Stories	Nos. of Choices	AV RESPONSE (%)
1. DOWERIN LAKES (N=5)						(N=25)	
*Individuals Choosing (n)	2	2	1		1	6	
Average Response	40%	40%	20%	0%	20%		24%
2. MORBINNING (N= 10)						(N=50)	
*Individuals Choosing (n)	2		2	2	1	7	
Average Response	20%	0%	20%	20%	10%		14%
3. GABBY QUOI QUOI (N=8)						(N=40)	
*Individuals Choosing (n)	4					4	
Average Response	50%	0%	0%	0%	0%		10%
4. SOUTH TAMMIN (N=10)						(N=50)	
*Individuals Choosing (n)	1	2	1	2		6	
Average Response	10%	20%	10%	20%	0%		12%
ALL GROUPS (N=33)						(N=165)	
*INDIVIDUALS CHOOSING (n)	9	4	4	4	2	23	
AVERAGE RESPONSE	27%	12%	12%	12%	6%		14%

***NB: The same individuals can make more than one choice**

Table 5.14 shows firstly that on average there was an overall combined response rate of 14%. This indicates that the overall response to the offer to participate in the ongoing development and implementation of this PhD research/surveys in more creative ways (see Appendix 1) was “very poor”. This result was somewhat surprising given the penchant for more creative participation among *Living Landscapes* participant communities. However, Table 5.14 also provides a breakdown of this result. This breakdown shows that, of those respondents that were interested in becoming involved in the research in more creative ways, most would chose photography as their preferred medium (that is, the combined average response rate for photography=27%). This specific result is perhaps not surprising given the extensive use of photography to engage sub-catchment groups in *Living Landscapes*. Moreover, what is especially interesting is that the Dowerin Lakes sub-catchment group appeared most willing overall to participate more creatively in the ongoing implementation and development of this PhD research/surveys (that is, the combined average response rate for Dowerin Lakes=24%). These results for Dowerin Lakes are compatible with this group’s responses in the initial rural case study survey indicating

members' preferences for engaging in the "Picture" aspect of social learning for achieving sustainable NRM.

In summary, feedback from farmers indicated that the initial rural case study survey, in terms of its structure and content, was received with "low" to "moderate" levels of approval. Comparing farmers' opinions about this survey and their opinions of the *Living Landscapes* project highlights a possible association between these data that has much to do with assumptions that are made during project planning. That is, given the extensive consultation that occurred in designing and planning the initial rural case study survey (Chapter 4) one would have assumed feedback from all participant groups to be much more favourable than indicated above. Similarly, given that participant sub-catchment groups were involved in *Living Landscapes* project planning from the outset, and, that the community engagement methods and activities used were very much local community focused (Frost *et al* 1999), perhaps there was also an underlying assumption made during planning that all parties would engage equally as well in the project. In conjunction with the results of the rural case study survey, then, this farmer feedback provides some *prima facie* evidence to suggest that such assumptions were and are misplaced. As such, this feedback also contributes towards providing a basis for further investigation of the issues raised thus far in this thesis, and ways of addressing them via the proposed collaborative monitoring tool. In this light, the following sections report the results of the follow-up urban survey/rudiments of the proposed collaborative monitoring tool.

5.4 MODIFIED URBAN CASE STUDY SURVEY/RUDIMENTARY COLLABORATIVE MONITORING TOOL RESULTS

This section provides an indication of how well the *Bannister Creek Catchment Group (BCCG)* and the *Two Rivers Catchment Group (TRCG)* believed that they were engaged in social learning for achieving sustainable NRM, this time in the broader context of the cooperative management-based *Perth Region NRM* program. It focuses more on the methodological issues brought to light in the previous reporting and preliminary analyses of the rural case study survey results. As such, this section provides an indication of how well the (similarly local community-focused) on-ground methods and activities used in this process might have been applied at the sub-regional level with the assistance of the *South East Regional Centre for Urban Landcare (SERCUL)*. This section is divided into four subsections. Each subsection reports the results of a much more concise and consolidated

survey and table design based on four broad categories: “Improved Knowledge”, “Shared Optimism”, “Sustained Motivation” and “On Reflection”. (NB: These categories are explained fully in the “how-to” manual in Appendix 6.) However, briefly, they are based on more concise renditions of the initial rural survey and results categories; respectively, on: accumulated local individual and community factual knowledge, the sharing of that knowledge locally and across greater geographical scales, over time and compared to other sources of similar learning.

These categories were devised by the PhD researcher on the basis of the combined rural survey results and farmers’ feedback on that survey, a concomitant case study review and ongoing help and advice from the relevant *SERCUL* employees (see Chapter 4). These modifications were made to do more than improve the survey design. They were made to develop an evolving learning methodology as the basis for the proposed collaborative monitoring tool for use by sustainable NRM researchers *and* practitioners (Chapter 1). Therefore, along with the revised urban survey design (Appendix 3), the modified tables in this section report the relevant community engagement/social learning data, but also form the basis for reporting and communicating similar sorts of data should the proposed collaborative monitoring tool be further developed and implemented. This section begins by presenting results for “Improved Knowledge”.

5.4.1: Improved Knowledge

This subsection provides an indication how well individuals in the *BCCG* and the *TRCG* believed they were helped to improve their broad knowledge and understanding (general awareness) of urban wetland conservation in their areas (a main focus for these groups). Table 5.15 provides a snapshot of *BCCG* and *TRCG* perceptions.

Table 5.15: Facilitating Community Engagement in Social Learning for achieving Sustainable NRM (Improved Knowledge): BCCG and TRCG Assessments (Appendix 3: Q1a, p.383)

SUB-CATCHMENT GROUPS	ASPECTS of "IMPROVED KNOWLEDGE"					TOTALS
1.BCCG (N=14)	a. Picture	b. Land	c. Wildlife	d. Money	e. People	(N=70)
Strongly Agree (100%)	10	6	6	4	4	30
Agree (75%)	3	6	7	5	5	26
Unsure (50%)		1		3	3	7
Disagree (25%)					1	1
Strongly Disagree (0%)				1		1
Number (n)	13	13	13	13	13	65
Average Response	93%	93%	93%	93%	93%	93%
Weighted Average	94%	85%	87%	71%	73%	82%
2.TRCG (N=12)						(N=60)
Strongly Agree	4	3	2	2	1	12
Agree	6	8	9	7	7	37
Unsure	1			1	1	3
Disagree		1		1	2	4
Strongly Disagree	1		1	1	1	4
Number (n)	12	12	12	12	12	60
Average Response	100%	100%	100%	100%	100%	100%
Weighted Average	75%	77%	73%	67%	60%	70%
BOTH GROUPS						(N=130)
NUMBER (n)	25	25	25	25	25	125
AVERAGE RESPONSE	96%	96%	96%	96%	96%	96%
WEIGHTED AVERAGE	85%	81%	80%	69%	67%	76%

NB: This table and others in this section are modified versions of those presented in Section 5.2.

In Table 5.15, the combined or potential sub-regional weighted average for the BCCG and the TRCG (76%) indicates that both groups believed they were engaged quite effectively in improving their general awareness of urban wetland conservation in their local areas. This result indicates that, overall, the on-ground methods and activities used to engage these local urban Landcare community groups in such learning may have been applied with a “high” degree of success (see also descriptors in Table 5.1 that can be used similarly in this urban context). However, Table 5.15 also highlights some possible differential learning

experiences similar to those elicited in the rural case studies (Section 5.2). Table 5.15 thus indicates that:

1. The *BCCG* believed that they were engaged most effectively, overall, through these on-ground methods and activities (i.e. the *BCCG* sub-catchment weighted average=82%, indicating a “very high” level of approval; while the *TRCG* sub-catchment weighted average=70%, indicating a “high” level of approval, a marked difference in values - see also Table 5.1).
2. Both the *BCCG* and the *TRCG* believed that they were engaged most effectively in learning about the visual impacts of urban wetland conservation in their areas (i.e. the combined, or potential “sub-regional”, weighted average for “Picture”=85% indicating “very high” levels of success – Table 5.1).
3. There is a significant difference between the *BCCG* weighted average for “Picture” (94%) and the corresponding *TRCG* weighted average for “Picture” (75%). (i.e. this difference indicates that the on-ground methods and activities were applied with “high” levels of success in engaging the *TRCG* in such learning, but were applied with not only “very high” but also, perhaps, “exceptionally high” levels of success in engaging the *BCCG*).
4. These on-ground methods and activities were applied least effectively in engaging both the *BCCG* and the *TRCG* in learning about the impacts of social-institutional-governmental relationships in urban wetland conservation in their areas (i.e. the combined/sub-regional weighted average for “People”=67% indicating “high” levels of success - Table 5.1).
5. These on-ground methods and activities were applied least effectively in engaging the *TRCG* in learning about the impacts of social-institutional-governmental relationships in urban wetland conservation in their areas (i.e. the *TRCG* weighted average for “People”=60% indicating “high” but bordering on “moderate” levels of success, compared to the *BCCG*’s “high” approval rating=73%, again a marked difference in values - Table 5.1).

The significance of these results is best understood when they are compared with the corresponding rural results (Section 5.2 see especially Tables 5.3 and 5.4).

With respect to “Picture”, the results for the “least experienced” *BCCG* (see below) are very similar to the corresponding results for the Dowerin Lakes sub-catchment (Table 5.3), the “least experienced” group in the *Living Landscapes* project. The *BCCG* is least experienced in terms of the partnership-building expertise of its members because the group was born out of local community direct concern and action for their local natural environment (see Fisher 1998; 1999). That is - at least initially - the group was formed by the Bannister Creek community mainly for the benefit of the Bannister Creek community and its natural

environment, rather than for the benefit of the much broader-scale social-ecological environment that requires extensive partnership-building knowledge and experience with especially governing bodies. However, since the formation of the *BCCG*, some of its members have learnt much about such partnership-building in Landcare and NRM, so much so that these individuals have gone on to found and manage *SERCUL*, an organization that contributes much towards improving the broader-scale social-ecological environment. (This information is also based on ongoing personal communications with *SERCUL* employees and associates.) In this way, then, the *BCCG* may be very similar to the Dowerin Lakes group, which, perhaps because of its (similar) lack of prior partnership-building knowledge and experience, was not selected as an Alcoa group. These “comparable” results for “Picture” (see limitations/Section 5.1) are significant in the context of this thesis. They support the argument that - in their current forms - the hands-on and often visually-oriented methods and activities, used in both rural and urban contexts to engage local communities in social learning for achieving sustainable NRM, are best suited for engaging “least experienced” groups - as a “hook” or “spark”. Urban results for “People” are similarly comparable.

With respect to “People”, the results in Table 5.15 also indicate that such on-ground community management methods and activities may have been used much less successfully in both the broader context of the urban *Perth Region NRM* program (a cooperative management approach) and in the rural *Living Landscapes* project (an adaptive management approach). That is, both initiatives may have been less successful in applying such methods and activities to engage their participant sub-catchment groups in learning about the impacts of social-institutional-governmental relationships in their respective nature conservation contexts. However, when these results for “People” are compared together with the similar results for “Picture” they further support the associated thesis argument: that the “more experienced” groups may be looking not so much to reject or to replace such hands-on and visually-oriented methods and activities, but to complement and enhance them. That is, the results for “People” for the *TRCG* – the more experienced urban Landcare and NRM group in terms of partnership-building – are very similar to those of the more experienced rural South Tammin, Gabby Quoi Quoi and Morbinning sub-catchment groups (Tables 5.3 and 5.4). They show that both the urban and the rural “more experienced” sub-catchment groups were least pleased with the help that they received to engage in “People”. However, the *TRCG* were also significantly less pleased than the *BCCG*

with the help that they received to engage in “Picture”. These results support the argument that the *TRCG*, given their prior more extensive partnership-building knowledge and experience (Chapter 3), may also have been ready to engage more deeply in Landcare and in sustainable NRM, and, may have been looking for more effective ways of so doing. Moreover, these “comparable” results suggest that the *TRCG*, like the South Tammin, Gabby Quoi Quoi and Morbinning groups, may have been most ready and able to engage in learning about “People”, at least in the first instance. In this way, as with “most experienced” rural groups, the *TRCG* might then have helped other “least experienced” local urban Landcare groups – like the *BCCG* – to better engage in “Improved Knowledge”, and, ultimately, in social learning for achieving sustainable NRM.

5.4.2: Shared Optimism

Tables 5.16 and 5.17 both provide an indication of the extent to which the *BCCG* and the *TRCG* believed that they were helped to share their “Improved Knowledge” of urban wetland conservation (Table 5.15) with a range of government, quasi-government and/or non-government bodies. Both provide broad indications of a sense of “Shared Optimism” among the *BCCG* and the *TRCG* concerning such engagement, in particular concerning the effectiveness of the on-ground methods and activities used in this process (see Appendix 6 for definitions of “Shared Optimism”). Table 5.16 gives the first of such indications. It provides a broad initial overview of *BCCG* and *TRCG* opinion.

Table 5.16: Facilitating Community Engagement in Social Learning for achieving Sustainable NRM (Shared Optimism): *BCCG* and *TRCG* Broad Assessments (*Appendix 3: Q2a, p.384*)

SUB-CATCHMENT GROUPS	GEOGRAPHIC SCALES					TOTALS
1. <i>BCCG</i> (N=14)	a. Sub-Catchments	b. Swan-Canning Catchment	c. Southwest Regional WA	c. WA State	e. Australia & Overseas	*(N=70)
*Individuals Choosing (n)	12	6	6	3	2	29
Average Response	86%	43%	43%	21%	14%	41%
2. <i>TRCG</i> (N=12)						(N=60)
*Individuals Choosing (n)	9	8	2	3	1	23
Average Response	75%	67%	17%	25%	8%	38%
BOTH GROUPS (N=26)						(N=130)
NUMBER (n)	21	14	8	6	3	52
AVERAGE RESPONSE RATES	81%	54%	31%	23%	12%	40%

***NB: Individuals can make more than one choice**

Table 5.16 indicates that members of both the *BCCG* and the *TRCG* believed that they were not significantly helped, in the context of the broader *Perth Region NRM* program, to develop a positive sense of “Shared Optimism” (i.e. their combined/“sub-regional” weighted average=40%, indicating a “low” level of achievement). The table also shows that there is little difference between the two groups in this respect. Again, Table 5.16 provides more detailed information. It also provides an indication of how well the *BCCG* and the *TRCG* believed they were helped to share their “Improved Knowledge” at increasingly larger geographical scales. Table 5.16 shows how their opinions became gradually less positive as the geographical scales increased. Moreover, this inverse relationship indicates that both the *BCCG* and the *TRCG* believed that they were helped to share their “Improved Knowledge” most effectively with other relevant groups, organisations and/or communities at the sub-catchment level (i.e. the average response for both groups, 81%, is highest at the sub-catchment scale, indicating a “very high” level of success). In light of the previous results (Subsection 5.4.1 and in Section 5.2), Table 5.16 also shows some significant differences between the individual and gradually decreasing scalar measures for the *BCCG* and the *TRCG*. The table also indicates that:

1. While both the *BCCG* and the *TRCG* believe they were helped very effectively to share their “Improved Knowledge” at the local/Sub-Catchment scale, their individual responses at this scale differ (i.e. the *BCCG* value=86%; the *TRCG* value=75%).

2. The decreasing scalar values for each of these sub-catchment groups also differ. Values for the *BCCG* decline sharply from the local/Sub-Catchment scale (86%) to the Swan-Canning Catchment scale (43%), and then more gradually with increasing geographical scale. The lower values for the *TRCG* decline gradually from the Sub-Catchment scale (75%) to the Swan-Canning scale (67%), and then more sharply with increasing geographical scale.

These results provide some *prima facie* evidence that the local community-driven *BCCG*, with the least direct Landcare and sustainable NRM experience, may have been helped to share their “Improved Knowledge” very well locally. Indeed, these results suggest that such learning was most concentrated (“contained”) at this level. They also provide *prima facie* evidence that the *TRCG*, which was established as the result of official pre-planning and was the group with more direct Landcare and NRM experience, was helped less to share their “Improved Knowledge” locally, and to a much lesser extent to share this with those groups responsible for Landcare and sustainable NRM at larger scales. The exception was the help that the *TRCG* received to share their learning at the Swan-Canning Catchment scale (67%; however, see also Table 5.17 below). Indeed, these differences, in scalar values, between the *BCCG* and the *TRCG* in this urban context are much clearer than the corresponding differences in values for their rural sub-catchment counterparts (i.e. between Dowerin Lakes and the remaining three *Living Landscapes* sub-catchment groups; Section 5.2, see Tables 5.5-5.8). This evidence therefore lends some support for the developing “linchpin” arguments presented in Section 5.2. It suggests more clearly that, in an urban context at least, the “most experienced” (*TRCG*) Landcare group might best be approached first in modifying community engagement/social learning methods and activities accordingly. Table 5.17 provides more detailed information in support of this argument.

Table 5.17: Facilitating Community Engagement in Social Learning for achieving Sustainable NRM (Shared Optimism): BCCG and TRCG Detailed Assessments (Appendix 3: Q2c, p.384)

SUB-CATCHMENT GROUPS	GEOGRAPHIC SCALES					TOTALS
	a. Sub-Catchments	b. Swan-Canning Catchment	c. Southwest Regional WA	c. WA State	e. Australia & Overseas	*(N=280)
1. BCCG (N=56)*						
I. A deeper understanding of the links between the natural and human environments	14	8	7	5	3	37
II. A greater sense of ownership and pride in natural environments.	14	8	7	5	3	37
III. Better working relationships with other individuals and groups involved in nature conservation.	12	6	6	4		28
IV. Confidence in becoming part of a stronger, more effective urban Landcare group.	12	6	5	1		24
Number (n)	52	28	25	15	6	126
Average Response	93%	50%	45%	27%	11%	45%
2. TRCG (N=48)*						(N=232)
I. A deeper understanding of the links between the natural and human environments.	8	5	2	4	2	21
II. Better working relationships with other individuals and groups involved in nature conservation.	8	4	1	3		16
III. Confidence in becoming part of a stronger, more effective urban Landcare group.	7	4	1	3		15
IV. A greater sense of ownership and pride in natural environments.	6	3		3	2	14
Number (n)	29	16	4	13	4	66
Average Response	60%	33%	8%	27%	8%	27%
BOTH GROUPS (N=104)						(N=512)
NUMBER (n)	81	44	29	28	10	192
AVERAGE RESPONSE	77%	42%	27%	27%	10%	37%

*NB: (1) For the BCCG N=56 (4x14/Total Sample Size) because of the four different questions asked). Similarly for the TRCG N=48. Again, individuals can make more than one choice. (2) Categories I-IV attempt to capture better the relevant underlying “driving” social learning qualities considered in Section 5.2.

Table 5.17 also indicates that both the BCCG and the TRCG believed that, overall, they had not been helped to engage in this shared learning process to maximum effect – arguably, the most desired level for achieving common understanding? (I.e. their combined/”Sub-

Regional” weighted average=37%). That is, this result is comparable with the corresponding combined weighted average in Table 5.16 and helps to substantiate it. On further inspection, though, Table 5.17 shows a significant difference between the sub-catchment weighted averages. The table shows that:

1. The *BCCG* (sub-catchment) weighted average (45%) is slightly greater than the combined weighted average in this table. This indicates that this group felt more positive overall about how well they were helped to share their acquired learning, or their “Improved Knowledge”, with those groups responsible for achieving more sustainable NRM at greater scales.
2. In contrast, however, the *TRCG* sub-catchment weighted average is well below the combined weighted average (27%). This indicates, on closer inspection, that the group was much less successful in engaging its members in this shared learning process.

These differences further suggest that *BCCG* members believed that they were helped “moderately” well to develop a positive sense of “Shared Optimism”. On the other hand, these differences suggest that *TRCG* members felt that they were not helped that well to develop a positive sense of “Shared Optimism” (that the group may have been engaged in this shared learning process with a “low” level of success).

In the context of the broader arguments presented in this thesis, these results suggest that the less experienced *BCCG* believed that the on-ground methods and activities, facilitated sub-regionally via organisations like *SERCUL*, were used most effectively to help them develop a positive sense of “Shared Optimism” (an essential underlying quality for “driving” community engagement in social learning for achieving sustainable NRM?). They suggest, however, that the “more experienced” *TRCG* members believed that they were helped little to develop this core community engagement/social learning process. Table 5.17 also indicates that:

1. *BCCG* members believed that they were helped extremely well to share such learning among themselves and with other local community groups (i.e. the *BCCG* sub-catchment Average Response = 93%, indicating an “exceptionally high” level of success). However, again, as in Table 5.16, this table shows a marked difference between this result and the Swan-Canning Catchment result (50%). It then shows gradually decreasing values for the larger geographic scales.
2. By comparison, *TRCG* members believed that they were helped much less to share such learning. The table shows that *TRCG* members believed they were helped to share their “Improved Knowledge” at the sub-catchment level with more “moderate” levels of success (i.e. the associated Average Response=60%). As was

the case for the *BCCG*, the table then shows a marked difference between this result and the Swan-Canning Catchment result (33%) and generally decreasing values with increasing geographical scale.

Again, the significance of these results (Table 5.17) is best understood by comparing them with the corresponding results for the rural adaptive management-based *Living Landscapes* project (Tables 5.5-5.8). The different learning experiences elicited in Table 5.17 further suggest (more clearly than the corresponding scalar results for rural communities) that the relevant on-ground community engagement methods and activities have been applied most effectively, and exceptionally well, to help the “least experienced” *BCCG* share their “Improved Knowledge” among themselves and/or with other local community groups. They indicate, therefore, that the *BCCG* may have been helped exceptionally well to develop a positive sense of “shared optimism” locally; to develop those essential learning qualities (i.e. a deeper understanding...; a sense of ownership...; better working relationships...; confidence...) necessary for driving community engagement in social learning for achieving sustainable NRM at the all-important local community level. These results are broadly similar to the corresponding shared learning results for the “least experienced” Dowerin Lakes sub-catchment group in the rural *Living Landscapes* project (see Tables 5.5-5.8).

In contrast, these differences suggest (again more clearly than for the rural survey) that the community engagement methods and activities were not applied as well to help the “most experienced” *TRCG* share such learning both locally and beyond. As such, they may have been much less effective at helping the *TRCG* to develop a positive sense of “Shared Optimism”, not only locally but also across all geographical scales (i.e. with those groups responsible for sustainable NRM at larger geographical scales). Again these urban results for the *TRCG* are broadly similar to the corresponding shared learning results for the South Tammin, Gabby Quoi Quoi and Morbinning sub-catchment groups in the *Living Landscapes* project (see also Tables 5.5-5.8). That such differentiated shared learning experiences might be similar in both urban and rural contexts provides further *prima facie* evidence: (1) for the argument that the process of community engagement in social learning for achieving sustainable NRM is being “contained” locally and (2) for the developing “linchpin” proposals as possible ways of solving this problem. Subsection 5.4.3 provides further *prima facie* evidence in support of these arguments and proposals for practical solutions.

5.4.3: Sustained Motivation

This subsection describes results that show the extent to which the *BCCG* and the *TRCG* may have helped their members to engage in the above learning over time - in “Sustained Motivation” (see Appendix 6). Based on further research the category “Sustained Motivation” may provide an indication of another important underlying quality for driving community engagement in social learning for achieving sustainable NRM: the extent of group motivation in the face of broader challenges. For example, adaptive management projects, like *Living Landscapes*, and broader co-management based sustainable NRM programs, like the one implemented via *Perth Region NRM*, have been assisting participants to achieve ‘common understandings’ (Frost *et al* 1999) through shared learning experiences for some time. However, attainment of this goal still remains a significant challenge for such endeavours. As such, many participants are left feeling frustrated and burnt out (see for example Nursey-Bray 2000). However, many local communities continue to engage in such projects and programs; they remain motivated despite their frustrations. In this experimental context, then, “Sustained Motivation” provides an indication of the *BCCG*’s and the *TRCG*’s capacities to deal with such “external pressures”, and to mitigate such “systems disturbance”. In this sense this category may also provide a broad indication of group “resilience”. In an attempt to illustrate this idea, this subsection also compares these results with corresponding results of the initial rural case-study survey of the rural *Living Landscapes* project (Section 5.2). Table 5.18 provides a concise indication of how well the *BCCG* and the *TRCG* thought that they were helped to engage in all the above learning over time (i.e. from when the groups were first formed, to currently/at the time of the survey, and, potentially, into the future).

Table 5.18: Facilitating Community Engagement in Social Learning for achieving Sustainable NRM (Sustained Motivation): BCCG and TRCG Sub-Catchment Groups' Assessments (Appendix 3: Q3a, p.385)

SUB-CATCHMENT GROUPS	TIME			TOTALS
	a. Over the next five to ten years?	b. Currently	c. When the group first formed	
1. BCCG (N=14)				(N=42)
Very High (100%)	1	6	4	11
High (75%)	7	2	4	13
Unsure (50%)	6	3	0	9
Low (25%)		3	1	4
Very Low (0%)			1	1
Number (n)	14	14	10	38
Average Response	100%	100%	71%	90%
Weighted Average	66%	70%	73%	70%
2. TRCG (N=12)				(N=36)
Very High	1	1	1	3
High	6	5	2	13
Unsure	4	2	5	11
Low	1	3	2	6
Very Low		1		1
Number (n)	12	12	10	34
Average Response	100%	100%	83%	94%
Weighted Average	65%	54%	55%	58%
BOTH GROUPS (N=26)				(N=78)
NUMBER (n)	26	26	20	72
AVERAGE RESPONSE	100%	100%	77%	92%
WEIGHTED AVERAGE	66%	62%	64%	64%

Table 5.18 indicates that both the *BCCG* and the *TRCG* believe that they have been helped to engage in social learning for achieving sustainable NRM (i.e. in all the learning previously described) over the life of the program to a “high” level, and that such perceptions are likely to be retained into the future (i.e. the combined/sub-regional weighted average=64%). The overall weighted averages for each time period also helps support this notion (i.e. responses for these time periods fall into the mid-60% range). Table 5.18 also indicates that:

1. The *BCCG* believed that they were better helped than the *TRCG* to maintain such motivation levels over the life of the program (i.e. the *BCCG* sub-catchment weighted average=70%, indicating a “high” level of achievement, while the *TRCG* sub-catchment weighted average=58%, indicating a more “moderate” level of achievement; again, a marked difference in values).

2. The levels of motivation for the *BCCG* may have decreased since the group first formed, and may decline further in the future (i.e. the *BCCG* sub-catchment weighted averages for “...First Formed”=73%, “Currently”=70% and “...Next Ten Years=66%); while the corresponding values for the *TRCG* have increased (i.e. 55%, 54% and 65%). The decreasing values for the *BCCG* and the increasing values for the *TRCG* thus “converge”.

Table 5.18 thus provides a broad indication that as with their rural counterparts, the *BCCG* and the *TRCG* may have reached a “plateau” in terms of their motivation to continue engaging in social learning for achieving sustainable NRM. The converging values for the *BCCG* and the *TRCG* suggest this. These converging values though can suggest more in terms of the developing “linchpin” arguments.

Firstly, the sub-catchment weighted averages for the “more experienced” *TRCG*, although lower overall than those for the “less experienced” *BCCG*, did increase over time. Given this inverse relationship, the “more experienced” *TRCG* might have been the best group to approach first in any development of (the similarly “Picture”-focused) community engagement methods and activities. In other words, the combination of lower satisfaction rates for the *TRCG* and the group’s increasing optimism for the future perhaps suggest more of “a readiness” for engaging in learning about “People”, and thus for wanting to improve “Picture-focused” methods/activities accordingly. The *TRCG* are more ready than the “less experienced” *BCCG*, whose overall satisfaction rates are higher but whose optimism for the future has declined. Secondly, there are some similarities here between the *TRCG* and the Gabby Quoi Quoi group in terms of such readiness. While comparable results for Gabby Quoi Quoi (Table 5.10) indicate that this group’s feelings about *Living Landscapes’* capacity to engage them may have reached a “plateau”, the relevant weighted average value for the future is “high”, and is the highest when compared to the other three rural groups (i.e. if you also take into account Gabby Quoi Quoi’s weighted average value for “Currently”=85%). This suggests that, compared to the other three rural groups, Gabby Quoi Quoi was still best placed to improve the project’s capacity to engage its participants in social learning for achieving sustainable NRM in the future. The Table 5.18 results for the *TRCG* suggest the same thing; that compared to the “less experienced” *BCCG*, this “more experienced” group possesses very similar qualities: not so much because of any specific weighted average value but because all three relevant values combined indicate that the *TRCG* has “the momentum” required. The Table 5.18 results (along with those in Table 5.10) indicate that a group’s relative potential for improving future trends is one of the

better indicators for helping identify leadership qualities (i.e. for improving social learning and indeed modifying community engagement methods and activities to help achieve this in practice).

The significance of these more detailed results is that they elicit more complex learning issues for further discussion. The following results for “On Reflection” continue this process.

5.4.4: On Reflection

Table 5.19 indicates how well the *BCCG* and the *TRCG* in their sub-regional contexts may have engaged their members in social learning for achieving sustainable NRM, as compared with other possible sources of similar learning.

Table 5.19: Facilitating Community Engagement in Social Learning for achieving Sustainable NRM (On Reflection): *BCCG* and *TRCG* Sub-Catchment Groups’ Perceptions (Appendix 3: Q4a, p.385)

SUB-CATCHMENT GROUPS	OTHER SOURCES of SIMILAR LEARNING				TOTALS
	a. Family & Friends	b. Formal Education	c. Work	d. Others	
1. TRCG (N=12)					(N=48)
Much Better (100%)	3	2	2		7
Better (75%)	5	5	5	2	17
Same (50%)	2	3	4	3	12
Worse (25%)		1			1
Much Worse (0%)			1		1
Number (n)	10	11	12	5	38
Average Response	83%	92%	100%	42%	79%
Weighted Average	78%	68%	65%	60%	68%
2. BCCG (N=14)					(N=56)
Much Better	8	3	2		13
Better	2	6	4		12
Same	4	4	5	7	20
Worse		1	1		2
Much Worse			1		1
Number (n)	14	14	13	7	48
Average Response	100%	100%	93%	50%	86%
Weighted Average	82%	70%	60%	50%	66%
BOTH GROUPS (N=26)					(N=104)
NUMBER (n)	24	25	25	12	86
AVERAGE RESPONSE	92%	96%	96%	46%	83%
WEIGHTED AVERAGE	80%	69%	63%	55%	67%

Table 5.19 results suggest that overall the *TRCG* and the *BCCG* may have helped their members to engage in social learning for achieving sustainable NRM more than have other sources of similar learning (i.e. the combined/"Sub-Regional" weighted average=67% - Table 5.1). The very similar sub-catchment weighted averages for the *TRCG* (68%) and the *BCCG* (66%) substantiate this overall result. Table 5.19 also indicates that:

1. Overall, both the *TRCG* and the *BCCG* believed that such community engagement experiences were: "Much Better" than those gained via "Family and Friends" (i.e. the combined/"Sub-Regional" weighted average for "Family and Friends"=80%); "Better" than "Formal Education" and "Work" (i.e. the combined/"Sub-Regional" weighted averages=69% and 63% respectively); the "Same" as "Others" (i.e. combined/"Sub-Regional" weighted average for "Others"=55%). (NB: Respondents were given the option in this urban study to list any other relevant sources.)
2. Sub-catchment weighted averages for each of the "Other Sources of Similar Learning" categories were very similar to those above.

These overall results, analysed in the context of previous results for the *BCCG* and the *TRCG*, indicate that the "Picture-focused" methods and activities used to facilitate urban community engagement/social learning compared favourably when evaluated against other possible similar sources of community engagement/social learning. They suggest that they have "high" potential for future use; to engage the *BCCG* and *TRCG* (and other similar groups in other sub-regions?) in social learning for achieving 'common understanding' (Frost *et al* 1999)/sustainable NRM in the sub-regional context of *SERCUL*/the broader cooperative management-based *Perth Region NRM*. Further modifying and strengthening these methods and activities as a "linchpin", in the ways suggested for the rural *Living Landscapes* project, led this time by the *TRCG* might provide a means of realising this potential. Indeed, comparing these urban results with their corresponding rural results, in the context of the limitations discussed at the beginning of this chapter, the potential for such modification seems greater in the cooperative management-based *SERCUL/Perth Region NRM* contexts.

In summary, in the context of the specific thesis objectives, its broader arguments and its limitations, all the results (urban and rural) suggest that such projects and programs are engaging local participant communities in social learning for achieving sustainable NRM quite well, but, that these processes are being "contained" to the local community level. This equates to partial effectiveness but great potential for improvement using relevant existing "Picture-focused" methods and activities remains. However, preliminary analyses

of these results also suggest that, notwithstanding the many successes and good intentions of such projects and programs, we still have not learnt how best to “tap into” and better utilise such potential. Indeed, as also suggested in this thesis, the broader community engagement/social learning/sustainable NRM policy environments and historical-geographical contexts have not always been favourable (Chapters 2 and 3). Furthermore preliminary analyses of both urban and rural results suggest that, unless such “Picture-focused” community engagement methods and activities are further developed and/or better applied, perhaps in the ways suggested in this chapter, as “linchpin” methods and activities, this situation is not likely to change into the future. There is both a need and a potential to move beyond the suggested community engagement/social learning “plateau”, to improve: (1) sustainable NRM policy development and implementation in Australia and, through this process, (2) contribute towards reinvigorating an age-old pragmatic co-evolutionary approach to achieving sustainable NRM at greater historical-geographical scales.

In further preparation for such a discussion, the last subsection describes the responses of members of both the *BCCG* and the *TRCG* concerning the design and implementation of this modified case study-action research survey. A comparison of these responses with those of the *Living Landscapes* farmers concerning the earlier survey format shows that this modified survey was better received. This has implications for the applied research aim of this thesis, namely the design of a collaborative monitoring tool (Chapters 1 and 7; Appendix 6).

5.5 COMMUNITY FEEDBACK

This section describes the opinions of those members of the *BCCG* and *TRCG* who participated in the urban case study-action research based survey (Appendix 3) concerning its design and implementation. These opinions are also compared with those of the *Living Landscapes* sub-catchment groups who criticised the initial rural case study survey (Section 5.3). These enable better judgements to be made about the value of making the proposed changes to the survey instrument. Table 5.20 provides a broad indication of these opinions.

Table 5.20: BCCG and TRCG Opinions of the Modified Case Study-Action Research Based Survey (Appendix 3: Q5, p.386)

SUB-CATCHMENT GROUPS	TOTALS	COMMENTS
1. TRCG (N=12)		
Very Easy	3	
Easy	8	<i>This was a good questionnaire</i>
Unsure		
Difficult	1	
Very Difficult		
	Number	12
	Average Response	100%
	Weighted Average	77%
1. BCCG (N=14)		
Very Easy	3	<i>1) Well done. I do think some BCCG community members will find this challenging. 2) Was only difficult to answer as I have not had a lot of direct involvement with group over last few months as working full time now.</i>
Easy	7	<i>1) Q4 difficult to grasp concept. Rerword to make understanding easier.</i>
Unsure	1	<i>1) Neither easy nor difficult. Had to read questions carefully and go back over previous questions.</i>
Difficult	3	
Very Difficult		
	Number	14
	Average Response	100%
	Weighted Average	68%
ALL GROUPS (N=26)		
	NUMBER	26
	AVERAGE RESPONSE	100%
	WEIGHTED AVERAGE	73%

Table 5.20 shows that both BCCG and TRCG respondents found this survey, overall, easy to complete (73%). This is quite a significant improvement on the initial rural case-study survey where the farmers felt unsure about the effectiveness of the design and implementation of this survey (50% - Table 5.11). Closer examination of Table 5.20 lends further support to the significance of this improvement. Members of both the TRCG (77%) and the BCCG (68%) felt that the survey was “Easy” to complete. However, three out of the four sub-catchment groups that participated in the initial rural case-study survey – i.e. Morbinning (56%), Dowerin Lakes (55%) Gabby Quoi Quoi (54%) – were “Unsure” about the survey, while the fourth group, South Tammin (36%), found the survey generally difficult to

complete (see also Table 5.1). These comparisons suggest that the modified survey instrument would generally be easy to complete were it to be used in future, certainly in an urban context. However, these positive results, notwithstanding the likewise positive written comments in Table 5.20, also show that respondents had some reservations about the survey. Table 5.20 may also indicate the potential usefulness of the modified survey instrument as the basis for the proposed collaborative monitoring tool (Chapters 1 and 7 and Appendix 6). Table 5.21 shows the preferences of survey respondents for follow-up interviews/discussions.

Table 5.21: BCCG and TRCG Preferences for Follow-Up Interviews/Discussions (Appendix 3: Q6, p.386)

SUB-CATCHMENTS		PREFERENCES		TOTALS
1. BCCG (N=14)		Group	Individually	NUMBER (N=28)
Yes	13	13	26	93%
No	1	1	2	7%
Number	14	14	28	
Average Response	100%	100%		100%
2. TRCG (N=12)			NUMBER (N=24)	
Yes	10	9	19	79%
No	2	3	5	21%
Number	12	12	24	
Average Response	100%	100%		100%
BOTH GROUPS (N=26)			NUMBER (N=52)	
NUMBER	26	26	52	
AVERAGE RESPONSE	100%	100%		100%

Table 5.21 indicates that the BCCG (93%) and the TRCG (79%), respectively, were either “very willing” or “willing” to participate in the follow-up interviews/discussions. Moreover, the table also indicates that members of both groups were happy to participate on an individual basis and/or in a group. This is in sharp contrast to the rural case-study survey respondents: in two out of the four sub-catchment groups (South Tammin and Morbinning) only around half of respondents were willing to take part in any follow-up interviews/discussions; of the remaining two groups (Gabby Quoi Quoi and Dowerin Lakes), most respondents indicated that they did not wish to participate further at all (see also Table 5.11). Tables 5.20 and 5.21 thus indicate that the modified survey is more suited as a

basis for developing the proposed collaborative monitoring tool at least in urban Landcare/sustainable NRM contexts.

Further to this proposition, Table 5.22 shows the preferences of *BCCG* and *TRCG* respondents for participating in the ongoing development and implementation of this modified survey. Like their rural counterparts, urban local community Landcare and sustainable NRM initiatives endeavour to engage people using as many different community-friendly methods as possible. Many of these involve the sort of creative options described in Table 5.22.

Table 5.22: *BCCG* and *TRCG* Preferences for Creative Participation in the Implementation and Development of the Modified Survey (*Appendix3: Q7, p.387*)

SUB-CATCHMENT GROUPS	CREATIVE OPTIONS									TOTALS	
	a. Photography	b. Diaries/Journals	c. Poetry	d. Oral Histories	e. Drama	f. Filming	g. Story Writing	h. Painting/Drawing	i. Song Writing	Nos. of Choices (*N=108)	AVERAGE RESPONSE (%)
1. TRCG (N=12)											
*Individuals Choosing (n)	2	2	3	1	3	2	2	1	1	17	
Average Response	17%	17%	25%	8%	25%	17%	17%	8%	8%		16%
										(*N=126)	
2. BCCG (N=14)											
*Individuals Choosing (n)	6	4	1	3	0	1	1	2	0	18	
Average Response	43%	29%	7%	21%	0%	7%	7%	14%	0%		14%
										(*N=234)	
BOTH GROUPS (N=26)											
NUMBER (n)	8	6	4	4	3	3	3	3	1	35	
AVERAGE RESPONSE	30%	23%	16%	15%	13%	12%	12%	11%	4%		15%

*NB: The same individuals can make more than one choice. Therefore, the ideal response for the *BCCG* would be $12(\text{Sample Size}) \times 9(\text{Total Number of Possible Choices}) = 108 (100\%)$. However, only 17 choices were made in total $(17/108) \times 100=16\%$; similarly for the *TRCG*.

Table 5.22 shows that, overall, members of both the *BCCG* and the *TRCG* had little interest in participating creatively in the ongoing development and implementation of the modified survey (15%). In the context of the limitations discussed in Section 5.1, this response is almost exactly the same as the corresponding rural response rate (14%). However, notwithstanding this broad consensus, as with the rural groups there were some individuals in urban Landcare who felt that such endeavours would be worthwhile and who selected photography as their preferred medium (30%). The corresponding overall response rate in the rural survey for photography is 27%. Read in conjunction with the rural results for Dowerin Lakes and previous results for the *BCCG*, this shows the potential power of this medium for engaging some local communities in the ongoing development and implementation of this modified survey method in the future (Chapters 1 and 7 and Appendix 6).

In summary, these results suggest that modifications made to the initial rural case study survey in the context of the thesis arguments and objectives were worthwhile, certainly in an urban Landcare/sustainable NRM context. Subsequent interviews with representatives of the respective regional catchment councils (*Wheatbelt NRM* and *Perth Region NRM*) supported the general thesis arguments and objectives within which such modifications were framed. As indicated earlier in this chapter, these qualitative data are reported in Chapters 6 and 7. However, to help “set the scene” for this subsequent reporting a brief summary of regional catchment councils’ supportive responses is provided in the following section.

5.6 AN OVERVIEW of REGIONAL CATCHMENT COUNCIL INTERVIEWS

The interviews with representatives of both the *Perth Region NRM* (formerly the *Swan Catchment Council*) and the *Wheatbelt NRM* (formerly the *Avon Catchment Council* within which the *Living Landscapes* project was implemented) were by and large positive. Respective chairs and project managers warmed to the general idea of developing the proposed collaborative monitoring tool. However, a major caveat was that, while such a tool should be able to augment existing monitoring and evaluation regimes, it would still have to “fit in” or comply with regional catchment council practices. In other words, innovations along these lines should not be too radical or based solely on theory. Moreover, all agreed that any data collected should be relevant to achieving their regional aims and objectives. Generally, these bodies are still striving to achieve better

'compromise', 'consultation', 'knowledge-sharing', 'behaviour change', 'feedback', 'communication,' 'governance', 'trust-building', 'listening', 'building of social capital' and 'reporting' thereof (personal communications, *Perth Region NRM* and *Wheatbelt NRM* chairs and project managers, 2007). The Regional catchment council representatives interviewed generally agreed, in principle, that a collaborative monitoring tool developed and implemented along the lines proposed in this thesis could help them to address more complex problem situations (Pahl-Wostl 2007; Chapter 1). Whether and/or how this might be possible is further discussed, in light of relevant qualitative data, in Chapters 6 and 7 and in conjunction with Appendix 6.

5.7 SUMMARY

This chapter has reported the results of the initial rural case study survey and subsequent modified urban survey/basis of the proposed collaborative monitoring tool data collection. Preliminary analyses of these results suggest that community engagement in social learning for achieving sustainable NRM may, indeed, be "contained" locally. Moreover, these analyses identify a possible reason for such "containment", and, suggest how one might "scale-up" such community engagement - to improve sustainable NRM policy development and implementation in Australia and elsewhere. However, in presenting these results as tables - and discussing their developing configurations - these preliminary analyses also develop the basis of data sharing using the proposed collaborative monitoring tool. That is, it considers how sustainable NRM researchers and practitioners might jointly be able to utilise, share and/or discuss relevant substantive data sets from the outset of a relevant project. For example, data might be used initially in this context by sustainable NRM researchers as a basis for deeper analysis; sustainable NRM practitioners might use the same data more immediately, say, in reporting the success or otherwise of a relevant project or program as part of meeting their commitments for Australian government funding. Of course, these data might then be shared as part of the ongoing development of any sustainable NRM project or program, and indeed in the ongoing development and implementation of the proposed collaborative monitoring tool (see especially Hooshangi *et al* 2013, Figure 1.2, Chapter 1). These results and preliminary analyses thus explore reasons for the proposed "containment" of community engagement in social learning locally, and, how such community engagement might act as a "linchpin" for addressing the associated broader scale issues discussed in this thesis. Chapter 6 develops these analyses by

discussing a possible schema for engaging, the “more experienced” local/sub-catchment Landcare/NRM groups in social learning for achieving sustainable NRM.

CHAPTER 6

Differences in Community Engagement in Social Learning at a Local Community Level

This chapter discusses the results and preliminary analyses presented in Chapter 5 and achieves the second thesis objective: evaluating the effectiveness of (1) the rural *Living Landscapes* adaptive management project and (2) the urban *Bannister Creek Catchment Group (BCCG)* and *Two Rivers Catchment Group (TRCG)* in a cooperative management-based regional NRM context to engage their respective participants in social learning for achieving sustainable NRM. The chapter draws on qualitative data collected in follow-up interviews with rural survey respondents from Gabby Quoi Quoi and South Tammin sub-catchment groups. Farmers present at the South Tammin interview who did not participate in the initial survey also contributed to this discussion. The chapter also draws similarly on qualitative data collected in follow-up interviews with the *BCCG* and the *TRCG* (Chapter 4; Appendices 2 and 4). In so doing, the chapter develops and discusses a schema that both rural and urban local community engagement initiatives might have applied to address the issues of community engagement/social learning “containment” raised in Chapter 5. This discussion forms the basis of Chapter 7, which, in conjunction with Chapter 1 and the “how-to” manual (Appendix 6), shows how such a schema might have been developed and implemented as a result of applying the proposed collaborative monitoring tool. This “feasibility study” achieves the third thesis objective to develop the rudiments of such a tool.

Section 6.1 provides a summary of relevant comments made by Gabby Quoi Quoi and South Tammin sub-catchment group members that were recorded during follow-up interviews with these groups. This section discusses a possible association between farmers’ comments and the results for the rural *Living Landscapes* project and associated preliminary analyses presented in Chapter 5. This association then forms the basis of the subsequent development and discussion of the proposed schema, and how such a schema might have been used in this rural context. Section 6.2 provides a summary of *BCCG* and *TRCG* recorded interview comments. This section further develops the proposed schema,

and how it might have been used in the context of *SERCUL/Perth Region NRM*. It also draws on parallels between the rural and urban participant community comments. Section 6.3 summarises these discussions in terms of the proposed heuristic framework and methodological limitations discussed in this thesis.

6.1 BETTER EXPLOITING DIFFERENTIAL LEARNING LOCALLY in the RURAL LIVING LANDSCAPES PROJECT

Table 6.1 summarises the relevant GQQ and ST farmers' comments. Comments pertain to the specific "People"/government and governance-related issues raised in Chapter 5. They provide further indication that government and governance issues in particular may have been of most concern to these "more experienced" *Living Landscapes* participant communities.

Table 6.1: Examples of Gabby Quoi Quoi and South Tammin Farmers Main Concerns: Summaries of Relevant Recorded Interview Comments

	CSIRO	CALM	DOA	FEDERAL GOVERNMENT POLICY
GQQ			<p>-Thought DOA a good organisation, with good personnel. But that changes in government policy, departmental organisation and personnel render DOA less effective: <i>The DOA explained magnetometer/mapping rock formations and groundwater flows, but provided no ongoing help re:- tackling such problems</i></p> <p>-Could see DOA competing with mining for personnel, but agree, though, that they must learn to live and work better with these changes.</p>	<p>-Feel that the regional/INRM approach is OK in principle, but feel that such planning should begin locally.</p> <p>-Feel that this is not happening, that the region as a whole is the main priority in planning.</p>
ST	<p>-Gaining knowledge of deep drainage installation, but uncertain about its feasibility: Experienced problems installing pipes that cross <i>CSIRO</i> land; <i>CSIRO</i> stops farmers. Farmer pitched against farmer: <i>Confusion, so some just going ahead and drain land; contaminate neighbours' properties but also upset CSIRO</i>. Feel that an 'end point' was not planned for. Also feel uncertain about alternatives to deep drainage: <i>Ag. Dept. (plant salt bush) vs. Farmers (problem sub-surface, need deep drainage)</i>.</p> <p>-Can see all sides, but also feel 'at a loss'; do not know what to do; searching</p>	<p>-Think <i>CALM</i> poorly managing local reserves: <i>Mallee fowl were returning, now gone again</i></p> <p>-Say <i>CALM</i> personnel unavailable/not visible. They feel uninspired by this.</p> <p>-Can see potential for <i>CALM</i> to inspire though: <i>CALM brought back mallee fowl; farmers saw this; felt inspired to continue nature conservation on their land.</i></p>	<p>-Learnt much from DOA scientists. But again since a change of government/rules, that DOA has 'gone downhill'.</p> <p>-Perceive poor ongoing help and advice: <i>See also magnetometer issue</i></p> <p>-Feel that DOA not really appreciating farmers' knowledge of their land: <i>Not consulted about where best to plant trees on their land to prevent wind erosion</i></p> <p>-Feel that bureaucrats are "here today, gone the next"</p>	

KEY: GQQ- Gabby Quoi Quoi; ST-South Tammin; CSIRO - Commonwealth Scientific and Industrial Research Organisation; CALM – WA State Government Department of Conservation and Land Management (now the Department of Environment and Conservation); DOA – WA State Government Department of Agriculture

The comments in Table 6.1 suggest that both the Gabby Quoi Quoi and South Tammin sub-catchment groups believed that it was not so much the government agencies or the sustainable NRM policies themselves that were the problem, but the ways in which the agencies had been re-organised and the relevant policies had been implemented as a consequence of changes in Australian government and hence policymaking in this area.

Both groups indicate that these changes led to agency personnel becoming much less visible in local farming communities or sub-catchment groups. Changes in government organisation saw agency personnel become much more involved in administration, and less involved in consulting local Landcare and sustainable NRM communities and thus in providing necessary on-ground advice and support. Secondly, Table 6.1 comments suggest that Gabby Quoi Quoi and South Tammin local farming communities felt increasingly uncertain about how best to engage with these agencies and policies. Indeed, comments suggest that both the Gabby Quoi Quoi and South Tammin sub-catchment groups, while still valuing the knowledge and expertise of government agencies and the regional NRM approach, felt at a loss about how best to engage with them in these changing circumstances. More generally, Table 6.1:

1. Provides some specific examples of the types of ‘complex problem situations’ (i.e. conflicting opinions; feelings of uncertainty instead of disdain) (see Pahl-Wostl 2007; Chapter 1) that must be addressed to overcome social-institutional-governmental barriers, and to achieve ‘common understanding’ (Frost *et al* 1999) and more sustainable NRM in practice.
2. Provides some more specific examples of the sort of problems that adaptive management-based projects – like *Living Landscapes* – ultimately seek to help achieve through engaging communities in social learning.
3. Provides some further *prima facie* evidence to suggest that these sorts of problems are still prevalent and are still very difficult to solve despite the efforts of such projects to address them.
4. Suggests a possible correlation between Gabby Quoi Quoi and South Tammin sub-catchment groups’ feelings of uncertainty concerning government agencies (i.e. qualitative data) and these groups’ concerns about, and their weighted averages for, “People” (i.e. quantitative data).

Of course, given the limitations discussed in Chapter 5 one must be cautious about suggesting correlations between qualitative and quantitative data for these groups. However, such *prima facie* evidence can still be used as a basis for further discussion about the *Living Landscapes* project; about how it might have better addressed community engagement/social learning issues raised in Chapter 5 from the earliest stages of the project. This “association” is thus used in this thesis as a basis for further developing the arguments that: (1) “People”/government-related issues are of major concern for participant communities (especially the “more experienced” communities); (2) the “more experienced” Gabby Quoi Quoi and South Tammin sub-catchment groups have had some

considerable prior partnership-building experiences in dealing with these agencies; and as such (3) might well be best placed to “take a lead” in helping to further develop the relevant on-ground community engagement methods and activities in the ways suggested in Chapter 5. The following subsection develops and discusses a schema that *Living Landscapes* might have used in more favourable sustainable NRM policy environments to achieve this goal.

6.1.1: Developing a Schema for Engaging *Living Landscapes* Local Participant Communities More Substantively in Social Learning for achieving Sustainable NRM

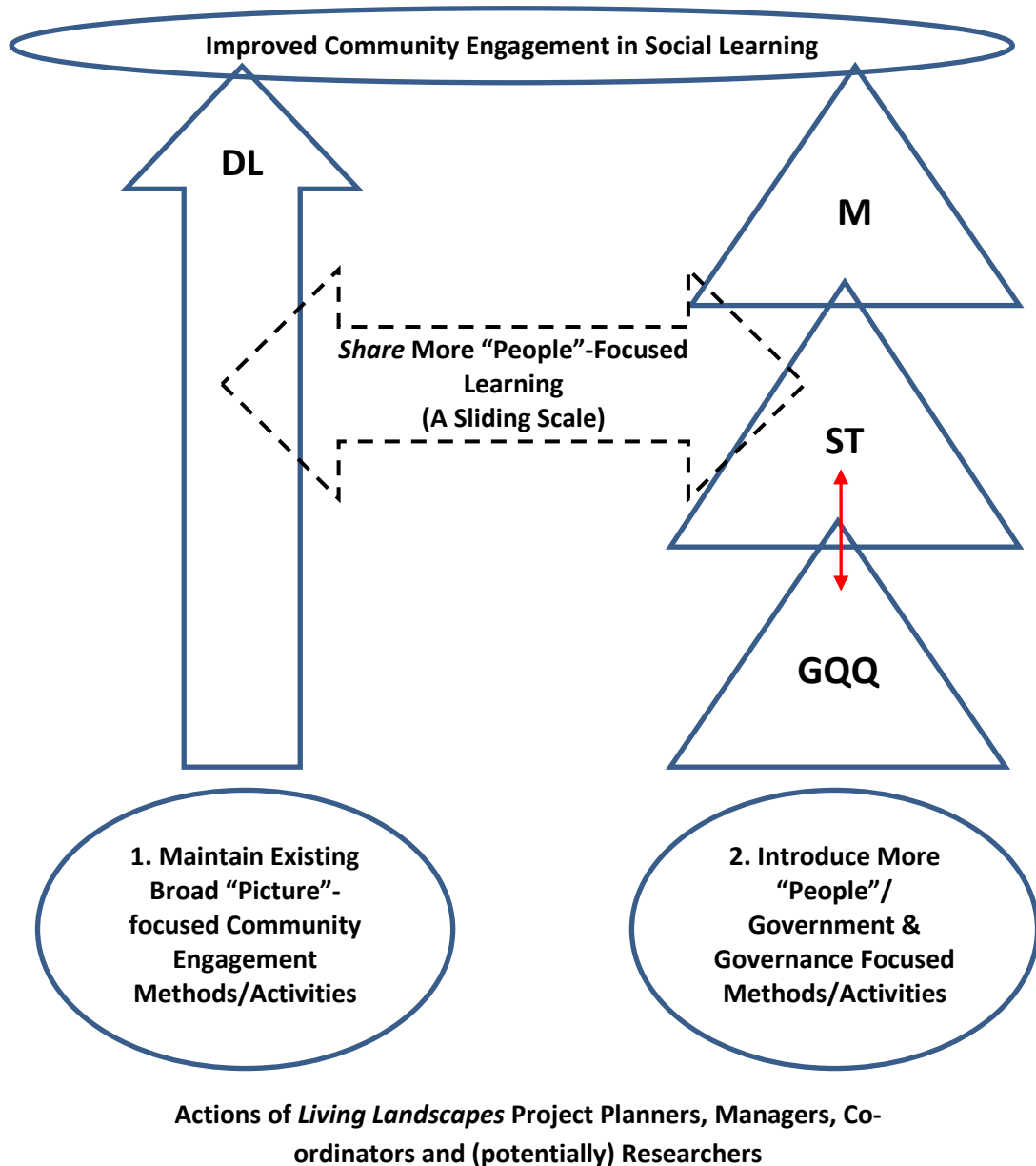
Results and preliminary analyses in Chapter 5 suggest that Gabby Quoi Quoi might be the best group to approach first in the proposed modification of focal species-experiential learning community engagement methods and activities. Gabby Quoi Quoi has had some extensive prior experience in Landcare, especially in partnership-building, and thus might be most ready to fulfil such a role. However, according to Coles and Hammond (2004) of the four farming communities that participated in *Living Landscapes* South Tammin seem to have had the most extensive partnership-building experience in Landcare and in sustainable NRM. Given this group’s more extensive prior experience, then, one could argue that South Tammin should be approached first. Before considering the development and discussion of a schema, it is worth reviewing the Landcare history of South Tammin in this context.

South Tammin’s involvement in Landcare and in sustainable NRM stems from the Shire of Tammin’s long history of community environmental action related to farming that can be traced to the 1940s and 1950s (Coles and Hammond, 2004). Much of this history involved building ‘multiple enduring partnerships’ with, inter alia, government organisations, and becoming involved in associated matters of ‘democratic governance’ (p.1). As a more recent part of this history, the South Tammin sub-catchment group inherited this knowledge and experience. This background may have had considerable bearing on Alcoa’s choice of South Tammin for a demonstration group for its Landcare Project. That is, while Gabby Quoi Quoi and Morbinning also had similar past experiences and (along with Yeelana, South Yoting and West Dale) were also selected as demonstration groups, South Tammin was perhaps Alcoa’s primary choice. Furthermore, being an Alcoa demonstration group, South Tammin, along with Gabby Quoi Quoi and Morbinning, gained access to extra funds and the support of DOA staff and learnt a lot more about their catchments through farm and catchment planning. As such, the South Tammin sub-catchment group in particular was able to further accelerate its prior learning and partnership-building

experiences. The *Living Landscapes* nature conservation planning project managed by Greening Australia, in effect, evolved out of Alcoa's Landcare Project. As part of a natural progression, then, *Living Landscapes* project planners and managers may have made South Tammin a central part of the project's initial trial because of its extensive prior Landcare experience.

Further qualitative analyses of results presented in Chapter 5 provide more insights into the extent of the prior Landcare experiences of Gabby Quoi Quoi and South Tammin. However, these analyses also raise questions about which of these "more experienced" groups might be approached first in the proposed modifications of the focal species-experiential learning community engagement methods and activities. The results and preliminary analyses in Chapter 5 suggest Gabby Quoi Quoi; further qualitative analyses suggest South Tammin. This thesis suggests that either, or both, of these groups might have been approached first to help modify the focal species-experiential learning community engagement methods and activities as suggested in Chapter 5.

To further explain how *Living Landscapes* might have facilitated these modifications, in practice, without compromising the capacity of the existing focal species-experiential learning methods and activities to engage the "less experienced" Dowerin Lakes group, this thesis proposes the following schema.



KEY

DL = Dowerin Lakes ST = South Tammin GQQ = Gabby Quoi Quoi M = Morbinning

Figure 6.1: Schema Augmenting *Living Landscapes'* Existing Methods and Activities for Better Engaging Local Communities in Social Learning for achieving Sustainable NRM

Figure 6.1 depicts a schema which *Living Landscapes'* planners and managers might have developed and applied from the earliest stages of project planning to better utilise the differential learning experiences of its four participant sub-catchment groups. Guided by relevant planners and managers (and potentially researchers; see Chapter 7; Appendix 6), it depicts how the four participant sub-catchment groups might have become involved in

modifying/strengthening the existing focal species-experiential learning (“Picture”-focused) community engagement methods and activities to make them equally “People”-focused. The idea, then, is not to replace these successful visually-oriented hands-on methods/activities. (The schema thus acknowledges the power of “Picture”-focused learning, as a “spark”, for helping engage all four participant sub-catchment groups, but especially the “less experienced” Dowerin Lakes group in social learning for achieving sustainable NRM). Figure 6.1 thus depicts a schema that *Living Landscapes*’ planners and managers (and researchers) might have developed and utilised to help better engage participant communities in social learning for achieving sustainable NRM; for helping them better to: (1) address the issues of “containment” reported in Chapter 5, (2) scale-up community engagement/social learning for more effective sustainable NRM policymaking in Australia for (3) more effective historical-geographical developments in this area at a global level. However, before further explaining how this schema might have worked in practice it is important to consider the following caveat.

While this thesis suggests that *Living Landscapes* planners and managers might have best approached the Gabby Quoi Quoi and/or South Tammin groups first to take a lead in further developing focal species-experiential learning methods and activities (see the red two-way arrow in the diagram), in practice such decisions would be finalised in consultation with all four groups. (NB: The “sliding scale” in the diagram is designed to indicate such flexibility; explained further below). Consultations of this nature are most important. If the “less experienced” sub-catchments groups (in this case Dowerin Lakes) were not consulted in this way, group members might feel that they have been co-opted after the fact (*post hoc*). Omitting this consultation phase would most likely lead to these groups feeling more disempowered. This runs contrary to what the proposed schema seeks to achieve. As such, this thesis proposes that the leadership role of the “more experienced” Gabby Quoi Quoi and South Tammin groups (or, most likely, a few willing members within these groups) in developing and implementing the proposed schema would not have been top-down. Rather, their positions of leadership would have been negotiated as part of a democratic process and would have been defined more in terms of facilitation and/or coordination than instruction.

The following steps read in conjunction with Figure 6.1 explain why and how *Living Landscapes* project planners and managers (and researchers) might have developed and implemented this schema in practice:

1. Gabby Quoi Quoi (GQQ)

Living Landscapes planners and managers might have approached the Gabby Quoi Quoi sub-catchment group first to become lead facilitators or coordinators in strengthening existing “Picture”-focused focal species-experiential learning community engagement methods and activities to help better engage all four participant groups in learning equally well about “People”/governance. The *prima facie* evidence for this has already been discussed.

As such, Gabby Quoi Quoi sub-catchment group members might then have felt more valued as their prior experiences and expertise in “People”/“Government” and governance in Landcare was both recognised and utilised by *Living Landscapes* planners and managers. Gabby Quoi Quoi farmers might then have seen *Living Landscapes* less in terms of a project ‘filling a void when the Ag Department (sic) was unable to continue’ (Gabby Quoi Quoi farmer, personal communication), and more as a project that was helping them to develop the necessary skills for continuing to engage in Landcare and in sustainable NRM on a more independent basis.

The Gabby Quoi Quoi sub-catchment weighted average for the “People”/“Government” aspect of social learning might then have been “very high”. These results might then have contributed significantly towards further improving *Living Landscapes*’ “high” overall project weighted average. Gabby Quoi Quoi are thus depicted as “step one” in this proposed schema (Figure 6.1).

2. South Tammin (ST)

Given South Tammin’s history and prior extensive experience in ‘democratic governance’ in Landcare/NRM, *Living Landscapes* project planners and managers might have also approached this group first to achieve the same aims as those described above. The *prima facie* evidence for this has also been discussed. So what might have transpired in practice as a result of approaching South Tammin first?

South Tammin farmers whose lands did not adjoin natural bushland appeared least pleased with *Living Landscapes*. If “more experienced” South Tammin members were approached first to help strengthen “Picture”-focused community engagement methods/activities (to make them equally “People”-focused) then ways might have been found to better engage these farmers. These farmers might have been better helped to understand the underlying principles of *Living Landscapes*, and *Living Landscapes* planners and managers might have better understood the position of these farmers. Moreover, all South Tammin farmers might then have felt that their prior experiences and expertise were being valued even more by *Living Landscapes* project planners and managers. If this had taken place then the South Tammin sub-catchment weighted averages for “People”/“Government” might also have been “very high”, contributing similarly to improving the *Living Landscapes* project overall weighted average.

South Tammin is thus depicted as “step two” in this proposed schema (but, for reasons already stipulated the position of this group is interchangeable with Gabby Quoi Quoi and “step one”).

3. Morbinning M

No follow-up interview data were collected for M. However, M’s weighted averages were often comparable with South Tammin and Gabby Quoi Quoi (see Tables in Chapter 5), and Morbinning was also an Alcoa demonstration group. Given these similarities, if *Living Landscapes* planners and managers had also approached its members in the ways suggested above results may have been similarly improved. Morbinning is thus depicted as a “third step” in the proposed schema.

4. Dowerin Lakes (DL)

The schema also depicts the three “more experienced” groups discussing such community engagement/social learning improvements with the “less experienced” Dowerin Lakes group members. For reasons already stated, these discussions must also provide Dowerin Lakes sub-catchment groups members with equal opportunity to say when, where, how, why and, indeed, who to involve in strengthening these Picture-focused community engagement methods and activities. The Dowerin Lakes sub-catchment group must also be afforded opportunities to utilise and develop their prior knowledge, understanding, skills and experiences in Landcare.

Dowerin Lakes is thus depicted in the proposed schema not as a “fourth step”, where group members might have felt co-opted *post hoc*, but as participants in an ongoing process of negotiation with Gabby Quoi Quoi, South Tammin and Morbinning. (The two-way sliding scale depicts such participation.) So while the three “more experienced” groups (Gabby Quoi Quoi and/or South Tammin in particular) might have been approached first by *Living Landscapes’* planners and managers — to “kick start” the improved community engagement process — in this schema they then become facilitators or coordinators in and of a much more inclusive process.

Again, this might have helped contribute towards improving the Dowerin Lakes sub-catchment weighted average for “People” and hence the *Living Landscapes* project overall weighted average.

In summary, then, Figure 6.1 shows how *Living Landscapes* project planners and managers might have better utilised differential learning experiences locally — to address the issues of “containment” discussed in Chapter 5, help “scale-up” community engagement/social learning for achieving more sustainable NRM policymaking in Australia and historically/geographically (Chapters 2 and 3).

Figure 6.1, therefore, is a schema that *Living Landscapes’* planners and managers might have developed and utilised to help local participant communities develop the levels of autonomy necessary for engaging more substantively in social learning for achieving these sustainability goals: Smith and Penter (2006) show that *Living Landscapes* can, ‘build understanding and awareness of issues, build enthusiasm for change, provide technical

advice, assist in securing financial resources, build confidence and facilitate community planning and action’, and, ‘can even encourage some degree of self-regulation if a community comes to the realisation that certain actions are contrary to achieving their mission and agree that those activities should not occur’ (p. 19). Perhaps this schema might have assisted *Living Landscapes* project planners and managers in helping local participant communities to come to such realisations, thus further building their capacities for self-regulation. This thesis also proposes that such a schema might have been used similarly in other local community engagement projects/programs to help their participant communities begin to influence sustainable NRM policy settings.

In this vein, comparable urban case study results serve to support the development of a similar schema that might have been used in the *SERCUL/Perth Region NRM* cooperative management-based context. These results and outcomes are discussed next.

6.2 BETTER EXPLOITING DIFFERENTIAL LEARNING LOCALLY in the URBAN SERCUL/PERTH REGION NRM PROGRAM

Like Table 6.1, Tables 6.2 and 6.3 also summarise the most relevant recorded comments — comments that were made by the *BCCG* and the *TRCG* members during the discussions that followed initial quantitative data collection. These results suggest that, like their rural counterparts, “People”/Government issues were a major concern for these local communities. Table 6.2 summarises *BCCG* comments.

Table 6.2: Examples of BCCG Main Concerns: Summaries of Relevant Recorded Interview Comments

STATE GOVERNMENT AGENCIES	PERTH REGION NRM*
<p>Change from a Local to a Regional NRM Approach</p> <ul style="list-style-type: none"> • <i>Swan River Trust (SRT), Department of the Environment (DOE), Department of Conservation and Land Management (CALM), Department of Water (DOW) and the Swan Catchment Council (SCC), all caught up in a storm of change in NRM management.</i> • <i>Big turnover of agency staff; in the last 2-3 years there have been more short-term contracts.</i> <p>Loss of Once Highly Committed Volunteers</p> <ul style="list-style-type: none"> • <i>State government taking control of volunteers' local environment (their 'patch') without consulting them.</i> • <i>Long-term cost of this takeover extensive. For example, in managing blackberry, volunteers once contributed 4000 hrs/year. Since this 'takeover' we have struggled to manage that site; it has cost us and the City of Canning \$1000s per year in weed management that was once done by volunteers</i> • <i>Governments not understanding feelings in local communities about such issues.</i> <p>Less Effective Sharing of Knowledge and Understanding</p> <ul style="list-style-type: none"> • <i>Universities and TAFE using local community organisations less as a valuable training ground for NRM students.</i> • <i>Once qualified, students go straight to into the bureaucracies. They can still make a difference, but are consumed by bureaucracy.</i> • <i>System not conducive to helping these new staff to achieve most relevant on ground outputs.</i> 	<p>Disappointment</p> <ul style="list-style-type: none"> • <i>Failure of Perth Region NRM to attend local community meetings.</i> • <i>Failure of Perth Region NRM to consult with local communities.</i> • <i>Appear disinterested in the local community and the ways it's set up.</i>

**Swan Catchment Council (SCC) at the time of data collection*

Table 6.2 suggests, firstly, that BCCG interviewees felt that as a consequence of the broader changes to Landcare and NRM in Australia, State government agencies were prevented

from doing their job: that increased levels of bureaucracy and associated wrangling consumed personnel who were formerly deployed to help local community groups, like the *BCCG*, to engage in Landcare and sustainable NRM projects and programs. Table 6.2 suggests, secondly, that *BCCG* interviewees felt that *Perth Region NRM* failed to explain these changes to them, and, as such, also failed to assist the *BCCG* adapt to them. Lastly, Table 6.2 suggests that a major concern for the *BCCG* was not so much the regional NRM policies or strategies *per se*, but the ways in which they were implemented and communicated. The concerns of the *BCCG* interviewees appear very similar to those of their rural counterparts (Table 6.1). Table 6.3 suggests that *TRCG* members may have shared similar concerns about these institutions and processes. Significantly for this thesis, however, the “more experienced” *TRCG* also discussed possible solutions.

Table 6.3: Examples of TRCG Main Concerns: Summaries of Relevant Recorded Interview Comments

DISCUSSING the PROBLEM

- **Disappointment**

Their job [Perth Region NRM] was to get an overarching view of the landscape-scale changes and then to roll out a plan to achieve them that involved all stakeholders. They haven't done that; they've compartmentalised and focused on specific areas; cooperation between areas is missing. Action does not match rhetoric.

- **Priority Funding**

SERCUL at a sub-regional level get money now; smaller groups, like the TRCG, are bypassed. Because of the ways in which NRM has changed, the TRCG was 'leap-frogged'.

- **Recognition of Difficulties**

Only a certain amount of money to spread over a region; not one person's fault. Swan is small compared to other regions (e.g. SW Region and in eastern states); then you've got all the different local groups. So you could do a couple of things well, but a lot of other things get brushed over. Not enough money in the bucket to effectively undertake Regional NRM.

- **Better Distribution of Monies/Better Prioritise**

*Go to local co-ordinators (e.g. BCCG TRCG, SERCUL, other **sub-regions**) and say this is what we need doing, and then help make it happen.*

- **How to Achieve This (?)**

What meaningful work should be done? What are the best things to do to preserve the environment? Need to be agreeable on this; doesn't seem that difficult, but in practice it is!

DISCUSSING a SOLUTION

- **Important Exchanges of Information**

Nothing comes without knowledge and experience...but will need more assistance with this process.

This is all well and good, but on a larger scale, where does the direction coming from? Who drives this process? Who do the groups get direction from? How do you accumulate the knowledge? How do you do it? There are different levels of knowledge, varied groups! So someone somewhere has to handle this well. We need information about what best needs to be done otherwise it's a waste of time and effort. I am curious about how to fit in with other forces; for example, the [regional] councils are doing a good job in their own right, but how can you coordinate their work with that of others...so that it all comes together well; and helps people to feel good!

- **Directions from Land Managers (Local and State Governments?)**

They can set an agenda, but then it needs to be discussed who is doing what and how/what is the best way forward. Yeah, go for it, but make sure you know what you're doing.

Who implements? Local government? TRCG? SERCUL? Who's setting the agenda? In assessment, who sets the questions? What are the questions? Land managers doing all this? Land managers have a say in what happens on their land. This has to be thrashed out otherwise it could come to nothing if you haven't got the right people there and people who want things to happen.

Table 6.3 suggests that *TRCG* members agree with *BCCG* members, especially concerning *Perth Region NRM* and their lack of consultation with local community groups concerning the broader changes to NRM and how best to address these changes. The *TRCG* suggested that one way of addressing the shortcoming would be for all parties to focus on facilitating an exchange of information between each other. Indeed, the *TRCG* is already trying to achieve this in practice. Table 6.3 suggests that the *TRCG* seems quite willing, ready and able to help its members to engage more substantively in social learning for achieving sustainable NRM.

The initial urban and rural survey results and the associated follow-up comments, then, appear quite similar. This similarity provides further *prima facie* evidence that can help support the community engagement/social learning “containment” argument in Chapter 5. Perhaps in this urban setting regional NRM planners and managers, in the absence of any specific sustainable NRM policies for guiding community engagement in social learning for achieving sustainable NRM, also assumed that their existing “Picture”-focused community engagement methods and activities would engage all parties equally well in such core learning. That as such they, too, did not recognise and utilise to their greater advantage the differential learning experiences that exist locally. Similarities appear most notable between the “less experienced” *BCCG* and Dowerin Lakes sub-catchment groups, and between the “more experienced” *TRCG* and the Gabby Quoi Quoi and/or South Tammin sub-catchment groups. Indeed, the differences between the results for the “less experienced” *BCCG* and the “more experienced” *TRCG* in the urban setting are much more clearly defined than for their rural counterparts. These results are discussed in the following subsection in terms of the schema already proposed (Section 6.1), and in terms of the broader Australian and global sustainable NRM contexts.

6.2.1 Further Evidence for Developing a Schema for More Substantive Local Community Engagement in Social Learning for achieving Sustainable NRM

Most significant are the similarities between the “less experienced” urban *BCCG* and the “more experienced” rural Dowerin Lakes sub-catchment groups’ perceptions of how well they thought they were engaged in social learning locally. For example, corresponding weighted averages for the *BCCG* and Dowerin Lakes for the relevant social learning aspects are, comparing respectively Tables 5.15 and 5.3: “Picture” (*BCCG* 94%; Dowerin Lakes 95%); “Wildlife” (*BCCG* 87%; Dowerin Lakes 80%); “Land” (*BCCG* 85%; Dowerin Lakes 75%); and, “People” (*BCCG* 73%; Dowerin Lakes 68%). The corresponding weighted averages for the

“more experienced” *TRCG* for these social learning aspects are also comparable to those of the three “more experienced” *Living Landscapes* sub-catchment groups (compare also these tables). Moreover, the corresponding *TRCG*, South Tammin and Gabby Quoi Quoi sub-catchment weighted averages for “People” indicate that these urban and rural local communities believed that they received least help from their respective initiatives to engage in this social learning aspect locally (compare Tables 5.15 with Tables 5.3 and 5.4).

These similarities are significant because the *BCCG*, like the Dowerin Lakes sub-catchment group, had less extensive prior partnership-building knowledge and expertise in Landcare and sustainable NRM. In this sense, the *BCCG*, like the Dowerin Lakes sub-catchment group, is comparatively new to such community engagement programs/projects. There was, perhaps, a dearth of partnership-building knowledge and experience in the *BCCG* because the group was born out of deep concern about local environmental degradation — the pollution of local waterways. And, arguably, a primary motivation for the Dowerin Lakes sub-catchment group to become involved in *Living Landscapes* was the community’s concerns over anthropogenic salinity. This human-made problem is serving to compound problems associated with managing naturally saline soils that are extensive in this area. The formation of the *BCCG*, like that of the Dowerin Lakes sub-catchment group, then, was very much the result of a socially-driven, bottom-up approach to community engagement in Landcare and NRM. Understandably, being thus focused these “less experienced” groups perhaps had less desire to engage in the more managerial partnership-building aspects of Landcare and sustainable NRM, and perhaps also felt less confident about so doing. The origins of the *BCCG* and the Dowerin Lakes sub-catchment group, therefore, may help explain why there appears to be a dearth of such knowledge and expertise in these participant sub-catchment groups. The *BCCG* Chair, however, thinks that members of this group do have the capacity to take more of a lead in developing their partnership-building knowledge and expertise.

On the other hand, the formation of the *TRCG*, like that of the South Tammin was more strategically-driven and top-down. The *TRCG* was formed as a result of a merger of the pre-existing Belmont-Victoria Park Catchment Group (1998) and the Canning Plain Catchment Group (2000). As such, many members of the *TRCG* would have had much more direct and extensive prior Landcare/NRM experience especially with government and quasi-government organisations and agencies at all levels, and thus with the processes of

governance as applied to Landcare and NRM. This is similar to the experiences of many members of the Gabby Quoi Quoi and South Tammin sub-catchment groups whose knowledge, understanding, skills and experience, though community environmental action-focused, evolved out of prior associations with governing bodies such as the Shire of Tammin. That the *TRCG* discussed not only community engagement/social learning/governance related issues but also possibilities for addressing them (Table 6.3) suggests perhaps that this group felt ready, willing and able to engage more directly with regional planners and managers, while the *BCCG* perhaps felt less confident. These similarities, between the *BCCG* and the Dowerin Lakes sub-catchment group, and between the *TRCG* and the GQQ and South Tammin sub-catchment groups, lend further support to the argument in this chapter, that the “more experienced” groups might best be approached first to help strengthen the “Picture”-focused community engagement methods and activities. Moreover, subsequent results for urban and rural participant sub-catchment groups (i.e. with respect to the help they received in sharing social learning knowledge locally and beyond; their views about the capacities of the respective initiatives to maintain such community engagement over time; and, how well these initiatives compared with other sources of similar learning) are all very similar.

The underpinning reasons for these similar results, then, might also be the same. In the context of the wider cooperative management-based regional NRM program, local community leaders (e.g. at *SERCUL* and in the *BCCG* and *TRCG*), in the absence of a specific community engagement/social learning NRM policy, might, albeit unintentionally, have made too many assumptions about the capacity of their existing methods and activities to engage all sub-catchment groups equally well in social learning for achieving sustainable NRM. Local community leaders might then have missed opportunities to better utilise the differential learning experiences locally. For example, they might have failed to recognise that the *TRCG* — like the Gabby Quoi Quoi and South Tammin sub-catchment groups — was more ready to engage in “People”/government and governance-focused social learning (Table 6.3). Importantly, while still very much local community oriented and focused, the *TRCG*’s “readiness” may also have had much to do with its formation via more strategically-driven top-down processes over a relatively longer period of time. (As such, its members would have had more extensive direct prior experience in government and governance.) Given these similarities, this thesis argues that the schema suggested for use in the rural

Living Landscapes project might also be applied in the context of urban Perth Region NRM/SERCUL program (Figure 6.2).

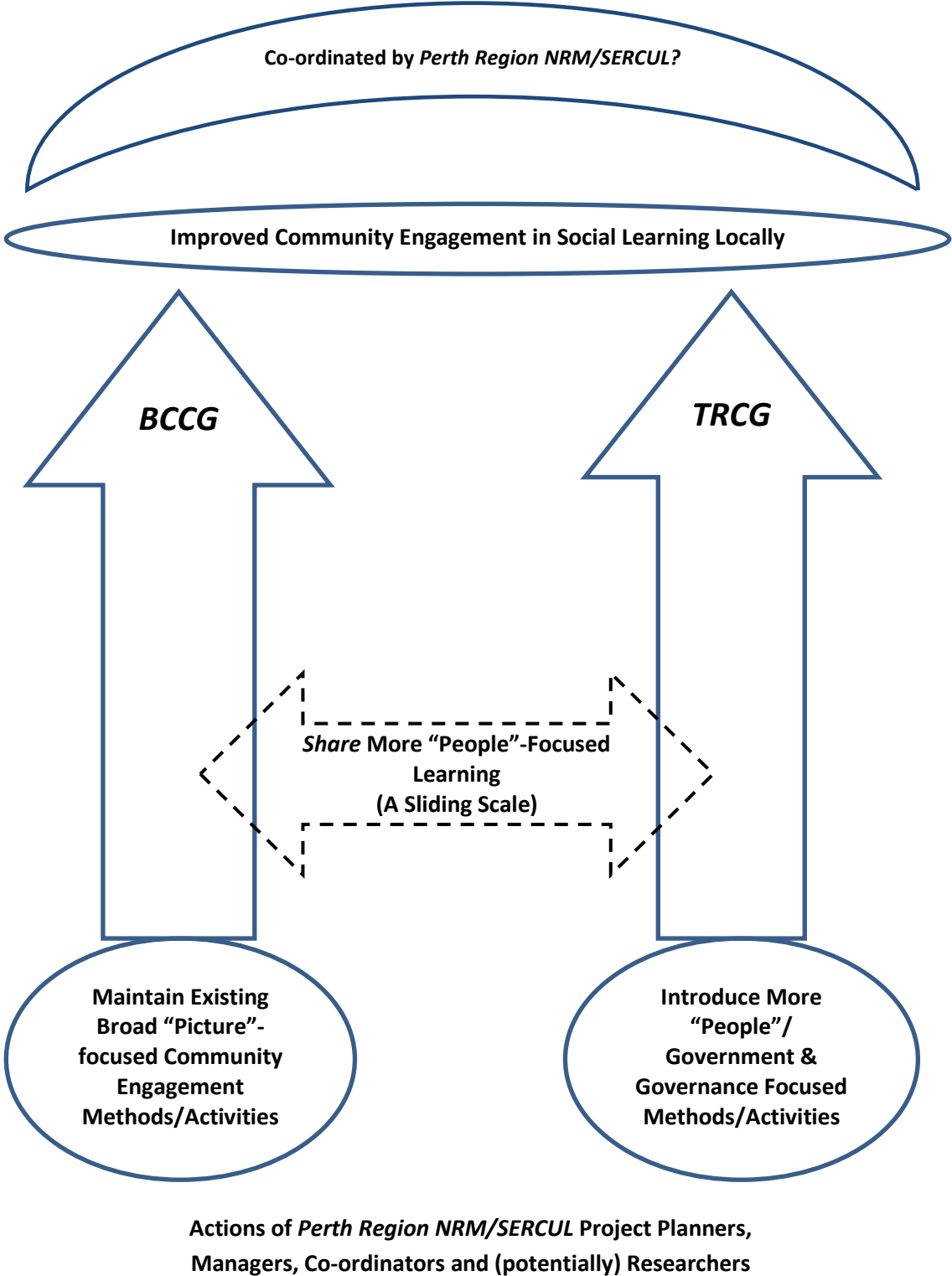


Figure 6.2: Schema Augmenting Perth Region NRM’s/SERCUL’s Existing Methods/Activities for Better Engaging Local Communities in ‘Social Learning for Sustainability’

Figure 6.2 illustrates how the proposed rural schema might be applied in an urban context. It depicts how the “more experienced” *TRCG* (in similar democratic fashion to the Gabby Quoi Quoi and/or South Tammin sub-catchment groups) might be approached first to help strengthen urban “Picture”-focused community engagement methods and activities. It thus depicts how the *TRCG* and the *BCCG* might collaborate to address the “containment” issues discussed in Chapter 5; to better help scale-up such community engagement/social learning for achieving more sustainable NRM policymaking in Australia. However, Figure 6.2 also suggests that perhaps the development and implementation of such a schema might best be coordinated at the regional catchment council level.

While still very much locally focused and requiring consultations with the *TRCG* and the *BCCG*, this schema might be coordinated at the *Perth Region NRM* catchment council level with the assistance and advice of sub-regional groups like *SERCUL*. The reasons for this are, firstly, that these local urban sub-catchment groups are inherently a part of the wider *Perth Region NRM* program. Secondly, these groups (in particular group leaders, given their many commitments) may well without such help and guidance find the development and implementation of such schema far too time and energy consuming. This is because they do not have the necessary resources for such ongoing development, implementation and coordination (Chair of the *BCCG* and regional coordinator of *SERCUL*, personal communication).

Figure 6.2 suggests that such a schema be coordinated through *Perth Region NRM*. Sub-regional groups, though, like *SERCUL*, must also be involved in this process. Of course, regional catchment councils are similarly constrained in terms of their time and available resources. This thesis therefore suggests the development of the proposed collaborative monitoring tool to help *Perth Region NRM* in conjunction with *SERCUL* (and possibly other regional catchment councils) to implement such a schema in practice.

6.3 SUMMARY

This chapter suggests that both rural and urban local community engagement projects and programs had similar issues when it came to achieving their ultimate goals of extending ‘common understanding’ and engaging their local communities in social learning for achieving sustainable NRM. It suggests that given the dearth of specific sustainable NRM community engagement and social learning policies in Australia, the respective planners

and managers were less able to identify, discuss and understand from the outset the differential learning experiences of their participant sub-catchment groups. This chapter then further argued that, as a consequence of not doing so early in the piece, planners and managers were also less able to empower these sub-catchment groups. Opportunities were missed, then, to help provide the sub-catchment groups with the levels of autonomy necessary for them to continue to engage in such core learning, more independently, within their respective regions or catchments. The chapter then proposed a schema, which, with the guidance of the right sustainable NRM policies and strategies, might have helped planners and managers to address these interrelated community engagement/social learning/empowerment issues in practice. As such, this schema might then have helped rural and urban community engagement initiatives better contribute towards addressing the “containment” issues discussed in Chapter 5; to help scale up such learning to affect sustainable NRM policymaking in Australia and historically/globally. The proposed collaborative monitoring tool might help achieve this in practice. Chapter 7 is a feasibility study of how such a tool, which draws on the methodological and community engagement/social learning outcomes previously discussed in this thesis, can be developed and implemented in practice.

CHAPTER 7

A Tool for Monitoring Community Engagement in Social Learning for Achieving Sustainable NRM: A Feasibility Study

This chapter discusses the feasibility of the collaborative monitoring tool proposed and developed in this thesis (see Chapters 1, 4 and 5 and Appendix 6). This chapter discusses how the tool might be applied to facilitate the community engagement/social learning issues examined in this thesis (Chapters 5 and 6) were the sustainable NRM policy environment more favourable in Australia (Chapters 2 and 3). This chapter draws on qualitative data collected during follow-up interviews with the regional catchment council representative (Chapter 4; Appendix 5) and uses a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis. A SWOT analysis involving groups of stakeholders is often used in strategic planning to determine the development of a product or business. However, the method can be used in other situations including in academia; for example, in viability or feasibility studies. In this context, definite “yes” or “no” answers are not required; a SWOT analysis is used instead to analyse problem situations and to propose solutions or plans for doing something about them. For example, SWOT analyses/feasibility studies can help to determine whether a proposed plan or solution is practically or technically possible in any given broader social, economic, political, cultural and/or environmental context, and to give reasons for any recommendations (e.g. see Robins and Dovers 2007). A SWOT analysis/feasibility study is thus suitable for use in this chapter to achieve the final thesis objective.

In a thesis of this length, the chapter discusses only the most important, or major, strengths, weakness, opportunities and threats that might affect the ongoing implementation and development of the proposed collaborative monitoring tool. Sections 7.1 and 7.2 discuss, respectively, its likely major strengths and opportunities; Sections 7.3 and 7.4 discuss, respectively, its likely major weakness and threats. Section 7.5 summarises this feasibility study. It does so in terms of the contributions that such a monitoring tool

might make towards addressing the broader community engagement, social learning and sustainability issues both in Australian sustainable NRM and worldwide.

7.1 STRENGTH: COMPLYING WITH and ENHANCING PROGRAM LOGIC

Program Logic is a contemporary programme used by regional catchment councils to monitor and evaluate local community engagement projects and programs. This thesis argues that the main strength of the proposed collaborative monitoring tool lies in its potential to comply with and enhance Program Logic. This thesis argues that with further development the proposed monitoring tool's capacity to quantify community engagement in social learning for achieving sustainable NRM might be enhanced to track what has thus far been neglected in Program Logic: the underlying and sometimes misplaced assumptions that can be made, albeit unwittingly, during the initial planning, management and implementation of local community-focused sustainable NRM projects and/or programs. Improving the monitoring tool's capacity to enable relevant planners, managers and/or coordinators to engage their local participant communities in learning more about "People"/matters of governance is especially relevant (Chapters 5 and 6). The following section begins with a broad overview of Program Logic, and indicates where the proposed collaborative monitoring tool might be incorporated into the program cycle to strengthen it.

7.1.1: Program Logic

Program Logic is an approach to program planning that has been applied since the 1970s. It has been applied in many disciplines but has been adapted more recently for use in sustainable NRM. Figure 7.1 shows how Program Logic is applied in this context. It also shows where the proposed collaborative monitoring tool might fit in to the Program Logic cycle to improve its capacity for tracking assumptions.

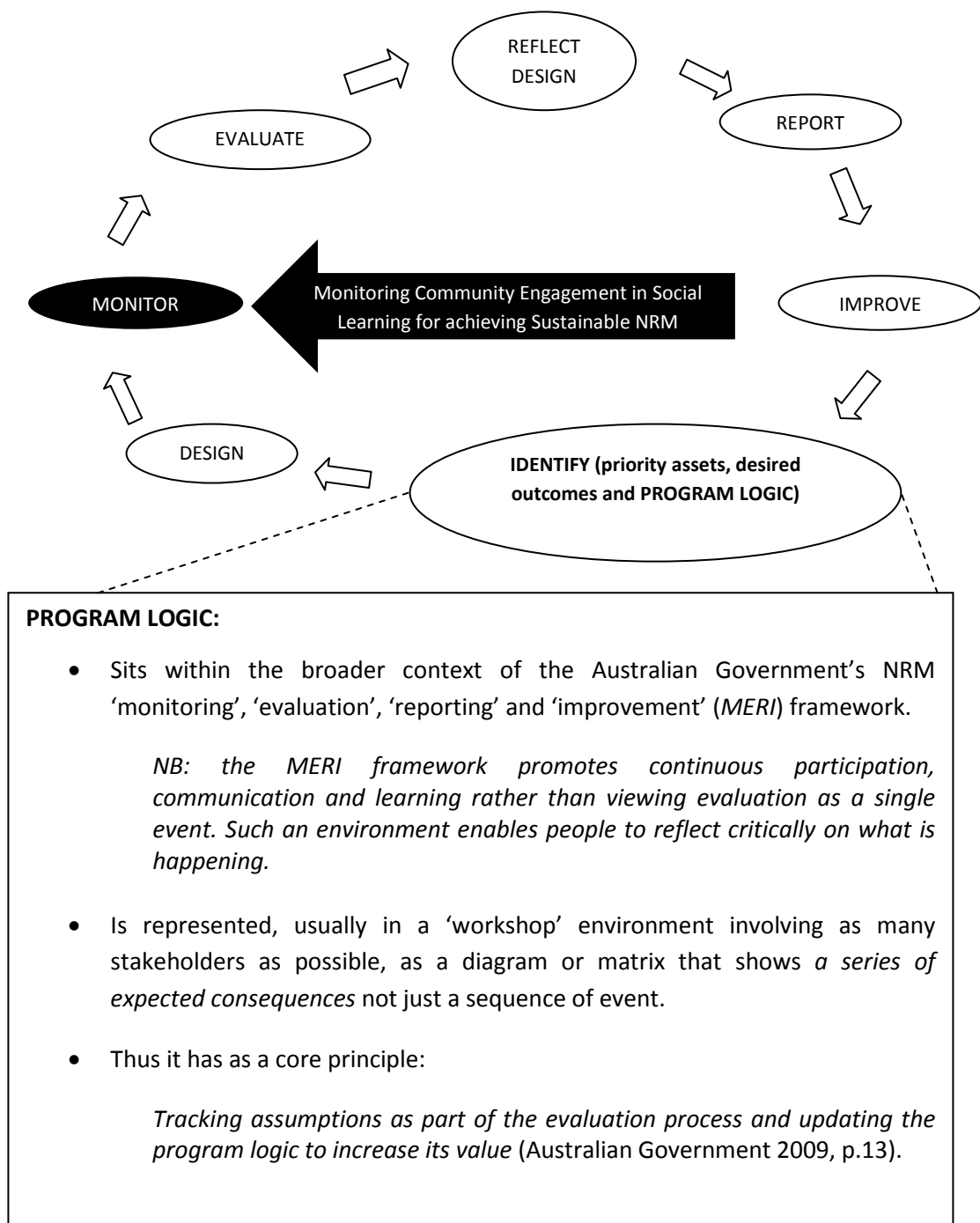


Figure 7.1: Program Logic in the Context of the Australian Government’s NRM *MERI* Framework

Source: Adapted from Australian Government (2009, pp.7-8)

The following subsection explains these assumptions, and then, based on the thesis results and analyses presented in Chapters 5 and 6, explains how the proposed collaborative monitoring tool might be used in a more favourable policy environment to track such assumptions and, thereby, strengthen Program Logic.

7.1.2: Tracking Assumptions to Strengthen Program Logic

In Program Logic, assumptions are divided into two broad categories: assumptions about the external influences on NRM program and/or project planning and the internal cause-and-effect logic of a program and/or project. For example, with respect to making assumptions about external influences:

Improving water quality might be based on an assumption of continued best practice water management by land managers. But the dam could silt up from poor environmental management or the water could be diverted to other users. By identifying assumptions and then what could go wrong, program managers and staff can accept the ones that are outside their direct control and discuss what they can do to reduce external risks (Australian Government 2009, p.31).

With respect to making assumptions about the internal cause-and-effect logic of a program and/or project:

A program may invest in a project to recruit volunteers to plant trees as a strategy to revegetate a degraded landscape. This approach assumes that enough people with skills in planting the right tree species in the right places will join and continue to work voluntarily until there are enough trees in enough places to achieve better landscape connectivity and biodiversity corridors. But will there be enough volunteers with the required capacity who stay on and will all the trees survive? Will the trees reach maturity and will native fauna return to the area? These are examples of internal logic assumptions that lie behind the simple statement, 'Planting trees results in biodiversity' (Australian Government 2009, p.32).

Assumptions concerning external influences on a project, then, are concerned primarily with separating the NRM issues that can clearly be addressed by project participants, from those issues beyond the control of project participants that they are powerless to address. These are usually the more discernible biophysical, technical and/or planning issues. It is, therefore, perhaps easier to track assumptions about external influences than assumptions concerning the internal cause-and-effect logic in a program or project. Tracking assumptions about the internal cause-and-effect logic of a program or project is about tracking (hereafter monitoring) much more complex human thoughts and feelings (e.g. the capacity, or the motivation, of volunteers to continue), and, of course, the biophysical issues beyond our control — like knowing, for certain, if all the trees will survive. Monitoring assumptions about the internal cause-and-effect logic in a program or project, then, is concerned with the more complex interrelationships between human and non-human nature (social-ecological complexity). Monitoring assumptions about a program or project's capacity to change peoples' attitudes and behaviours towards the natural environment is another process that is fraught with uncertainty. In the above example, program or project managers might also recruit volunteers in tree planting in an endeavour

to develop more positive attitudes and behaviours among them towards managing the natural environment. Such planning, though, would assume again (a) that all volunteers are committed and motivated enough, but also (b) that through tree planting these volunteers will gain a much deeper understanding about the natural environment, and, will therefore adopt more positive attitudes towards the natural environment. This sort of logic is fine in planning when setting out a vision, or an ideal or desired outcome for which to strive. However, in reality, given the complexity of human thoughts and feelings such social-ecological outcomes cannot be assured. Assumptions about attitude change in sustainable NRM, therefore, which clearly involves social learning, is much more difficult to track or monitor. This thesis argues that the collaborative monitoring tool as proposed and developed to a rudimentary level in this thesis (Appendix 6), could, with further development, contribute towards improving Program Logic in this respect.

For example, Chapters 5 and 6 discussed how local project and program planners and managers, despite their best intentions, can still make assumptions about the cause-and-effect logic of such projects and programs during the initial planning and management phases. Results in Chapter 5 highlighted some potential differential learning experiences among local participant communities. Preliminary analyses then suggested that from the outset these differential learning experiences were not identified and utilised well by the respective planners and managers. That, albeit unintentionally, planners and managers assumed too early in the piece that their community engagement methods and activities would be able to engage all participants equally well in social learning for achieving sustainable NRM. The chapter went on to argue that these assumptions (based on internal cause-and-effect logic) served to “contain” such community engagement/social learning locally. Indeed, the Chairs of both regional catchment councils interviewed in this thesis agreed, that despite the advantages of using Program Logic how to track or monitor such internal cause-and-effect logic adequately was (and is still) problematic (see below). Chapter 6 then discussed a schema that planners and managers might develop and apply to address this problem (Chapter 1). This chapter, then, discusses how the proposed collaborative monitoring tool could be applied using Program Logic to highlight and address such complexity, sooner rather than later in the life of a local community project or program (see also Figure 7.1).

7.1.3: Monitoring Community Engagement in Social Learning for Achieving Sustainable NRM in WA: Helping to Solve a Common Problem

The following comments made respectively by the Chairs of the *Perth Region NRM* (then the Swan Catchment Council) and the *Wheatbelt NRM* (then the Avon Catchment Council) suggest that both regional catchment groups share a common problem when it comes to improving such community engagement and, relatedly, capacity-building. Both Chairs acknowledged that these interrelated processes are very difficult to measure in practice, and that, as a consequence, misplaced assumptions were more likely to be made about the capacities of the relevant projects and/or programs to engage communities successfully in what are, essentially, social learning activities (Boxes 7.1 and 7.2).

Box 7.1: Regional Catchment Council Comments on Monitoring Community Engagement, Social Learning and Capacity-Building in Sustainable NRM in WA

Overall, these processes [capacity-building and community engagement] are not monitored; not formally anyway. They are possibly monitored informally via feedback through the reference groups. There is no framework set up to achieve this kind of qualitative monitoring. The new sub-regional reference groups identified above should provide a better framework for monitoring generally though.

The problem is that this type of qualitative monitoring is much harder to achieve, whereas monitoring physical quantities (e.g. the number of plants in the ground) is much easier, routine and straightforward. Sometimes the physical monitoring can get complex but it is doable; frameworks are simple, data storage is easy and information is easier to disseminate. Qualities, like learning, are much harder to measure.

Source: Interview, Chair, Swan Catchment Council/Perth Region NRM (2007)

Box 7.2: Regional Catchment Council Comments on Monitoring Community Engagement: Overlooking Misplaced Assumptions

Although attempts are being made to measure community capacity-building, measuring community engagement is an even bigger problem. This has not been done very well. For example ... no formal surveys have been undertaken that asks what communities need or what their expectations are regarding a particular project prior to its implementation. This baseline data is a must before any measure of community engagement can be attempted.

For example, regarding the soil acidity project, the objective was to find ways of engaging farmers to think more about this particular land management problem. So far only about 10% of farmers have done so. Farmers will think more about new ways of overcoming the locust problem because this is very visible but in comparison only 10% of farmers will think more about soil acidity because, although a problem, it is not as visible.

Assumptions were made prior to commencing this project that farmers will want to engage simply because they understand that soil acidity is a very real problem. This is a huge assumption to make; the visual impact of a particular problem was not taken into account before implementing this project.

Again, this shows how very difficult it is to measure/quantify behaviour change; engaging in a project doesn't always mean that people will change their behaviour.

Source: Interview, Chair, Avon Catchment Council/Wheatbelt NRM (2007)

Making such assumptions about the internal cause-and-effect logic of local community engagement projects and/or programs, therefore, was — and still is under *Caring for Our Country* — a particularly pressing problem in both regions (see in Chapter 3 and in Australian Government 2012). This is an issue, then, that Program Logic did not fully address under *NHT* and has yet to fully address under *Caring for Our Country*. The community engagement/social learning data analysed in Chapter 5 and the associated schema developed in Chapter 6 are used here to demonstrate how the proposed monitoring tool might be applied in the context of Program Logic in order to strengthen it. Figure 7.2 provides a snapshot of the locations of three potential rural community engagement projects/programs for monitoring in the *Wheatbelt NRM* region, and a potential three-way monitoring process facilitated by researchers.

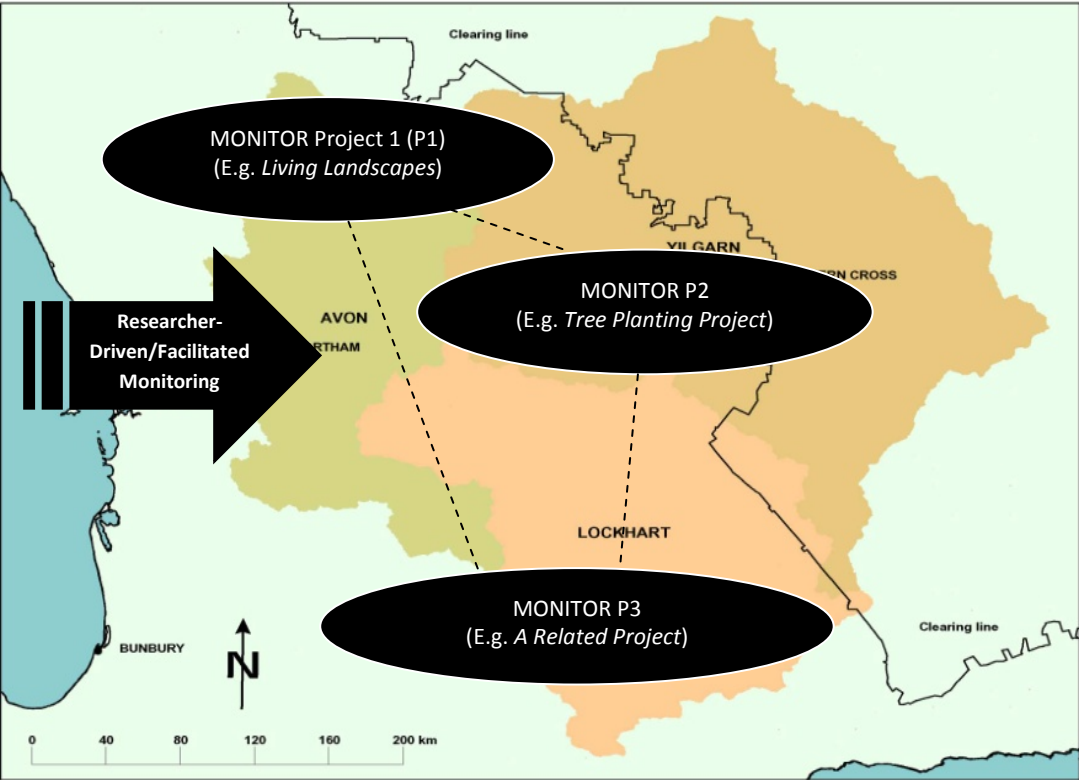


Figure 7.2: Monitoring Community Engagement in Social Learning for Achieving Sustainable NRM via Program Logic in the *Wheatbelt NRM* Region

Source:

http://www.wheatbeltnrm.org.au/resources/Avon_River_Basin_Land_Rresources_02.jpg

Figure 7.2 illustrates three potential adaptive management-based local community engagement projects within the Avon (sub) catchment now under the auspices of

Wheatbelt NRM that might be suitable for such monitoring. One of these projects, for example the *Living Landscapes* nature conservation planning project that has already been examined in this thesis, is located in the Avon sub-region (P1); another example a tree planting project is located in the Yilgarn sub-region (P2); and a third example, a similar local community engagement revegetation project, is located in the Lockhart sub-region (P3). As is evident in Chapter 5 and in Appendix 6, the proposed collaborative monitoring tool has as far as possible in a thesis of this length been standardised to facilitate such comparative monitoring and data analyses at this sub-regional scale. This thesis also suggests, therefore, that such monitoring be driven/facilitated or coordinated by researchers at least initially (see later) at the regional catchment council level (see also Figure 7.2 and Appendix 6). Of course, how this might be achieved in practice would be discussed further while conducting initial trials of the proposed collaborative monitoring tool, but would include the assistance of researchers (Chapter 1; Appendix 6). To give an example, though, let us assume that the collaborative monitoring tool was fully developed and had been applied in this sub-regional context.

With reference to Figure 7.2 let us assume, then, that: (1) *Living Landscapes'* community engagement/social learning data had been collected; (2) results had been analysed; and (3) there has been some discussion about developing a schema for addressing the issues that were raised (P1 in Figure 7.2). In this scenario, then, ideas are already flowing, locally, as a result of such "monitoring", about how one might avoid making too many assumptions about the capacity of popular community engagement initiatives to engage all participants equally well in the future. Now let us assume that the monitoring tool had been applied more widely; to ascertain how well similar projects or programs in the Avon sub-region might have engaged their participant communities in social learning for achieving sustainable NRM; to see: (1) if the *Living Landscapes* findings had been replicated elsewhere in the Avon sub-region; and (2) whether the proposed schema is viable for these projects in these locations (P2+P3 in Figure 7.2). Figure 7.2 thus illustrates how the proposed collaborative monitoring tool (driven/facilitated by researchers?) might be applied/further trialled and developed within the existing Program Logic context - to scale-up (locally "contained") community engagement/social learning to at least the Avon sub-regional level (P1+P2+P3 in Figure 7.2).

However, this thesis also proposes that the collaborative monitoring tool might be further developed to collect similar community engagement/social learning data in and across the Avon, Lockhart and Yilgarn (sub) catchments and beyond. As in the previous map, Figure 7.3 tries to help visualise how the proposed collaborative monitoring tool might be applied at this broader scale.

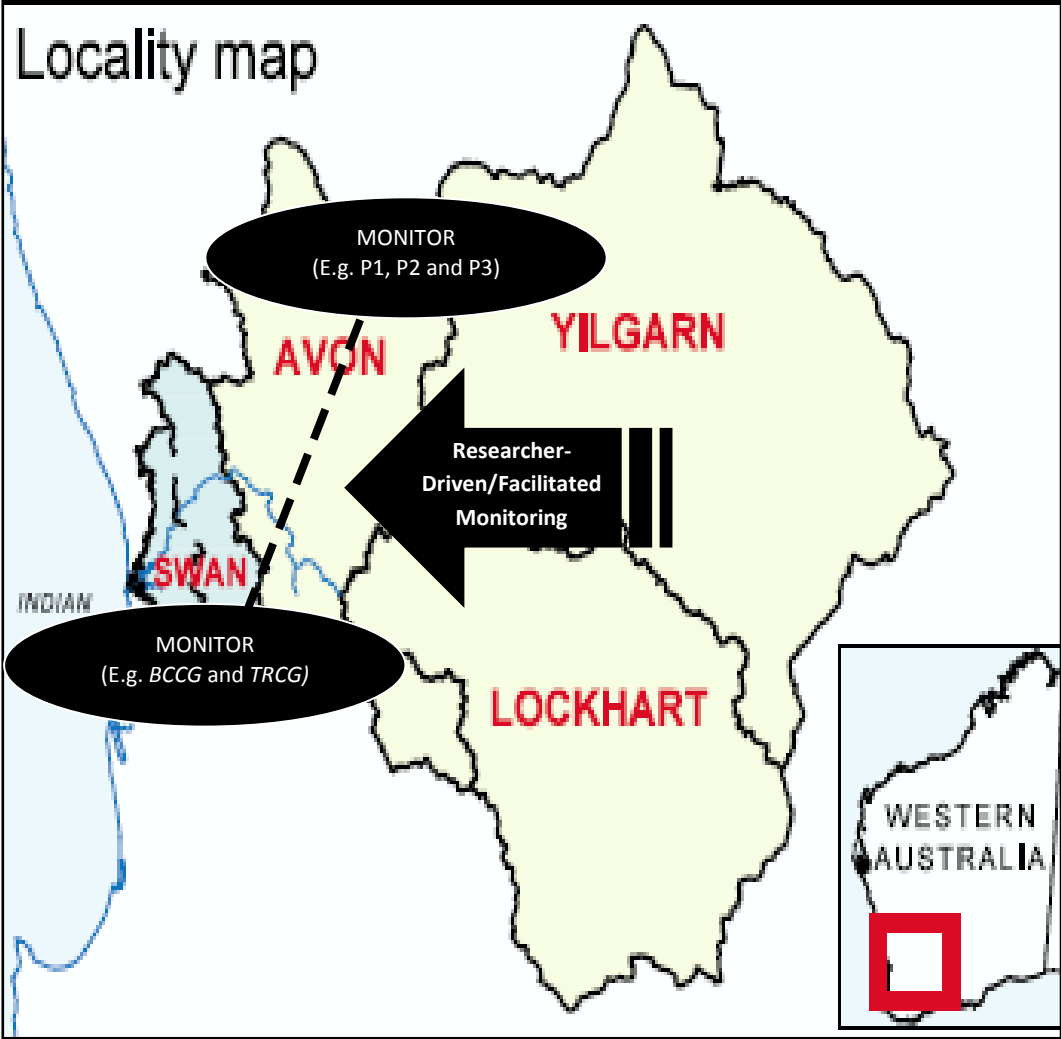


Figure 7.3: Monitoring Community Engagement in Social Learning for achieving Sustainable NRM via Program Logic across Regions in Western Australia

Source: Compiled from Map Data Held at *SERCUL* Main Offices

Figure 7.3 thus helps to visualise how the proposed collaborative monitoring tool might be further applied to collect and discuss both the rural and urban community engagement/social learning data in this thesis. The map in Figure 7.3, then, helps to visualise how the proposed collaborative monitoring tool might be applied to further scale-

up (locally “contained”) community engagement/social learning to the regional catchment council scale, thus further strengthening Program Logic.

A key element of the proposed collaborative monitoring tool in facilitating the scaling up process suggested in this thesis is its potential to “unpack” social learning aspects, in particular to help parties focus better on “People”/matters of governance. The following section discusses this key element of the monitoring tool in a WA regional NRM context.

7.1.4: Potential for the Proposed Collaborative Monitoring Tool to Better Engage Participants in Learning about “People”/Governance

Firstly, it is important to provide some background information. In the *Wheatbelt NRM* region there has been an overreliance on quantitative measures to assess community engagement in the relevant local projects or programs. For example, to measure community engagement in local soil health projects and programs the *Wheatbelt NRM* has relied on ‘tallies’; that is, numbers of:

- Farmers attending workshops
- Farmers in attendance at a soil health field day (e.g. ‘topical tents’ - one tent provided information on soil health; the other (more a field site with a soil pit) demonstrated the benefits of direct seeding and was staffed by the West Australian No Till Farmers Association (WANTFA). Four information sessions were held in each tent/site.)
- Farmers taking up soil testing
- Hectares being managed
- Farmers applying lime
- Farmers interested in salinity tenders (comparisons were then made between numbers applying and the amount of funding available; the numbers applying exceeded the funding available; this ratio was then used to judge the success of this community engagement endeavour)
- Management action reports (e.g. the twelve or thirteen river management plans that have been written over time on the fencing of rivers and foreshores and which show the benefits of long term engagement with communities). Word of mouth was then relied on to promote any positive outcomes contained therein.

Source: Interview, Chair, *Wheatbelt NRM* (2007)

Importantly, attempts were also made to provide more qualitative measures of community engagement in this context. For example, in the ‘topical tents’ while quantifying community engagement in the above terms a project officer also sought farmers’ opinions about the

quality of the questions asked. Results were then aggregated to form part of a general evaluation of community engagement in such local projects and programs using a Jules Pretty typology: broadly, low numbers indicate a 'low level' of motivation among participants to engage in a project; high numbers indicate a 'high level' of motivation, the latter being taken to indicate that communities are very self-motivated and are more likely to interact effectively in a particular project (see Pretty and Ward 2001; and also in Woodhill and Robins 1998). Plotting community engagement on this scale enables organisations to gauge the suitability of projects for investment. Using this framework can help to ensure more effective use of funding (Interview, Chair *Wheatbelt NRM*, 2007). However, while contributing towards improving monitoring and evaluation of community engagement, such processes still rely too heavily on quantitative measures.

Many existing quantitative measures can help guide project and program planning, management and implementation, especially in the biophysical and/or technical sense, but they cannot measure the social cohesion or social inclusion that can arise in a community as a consequence of engaging in these projects and programs (Interview, Chair, *Wheatbelt NRM* 2007). Consequently, they cannot guide and facilitate the development of such underlying qualities, which serve to drive long term project and program success. As such, misplaced assumptions can be made about the capacity of such community engagement projects and programs to succeed in this way (see Boxes 6.1 and 6.2; Chapter 6). This could lead to such complex problem situations being overlooked and masked. In this way, conventional quantitative evaluations might serve in the long term to undermine these projects and programs; they could curtail the invaluable contributions that local communities make towards achieving sustainable NRM. As the Chair also states, 'the benefits of good social cohesion can get lost easily if not effectively integrated into the monitoring and evaluation processes'. There is thus a drive in *Wheatbelt NRM* to place more emphasis on monitoring and evaluating community engagement and capacity-building; to ensure that otherwise very useful biophysical technical and/or planning outcomes do not inadvertently override community engagement outcomes. The Chair fought hard to include this sort of monitoring and evaluation over a three year period (2004-2007). Moreover, she reiterated that 'there must be a specific focus on social monitoring', and, that this notion 'has come out of what has been learnt over the past few years'.

Program Logic, then, is currently helping *Wheatbelt NRM* to develop such qualitative monitoring and evaluation. However, there is still pressure on these regional catchment councils to also quantify such measures. This pressure comes mainly from the Australian government, which still relies on “the numbers” to decide how best to distribute appropriate funding, assistance and/or advice. While the current Australian government’s major NRM program, *Caring for Our Country*, and the associated changes made by the regions (e.g. regional forums; Program Logic) has since *NHT* perhaps improved the situation, such pressure still remains; hence the current Australian government’s focus on developing the *MERI* strategy (Australian Government 2012). The regions, then, must still provide numerically-based evidence to demonstrate the success of sustainable NRM projects in quantitative terms. The central question, then, is how, given these constraints, can the regional catchment councils comply with such monitoring and evaluation demands when monitoring community engagement in social learning for achieving sustainable NRM?

This thesis suggests that the proposed collaborative monitoring tool, incorporated into and helping to improve Program Logic in the ways suggested above, might form the basis of a solution to this dilemma for the regions and local communities.

Key here is the proposed monitoring tool’s capacity to help regional catchment councils and their local participant communities to focus on matters of governance. Of primary significance are the tool’s “social learning aspects” (Chapter 5 and Appendix 6). By quantifying in this way how well a relevant local adaptive and/or co-management-based community engagement project or program has helped to engage participants in each social learning aspect, one might also instigate more substantive discussions about how well a project or program has helped the participant community to develop the capacity to engage with, in this case, the *ACC/Wheatbelt NRM*. The social learning aspects “Picture” and “People” are perhaps especially relevant in this thesis. The soil acidity project scenario is used as an example to demonstrate and explain how this might work in practice in the *Wheatbelt NRM* region (Box 7.3).

Box 7.3: Soil Acidity Project Scenario: An Example of a Sustainable NRM Issue for Discussion via Collaborative Monitoring

PROBLEM

- Conventional community engagement measures recorded that only 10% of farmers engaged in a soil acidity project, which was designed to engage farmers to think more about this particular land management problem.
- These measures provided some explanation for this response rate: that soil acidity is much less visible compared, say, to crop damage by locusts. However, they shed no light on the underlying and more complex reasons for this: *why* the remaining 90% did not engage, or, why the community engagement methods, tools or activities used, essentially, did not work.
- As such, misplaced assumptions about the value of the soil acidity project are more likely to be made, and a project with much potential for engaging farmers in deeper learning may be all too readily terminated (e.g. all that may be required are modifications to existing on-ground community engagement activities to engage better the remaining 90% of farmers perhaps with different levels of NRM knowledge and understanding, skills, experience and expertise.
- Similarly measured, then, projects that address more visible biophysical problems and that, as such, engage more farmers - e.g. controlling locusts - are judged successful, receive more funding and continue. This is, however, at the expense of projects that can help solve less tangible and more complex problems. The biophysical continues to override the social.
- The proposed monitoring tool, as a part of Program Logic (see above), potentially, could provide all farmers with greater opportunities to indicate not only why visibility was a problem, but to discuss why community engagement methods could not address this. The “aspects of social learning” are perhaps central to achieving this. For example, “Picture” and “People” might be the most relevant aspects.

SOLUTION

- Given that visibility is a problem, this may have been relevant to the project’s impacts on the visual landscape (“Picture”); given that community engagement is more of social issue and is related to the ways in which project is managed (i.e. is governance-related) then “People” would be a more relevant aspect.
- Comparing and contrasting these data sets a solution to this community engagement problem may have been found; better activities to engage those with different levels of prior knowledge and understanding of soil acidity. Sharing this information across the region and at an inter-regional level could enhance this process (see Figures 7.2 and 7.3).
- The proposed monitoring tool, therefore, does more than quantify core social learning data, it helps facilitate good governance: it ‘allows stakeholders to have a say in the management of natural resources’. As such, as part of Program Logic, it helps *Wheatbelt NRM* demonstrate how well the soil acidity project helped develop local community capacity to engage with it, whilst simultaneously facilitating this process.

Table 7.1 provides an overview of some issues in *Perth Region NRM* and thus the sort of problems that the proposed collaborative monitoring tool might help to address in this urban region.

Table 7.1: Linking Local Community Initiatives to Regional Priorities and Australian Government Policy

	Horizontal Integration	Vertical Integration	Score/5	Comments
1. Better integration of programs, strategies and statutory processes	Regional		3-4	<i>Well on the way to achieving</i>
2. Increasing understanding in community, government and industry	Local or Regional or State		3-4	
3. Influencing government policy		Local-Regional-Federal	2	<i>Some influence in certain government agencies but generally some way to go regarding policy change</i>
4. Linking local catchment activities to regional priorities		Local-Regional-Federal	Variable	<i>This can come down to the people and personalities involved</i>

Source: Interview, Chair, *Perth Region NRM* (2007)

Table 7.1 is based on information and “scores” provided to me by the Chair of *Perth Region NRM* during our interview. It categorises these problems in terms of “horizontal integration” and “vertical integration”: the proposed collaborative monitoring tool, if implemented as suggested above, might help *Perth Region NRM* to better address these vertical integration problems. The following subsection describes some possible

opportunities for further developing and implementing the proposed collaborative monitoring tool in these contexts.

7.2 OPPORTUNITY: DEVELOPING a GIS-BASED MONITORING TOOL

This thesis suggests that most relevant opportunities for further developing and implementing the proposed collaborative monitoring tool in the above contexts lie in the field of Geographic Information Systems (GIS). The reasons for this stem from the current capacity and potential of GIS-based programs for combining, collating and analysing geographical, ecological and social data. Also of significance is the enhanced capacity of GIS-based programs for communicating these data visually. Such developments might occur, for example, in the related areas of conceptual modelling and Soft Systems Methodology (SSM) (for most recent developments in this field in the health sector see Berge Holm 2013; for an overview, see Wilson 2001). This thesis argues that the Evolving Sustainable Systems model (Frost *et al* 1999) could form the basis of one such GIS-based collaborative monitoring tool, thus making a working model from a conceptual model. Figure 7.4 illustrates how a GIS-based collaborative monitoring tool/program based on this model could work (Figure 7.4 illustrates only a very rudimentary design as a basis for discussion. Figure 7.4 must be interpreted therefore in the context of the evolving learning methodology outlined in Chapter 1, the associated methodological issues discussed in Chapters 5 and 6 and the “how-to” manual in Appendix 6.)

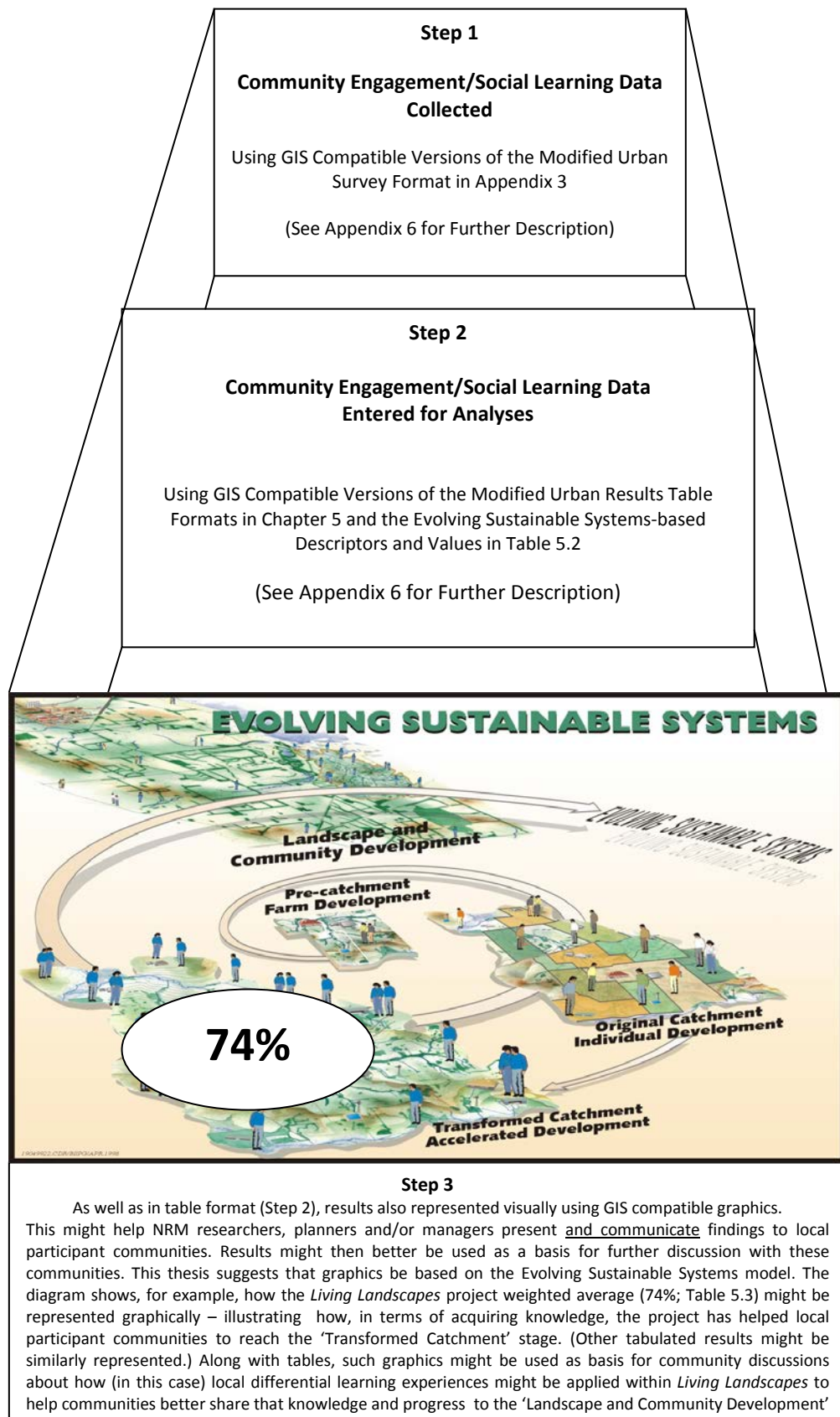


Figure 7.4: Rudiments of a GIS-Based Collaborative Monitoring Tool (Based on *Living Landscapes* Results and Analyses)

Figure 7.4 thus outlines how a rudimentary GIS-based collaborative monitoring tool might be applied in practice — via Program Logic at a regional catchment council level guided by sustainable NRM researchers (See also in Appendix 6) — to better identify, discuss and address the community engagement/social learning issues raised in this thesis (see Chapters 1, 5 and 6). Figure 7.4 outlines, then, how geographic principles (of scale), methods, technology and education might be combined to help address complex social-ecological issues in sustainable NRM (see mainly Chapters 1, 2 and 3).

There are, of course, limitations associated with achieving such goals. These would have to be addressed should the proposed collaborative monitoring tool progress beyond the rudimentary stages of development discussed in this thesis. Some of these limitations are discussed in the following sections, as potential weaknesses and as possible adverse external threats to its ongoing development and implementation. These discussions, though, serve ultimately to help justify the ongoing development and implementation of this tool in the contexts suggested in this thesis.

7.3 RESEARCH-DRIVEN MONITORING: A WEAKNESS?

The use of GIS software, particularly the software most relevant to this thesis — conceptual modelling and soft systems methods (SSM) and associated web design — is very experimental, and it is thus still unclear whether such modelling is art or science (e.g. Berge Holm *et al* 2013). Broadly, then, those areas of research, which seek to bridge the space between research/theory and practice/decision-making for achieving sustainable NRM are still in their infancy. The notion, then, that the ongoing development and implementation of the proposed collaborative monitoring tool be guided or driven by the research community is highly problematic:

Social and natural scientists are important players in social learning but they should not *drive* the process. Their task is to validate and share various kinds of knowledge, expose assumptions, help structure experiments capable of generating useful new information, and apply data collection, management and analysis tools in support of questions that arise from various players in the process (Tyler 2008, p.14).

A danger, then, associated with the research-driven development and implementation of the proposed monitoring tool, is that the research could override practice or decision-making. With respect to the application of the adaptive management experimental approach to achieving sustainable NRM that has at its core experiential (or more broadly in this thesis, social) learning:

The domination of scientific and technical models as tools for strengthening knowledge leads to an over-reliance on technical data collection and on framing problems as technical in nature when key management issues may be conflicts in institutions (rights, tenure) or values (Tyler 2008, p.9; see also Broderick 2008).

Tyler points out that the main problem is that adaptive management is structured as an experimental model that is 'often opaque to non-scientists' (p.9). In other words, adaptive management is most effective in more controlled situations; for example, in simple jurisdictional situations with limited political or legal conflict, where strong institutional arrangements to facilitate negotiations are in place and, most importantly, an organisational capacity exists to change and respond to this learning. The model is not as effective, however, in less controlled situations that comprise 'complex, open, social and institutional systems'. Examples include 'organisations that already have histories, cultures, and policies of resource management, and professional norms that are hard to change', and when 'the process relies on annual public budgets [and] maintaining the long-term continuity required for learning about ecosystems is costly'. Science does not factor in the effect of such complex internal and external variables. Therefore, more controlled adaptive management experiments, and thus the core shared or social learning on which they are based, is much more difficult to facilitate, let alone measure, in this messy reality (see also Tyler 2008, pp 9-10). The more contemporary adaptive co-management model addresses these incompatibilities. This thesis seeks to contribute towards the development of this model.

In this new paradigm, Tyler does not discount the roles and the value of research and researchers and the notion of the relevant local community engagement projects or programs as experiments. As such, he espouses instead the idea of researcher as facilitator rather than researcher as driver of the social learning processes central to the success of these initiatives. This thesis agrees that, ultimately, this should be the case. However, it suggests also that these notions of researcher as driver and as facilitator are inextricably linked in terms of meaning and thus can be used interchangeably. While researcher as facilitator, as described above, is ultimately the desired outcome, at least initially researchers can also drive the process. For example, the proposed collaborative monitoring tool was developed first in a research environment and so any "start-up" processes would unavoidably be research-driven. What is most important, then, is that underlying and complex matters such as these are elicited, discussed and resolved with all relevant parties from the earliest implementation of any adaptive co-management project. In this way the

role of the researcher at any given point in the ongoing development and implementation of the proposed collaborative monitoring tool — as driver, facilitator or combination of both — might be better delimited. This is a key element of the evolving learning methodology that underpins this thesis (See Chapter 1, especially Figure 1.2). This thesis, then, while acknowledging the possible weaknesses of the proposed research-driven collaborative monitoring tool also suggests how this weakness might be overcome in a more contemporary adaptive co-management framework. In this way, there is perhaps less chance of contemporary sustainable NRM research and theory development overriding practice in this field and vice-versa.

Researchers in taking a lead in this context would be addressing a (case-study) methodological problem for the benefit of both the academy and the wider community. Moreover, they would clearly be seen to be doing so. Given that such research can often be ‘opaque to non-scientists’, making the research clearer in this way could build vital initial trust between the two groups, an essential element if these partnerships are to work. That the proposed collaborative monitoring tool has been developed on the basis of strengthening the nexus between researchers and researched might help to develop this trust. This approach might also help to ensure that the science (in this case social-ecological research in sustainable NRM) does not take precedence over learning how to apply science in practice (practice in this case being adaptive co-management based community engagement programs in sustainable NRM). Buoyed by such trust-building both groups might work better together in applying the monitoring tool; for example, in identifying and discussing differential learning experiences at the local community level and the development of a schema for better utilising these experiences (Chapters 5 and 6). The following example further demonstrates how this might work in practice, should the proposed monitoring tool be further developed using GIS software as describe above.

7.3.1: A Further Exploration of the Effectiveness of the Monitoring Tool in Practice

The initial rural and the modified urban surveys, the latter of which form the basis of Step 1 of the proposed collaborative monitoring tool (see Figure 7.4 and Appendices 3 and 6), included sections that asked if and/or how participants might wish to engage in any ongoing development and implementation of the survey/monitoring tool in more creative ways. The rationale for including this section was to fit in with the ethos of both the adaptive management-based rural *Living Landscapes* project and the co-management-based *BCCG* and *TRCG* urban sub-catchment groups: all of these initiatives used

community-friendly on-ground methods, tools and/or activities to engage their respective participants. The opinions of the respective regional catchment councils on this matter were also sought through interviews. The implicit assumption here was that, because local communities are already engaged in this way, and because the regional catchment councils also espouse such processes, all parties would wish to engage similarly in any ongoing development and implementation of research associated with this thesis. However, mindful of the pitfalls of making such assumptions, it was essential that all participants and interviewees were provided with opportunities to have their say on the matter.

The rural and urban survey/monitoring results showed that both rural and urban participant communities did not favour engaging in any ongoing development and implementation of the monitoring proposed in this thesis in more creative ways. Even for photography — the overall preferred creative option — the numbers of positive responses were few. These results were somewhat surprising given that such visually-oriented community engagement methods and activities were highly valued by participants in the *Living Landscapes* project (Frost *et al* 1999). Follow-up interviews with urban survey respondents supported these results, and also suggested reasons why the local community members felt this way.

7.3.1.1: Urban Survey Responses

This [creative involvement] has worked locally ...but measuring this? This would be very difficult and time consuming: you would have to walk around and interview people; asking a lot of people questions to measure this effectively ...love to do it but this is time consuming and costly.

Could use photos ...but you would need training again. This could be used to get local people together, but not people from different levels together...You won't get state government agencies out of working hours. Volunteers, yes; agencies, no - they are discouraged to get out ...There are also possible conflicts of interest: you cannot work for the BCCG and the SRT.

Local community don't want to link up with them...they just want to stay local - to get local knowledge. You learn lots from locals...agencies are not people with the local knowledge and understanding, only locals are.

Why should we go up; they should come to us. Some people at the top have tremendous knowledge, but they don't come out and share it.

Source: BCCG Interview (2007)

I see no real value in using creative options (like the photographic displays illustrated) as part of a monitoring and evaluation program. I can't really see what it would achieve. For example, the SCC might come and view the photographs - of say improvements made in a certain area/project - and complement the local people on their work, but I can't really see any more coming out of such gatherings. I can't really see local communities and regional representatives talking/discussing and attempting to address any problems through this process. I think the new reference groups described above will be more meaningful in this respect.

Source: SCC Chair Interview (2007)

The urban communities, then, acknowledged that while such creative measures might be useful in a general sense — mainly in informal local community gatherings to showcase work — they would not be a useful in engaging groups more formally in the ways suggested in this thesis that would involve bringing together groups that work at different scales. On the one hand, the idea was considered simply impractical; on the other hand, objections had more to do with local community attitudes. However, there was some support for the idea at least in principle within these local communities, but only if the relevant larger organisations and/or agencies led the way. These larger organisations or agencies, though, appeared to have their own ideas about how best to monitor such learning; for example, through the new reference groups (Chapter 3). In short, this situation is perhaps much more complex than one might first envisage. On the surface the urban results were clear cut. However, at a deeper level, there appeared to be opportunities for at least discussing the value of incorporating such creative options into any monitoring of community engagement in social learning; for example, through participating in the new reference groups. Rural survey responses with respect to creative involvement were similar.

7.3.1.2: Rural Survey Responses

The corresponding results for *Living Landscapes* indicated that local communities also felt that creative involvement in any formal monitoring was not a preferred option. And yet, as with the urban sub-catchment groups, the *Living Landscapes* sub-catchment groups were in favour of creative involvement in a more general sense; in helping to bring local communities together to share their knowledge and understanding through, for example, camp-outs and associated photography. Differences occur, however, at the regional level: the opinions of *Wheatbelt NRM* officials seemed to differ from Perth Region NRM officials concerning this sort of creative participation in formal monitoring and evaluation of local projects and/or programs. *Wheatbelt NRM* officials (compared with their urban counterparts) seemed to express more of an interest in attending informal creative

community engagement initiatives to explore if or how they might be incorporated into formal monitoring and evaluation via MERI/Program Logic:

Less formal ways could be found to gather the relevant information. Usually, information is gathered in rather formal situations such as focus groups, meetings and workshop, where people are sat around a table and complete questionnaires. Often these sessions are attended by agency staff, which can be intimidating for some members of the local community. Some people might feel embarrassed if they make a comment or suggestion and agency staff criticise the idea. This can have a great impact on peoples' confidence levels preventing them from speaking again.

It would be much better to gather this sort of information in an informal setting with very few experts, rather than having too many experts in one room. Also, it would be better to go out to the sub-regions to collect this info rather than in places like Northam. In this way people feel more comfortable because they're in familiar surroundings. The key here is flexibility — catering for the many and varied needs of individuals and communities across the whole catchment.

Source: ACC Project Officer Interview (2007)

How well communities have engaged in a project is usually evaluated in terms of how many people attended workshops and field days. For example, the ACC set up two 'topic tents': one provided information on soil health and the other (more a field site with a soil pit) demonstrated the benefits of direct seeding and was staffed by the West Australian No Till Farmers Association (WANTFA). Four information sessions were held in each tent/site. This is the biggest agronomy field day in the state.

[A project officer] counted the numbers of people in each tent/session. Both tents/sites were reported to be crowded. She also spent time listening to people and getting feedback from them. The assessment thus comprised of a tally and an indication of the quality of questions attendees were asking. In total 380 people attended this field day. [The officer] visited both tents/sites and saw that they were both very popular.

Source: SCC Chair Interview (2007)

These results further suggest that beneath the surface there is a desire to include more creative options in monitoring and evaluation of learning in particular. The deeper (the real?) problem, then, is how best to achieve this in practice as part of the current MERI/Program Logic regime espoused by both regional councils. That is, not so much to neglect quantitative measures, but, given the constraints placed upon councils and local communities, to find better ways of monitoring social inclusion as part of this process. In this example, this would involve finding better ways to monitor how well farmers engaged

in the social learning process through attending, for example, the more creative ‘topical tents’ community engagement method or activity. The proposed research-driven and/or facilitated GIS-based monitoring tool might achieve such goals. That is, even before any such decisions are made this tool could facilitate more substantive discussions between relevant researchers and practitioners about the value of including creative options as part of monitoring tool. In this way, the relevant local community engagement projects and programs could utilise differences of opinion/differential learning experiences in order to avoid “throwing the baby out with the bathwater”. This section explores the fundamentals of how this could be achieved simply and effectively through a researcher-driven and/or facilitated GIS-based collaborative monitoring tool; one that might with further development fit in to existing *MERI*/Program Logic regimes (see outline in Figure 7.4 and in Appendix 6).

There are, of course, external variables beyond the control of both researchers and practitioners that may serve to halt or impede such developments. These are discussed briefly in the following subsection.

7.4 THREAT: CHANGES OF GOVERNMENT and GOVERNMENT POLICY

Changes of government at the national level perhaps pose the greatest external threat to the successful ongoing implementation and development of any monitoring tool. As Chapter 3 indicates, political changes at this scale have also led to major changes in sustainable NRM policy development and implementation (e.g. from *NLP* to *NHT* to *Caring for Our Country*). These changes may or may not espouse the idea of working towards the better measurement of social inclusion in sustainable NRM and thus towards the improved monitoring of social learning for achieving sustainable NRM.

[T]he Federal Minister for the Environment (Ian Campbell at the time)...declared that he was not going to fund any capacity-building in, mainly, WA and Qld...Ian Campbell had a big impact; people working on-ground in NRM to help build social capacity were sacked because he was no longer providing funding for projects with a capacity building focus.

Source: ACC Chair Interview (2007)

Requisite funding, assistance and advice, therefore, may or may not reach those (mainly local and regional) groups that need it most. These changes can affect sustainable NRM research funding as well as sustainable NRM practice. They can also affect the partnership-building processes that are essential for driving and/or facilitating the ongoing

development and implementation of any proposed monitoring tool. It is this cyclical process that produces feelings of uncertainty in the broader sustainable NRM community. In a vibrant democracy, though, such changes are unavoidable. The thesis also argues however that, despite their feelings of uncertainty the relevant sustainable NRM groups and perhaps especially the local communities have managed, and are still trying to manage, such external pressures:

The ACC investment plan had to be done by the book! The ACC did what they were told — some other groups however objected:

For example, the Grains Research and Development Corporation (GRDC) as well as having their own project also invested in grower groups' alliances and local farmer group networks. They organised workshops to help farming communities understand the process of government, so that they then have greater capacity to be involved in bigger projects. This helps to build the necessary leadership qualities and hence capacity required to manage such projects on an ongoing basis. The ACC hasn't really done this; the ACC used social capital that was built during the Landcare days but have done nothing to enhance it. The current focus is somewhat contradictory in terms of project tasks and outcomes; projects are supposed to engage the whole community but in the end the focus is mainly on higher value (biophysical) assets and so community input into projects is undervalued.

Source: ACC Chair Interview (2007)

There still appears to be a strong desire and determination among local communities to address these problems. Arguably, local communities want to reach out and make the necessary connections, to scale-up their acquired deeper knowledge and understanding in practice, but they feel that the mechanisms — methods, activities or tools — for so doing are, as yet, not sufficiently developed for such tasks. Historically this underlying determination (resilience?) has not really abated, notwithstanding external pressures, and may even be strengthening, certainly within local communities (e.g. Chapters 2 and 3). The challenge, then, is to develop and implement mechanisms (tools) that are better able to “tap into” and utilise this resilience; to better exploit the potential of local communities to withstand such external shocks.

Moreover, though local community focused, these tools should be designed to be implemented by the regional catchment councils with the help of researchers. Regional catchment councils are the umbrella groups that have the capacity to reach the optimum number of local community projects and/or programs required for such tools to work effectively (e.g. as suggested in Section 1). However, regional groups are also constrained because they are tied directly to Australian government policy and major program

requirements and thus to the cyclical changes and uncertainty associated with receiving the necessary funding, assistance and/or advice. The key, then, lies in providing a “circuit-breaker” — or perhaps more accurately in this thesis a “circuit-closer” — to this problem. To make an effective start in this context, any monitoring and reporting tool needs to “dovetail” with the existing, more conventional, regional catchment councils’ monitoring and evaluation programs preferred by governments.

The collaborative monitoring tool proposed in this thesis is therefore designed to fit in with MERI/Program Logic, an approach to monitoring and evaluation that is used currently by all regional catchment councils within the *Caring for our Country* policy context. As such, this rudimentary tool could be further developed and implemented in small or localised trials to test its viability within these regional and national contexts. Funding for these trials, from public and/or private sources, might thus be more readily obtained. Perhaps sustainable NRM researchers are perhaps in the best position to “kick start” this process? In this way, there is a greater chance that field trials might be successful since any changes to more conventional and well-established monitoring and evaluation regimes would be gradual; MERI/Program Logic would not be radically changed but strengthened. The thesis proposes, therefore, that such an approach be adopted to help all sustainable NRM groups to cope with these major external threats.

7.5 SUMMARY

This chapter achieves the final thesis objective (Chapter 1). In describing and discussing the major strengths, weaknesses, opportunities and threats associated with the proposed collaborative monitoring tool, the chapter discusses the possibility of its further development. The chapter suggests how this rudimentary tool could be incorporated into an existing contemporary monitoring and evaluation programs (i.e. Program Logic) to address the problems of community engagement in social learning discussed in Chapters 5 and 6, and more widely in sustainable NRM (Chapters 1-3), in practice. It suggests how the proposed monitoring tool could be applied to utilise the community engagement/social learning expertise that exists among participant local communities but appears to be “contained” at the local community level. Such a tool, then, could be used to “scale-up” social learning in sustainable NRM to influence Australian government policy in this area. This is essential if both regional catchment councils and their respective local communities are to improve their levels of community engagement, and, through this process, their

capacity-building. Such policy development is also essential in helping local participant communities to develop the levels of self-regulation or autonomy that they desire and which, in the longer term, are necessary for achieving sustainable NRM in Australia and worldwide. This chapter has discussed how ineffective communications feedback loops (Lefroy 2008) in sustainable NRM in Australia could be closed (see Chapters 1-4). Chapter 8 summarises all three thesis objectives in terms of this broader thesis context.

CHAPTER 8

Conclusion

This thesis has achieved its broad aim of contributing towards contemporary international social-ecological research. It has investigated community engagement in social learning and the capacity of collaborative monitoring to improve this process, to achieve more sustainable NRM in practice. It did so by achieving three specific objectives:

1. A review of the historical, geographical and theoretical literature on community engagement, social learning and sustainability in NRM. This review established a heuristic framework for the thesis based on improving 'community engagement in social learning pathways for achieving sustainable NRM in Australia and more broadly'.
2. An evaluation of the effectiveness of community engagement in social learning for achieving sustainable NRM. This was achieved through the review of four local Landcare communities that participated in the rural adaptive management-based *Living Landscapes* nature conservation planning project, and two local Landcare communities that participated in a broader urban cooperative management-based regional NRM program.
3. The development of the basis of a collaborative monitoring tool, for use in sustainable NRM research and practice to monitor and improve community engagement in social learning for achieving sustainable NRM. This was achieved through integrating an investigation of the case study methodology and methods used in this thesis with the analysis of the community engagement and social learning data collected.

The following three sections summarise how these objectives were achieved. A final section summarises the implications of these achievements for further sustainable NRM research and practice.

8.1 LITERATURE REVIEW and DEVELOPMENT of a HEURISTIC FRAMEWORK

This objective was achieved through theoretical, historical and geographical reviews of community engagement, social learning, and sustainability in NRM (Chapters 1, 2 and 3). By way of introduction in this thesis, the literature review in Chapter 1 discussed theoretical developments in the area of social-ecological/sustainable NRM research. In so doing it established an 'evolutionary learning methodology' (Hooshangi *et al* 2013) as a basis for

collaborative monitoring in sustainable NRM as a way of implementing contemporary theoretical developments in this area. This thesis seeks ultimately to contribute towards this area of contemporary sustainable NRM research and practice. The historical review in Chapter 2 traced the roots of community engagement, social learning and sustainability to place the related issues examined in this thesis into broad context. The geographical review in Chapter 3 examined how these community engagement, social learning and sustainability issues have become manifest in sustainable NRM policy development in Australia at the various scales of implementation. The outcomes of all three reviews are summarised below.

8.1.1: Theoretical Review

This thesis introduction/literature review in Chapter 1 examined some of the contemporary social-ecological research in sustainable NRM that seeks to bridge research and practice in this area through collaborative monitoring. This chapter discussed how in broad terms this thesis might contribute towards this research through the development of the rudiments of one such collaborative monitoring tool underpinned by an evolving learning methodology (Hooshangi *et al* 2013; see especially Figure 1.2). The bulk of this discussion took place in Chapters 5, 6 and 7 and in Appendix 6). This discussion argued that the proposed collaborative monitoring tool might comprise a working mechanism for the evolving learning methodology depicted in Figure 1.2 (or a variation thereof). In effect the proposed collaborative monitoring tool might dovetail between Steps 3 and 4 of this process (see modified diagram Figure 8.1).

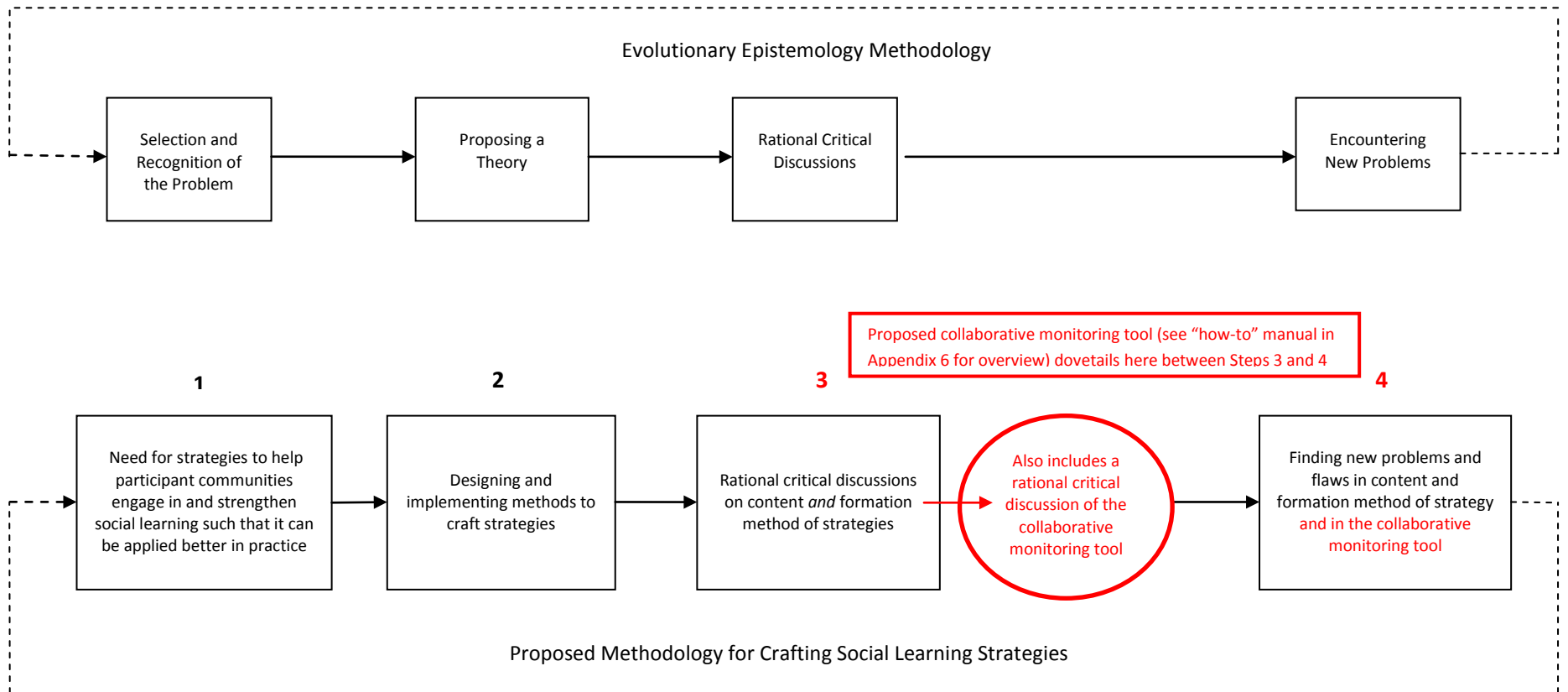


Figure 8.1: Revised View of Proposed Collaborative Monitoring Tool Implementation and Development in Adaptive Co-Management

Source: Based on Hooshangi *et al* (2013, p.963

This revised diagram and thus how the proposed collaborative monitoring tool underpinned by an evolving learning methodology might work in practice is best reviewed in conjunction with the summary of this tool/ “how-to” manual in Appendix 6.

8.1.2: Historical Review

This broad historical overview of community engagement, social learning and sustainability in NRM from early human history to the present day (2012) in Chapter 2 suggested that:

1. Community engagement in social learning for achieving sustainable NRM comprises two co-evolving learning processes: sharing ideas about how to manage natural resources sustainably in theory, and learning how best to implement these ideas in practice.
2. While the development of ideas about how best to manage natural resources has continued to improve (most recently through NRM policymaking), learning how best to implement these ideas in practice (most recently through working with local communities) has not progressed as quickly.
3. A ‘disjuncture in scales of social learning for achieving sustainable NRM’ has thus emerged over the last twenty or thirty years that has produced a hiatus in progress towards reinvigorating what is arguably an age-old coevolving process.

This review helped to frame the subsequent geographical review of Landcare and sustainable NRM policy development and implementation in Australia and in Western Australia.

8.1.3: Geographical Review

This review traced changing community engagement in social learning pathways for achieving sustainable Landcare and NRM policy development and implementation in Western Australia (WA) from the early 1990s through to the present day (2012). The review was divided into two main parts, the outcomes of which are summarized below.

Part 1 Outcomes

This part traced the changing ‘community engagement in social learning pathways for achieving sustainable NRM’ from the international to the Australian national policymaking levels, and then to the WA state, regional and local community levels. The review began by tracing such ‘information flows’ through the implementation of the *National Landcare Program (NLP)*.

1. The *National Landcare Program (NLP)* (1990-1996)

This review of the implementation of the NLP suggested that ‘community engagement in social learning pathways for achieving sustainable NRM’ in the context of WA Landcare were:

- (i) Strongest between national and state governing bodies responsible for developing the NLP and the participant local Landcare communities.
- (ii) Weakest between NLP governing bodies and governing bodies that were responsible for developing other major environmental programs.

This review suggested, therefore, that in WA community engagement in social learning pathways for achieving sustainable NRM were strongest within the confines of the NLP. It suggested that the *NLP* as a “stand-alone”, local community-focused major program was more adept at facilitating these flows of information vertically — from the national to the local scale — and was less adept at facilitating them horizontally primarily at the national scale. As such, this review suggested that in WA the *NLP* had created “a silo effect” in terms of facilitating community engagement in social learning pathways that are critical for achieving sustainable NRM in Australia.

2. The *Natural Heritage Trust Phase One (NHT1)* (1996-2002)

The *Natural Heritage Trust Phase 1 (NHT1)*, *inter alia*, attempted to redress this imbalance in ‘community engagement in social learning for achieving sustainable NRM’ by incorporating the *NLP* into this much larger major program. However, the review suggested that *NHT1* was only partially effective in so doing; that in the context of WA Landcare and NRM, *NHT1*:

- (i) Strengthened community engagement in social learning pathways for achieving sustainable NRM between the relevant national and state governing bodies (horizontally).
- (ii) Weakened equivalent learning pathways between these governing bodies and local Landcare and NRM communities (vertically).

The review suggested, therefore, that *NHT1* in incorporating all previous major programs (including the *NLP*) into the one large program, had, in effect, become too “top heavy” in terms of its capacity to facilitate community engagement in social learning pathways for achieving sustainable NRM. That in this sense *NHT1* had begun to undermine the successes of the former “stand-alone”, local community-focussed *NLP* in WA.

3. The *Natural Heritage Trust Phase Two (NHT2)* (2002-2007)

NHT2 offered a much more strategic regional approach to developing and implementing sustainable NRM in Australia. It sought to address the community engagement and social learning issues that arose in *NHT1* by providing local Landcare communities with increased levels of autonomy to better share their knowledge and understanding with the relevant governing bodies. *NHT2* attempted to address these developing complex issues through further empowering local Landcare communities in WA. This review suggested, however, that in this context *NHT2* instead continued to:

- (i) strengthen community engagement in social learning pathways for achieving sustainable NRM between the relevant governing bodies and across the relevant sub-programs (horizontal flows), and
- (ii) weaken equivalent learning pathways between these governing bodies and the local Landcare and NRM communities through which this major program was implemented (vertical flows).

This review suggested, therefore, that *NHT2* had become even more “top heavy” in terms of its capacity to facilitate critical community engagement in social learning pathways for sustainability. That, as such, *NHT2* did not empower local WA Landcare communities to the extent envisaged by the relevant governing bodies, and had in this sense further undermined the local successes of the *NLP*.

4. *Caring for Our Country* (2007-2012)

This review suggested that *Caring for Our Country*, the current major NRM program, has gone some way towards redressing these learning imbalances and towards improving community engagement in social learning pathways for achieving sustainable NRM policymaking. It suggested that *Caring for Our Country* based on its six priority areas/overarching themes has:

- (i) maintained strong community engagement in social learning pathways between the relevant governing bodies (horizontal flows)
- (ii) strengthened the equivalent learning pathways between these governing bodies and the regions (vertical flows)
- (iii) some way to go with respect to further strengthening these learning pathways, beyond the regions, to the local NRM communities (improving vertical flows).

This review suggested that *Caring for Our Country* has been partially effective at helping to improve sustainable collaborative NRM policymaking in Australia. This part of the

geographical review has thus provided the broad sustainable NRM policy context for this thesis.

Part 2 Outcomes

This part of the geographical review examined the capacity of the local community projects and programs investigated in this thesis, in their regional catchment council contexts, to engage their respective participants in social learning for achieving sustainable NRM in this changing Australian Landcare and NRM policy environment. It examined first how the WA regional catchment councils relevant to this thesis — the *Swan Catchment Council (SCC)*, now *Perth Region NRM*, and the *Avon Catchment Council (ACC)*, now *Wheatbelt NRM* — responded to the Australian government sustainable NRM policy changes reviewed in Part 1.

1. Responses of Two WA Regional Catchment Councils to Changes in Policy

This review described community engagement structures of both regional catchment councils to show how they adapted to these policy changes. It showed, firstly, how the community engagement structures evolved in very similar ways; how,

- (i) Under the auspices of the NLP, the joint *Swan Avon Catchment Council (SACC)* operated as a general advisory service for local participant Landcare communities.
- (ii) Under the auspices of NHT1 and NHT2, the *SACC* had separated to become the *Swan Catchment Council (SCC)* and the *Avon Catchment Council (ACC)*. Local participant communities were now engaged in Landcare through the *SCC* and *ACC* theme-based reference groups.
- (iii) Under the auspices of Caring for Our Country, the *SCC* had been re-named *Perth Region NRM* and the *ACC* had been renamed *Wheatbelt NRM*. Local participant communities in both regions were now engaged in Landcare via a theme-based reference group structure that had been further strengthened by adding geographic or place-based reference groups.

It showed, secondly, how the community engagement structures of these rural and urban regional catchment councils differed. That is, while the community engagement structures in both councils were similar, the ways in which community engagement was implemented in the two regions differed. Implementation varied because of the differences in area, geomorphology, land uses, populations and population distributions of the two regions. This review also described these differences. This part of the geographical review then examined how the subjects of this thesis — the rural adaptive management-based *Living*

Landscapes nature conservation planning project and the urban co-operative management-based sub-regional program via the *Southeast Regional Centre for Urban Landcare (SERCUL)* — operated within this changing collaborative NRM regional and policy environment.

2. Local Community Engagement Projects and Programs

This review examined the on-ground methods and activities used in these projects and programs to engage local communities in social learning for sustainability in practice. It showed:

- (i) How local communities in both projects and programs were engaged in social learning for sustainability, via these methods and activities, in different ways, and, that these differences are still not well understood in sustainable NRM research and practice.
- (i) That such differentiation in learning, and a lack of understanding of this process at all scales of sustainable NRM delivery, is a possible underlying reason why sustainable NRM policies have not been implemented as well as they could be in practice.

In summary, this geographical review of NRM policy implementation in WA and Australia shed more light on a possible reason for the disjuncture in scales of social learning and thus for the hiatus in progress towards reinvigorating community in social learning for sustainability. Moreover, it began to illustrate how this heuristic framework is being used to shed more light on reasons why collaborative NRM has still not been able to help develop the levels of common understanding between governing bodies and local participant communities that are necessary for achieving more sustainable NRM in practice (Chapter 1). As such, this geographical review formed the basis for further investigation in this thesis and a review of the theories that underpin this investigation.

8.2 AN EVALUATION of COMMUNITY ENGAGEMENT in SOCIAL LEARNING for SUSTAINABILITY

This objective was achieved through integrating analyses of the case study research methods and the evolving learning methodology used in this thesis with analyses of the social learning data collected (Chapters 4-7). This review summarises how this process unfolded. It begins with a summary of how the evolving learning methodology unfolded in the context of this thesis.

8.2.1: An Evolving Learning Methodology

This evolving learning methodology applied in this thesis unfolded in the following ways:

1. The researcher in this thesis engaged in preliminary discussions with sustainable NRM researchers and practitioners involved both in the *Living Landscapes* project and in broader NRM research and practice. These discussions influenced the design of the initial case study survey method (Appendix 1).
2. After receiving feedback from these survey respondents, the researcher in this thesis noted that, notwithstanding such preparation, the surveys were still too extensive, unnecessarily complex and repetitive. The case study survey design was simplified in preparation for the urban survey, but without compromising its capacity to collect substantive community engagement and social learning data (Appendix 3).
3. The researcher in this thesis considered how better to convey, and communicate, the results of the initial rural survey to sustainable NRM researchers, practitioners and communities. The tables used to report the associated urban data sets were configured on the basis of such reflection.
4. After receiving much more positive feedback from the urban survey respondents concerning the modified survey further table modifications were made. Consideration was given to integrating case study and action research methods as a basis for collecting community engagement in social learning data for the benefit of contemporary sustainable NRM research and practice (Chapters 4 and 5).

Establishing a stronger link or nexus between contemporary sustainable NRM research and practice in this way underpinned analyses of the community engagement and social learning data collected in both rural and urban surveys.

8.2.2: Community Engagement in Social Learning for achieving Sustainable NRM Data

This evaluation reported similar outcomes for both the rural adaptive management-based *Living Landscapes* nature conservation planning project and the urban co-operative management based sub-regional program, facilitated by the *South East Regional Centre for Urban Landcare (SERCUL)*. Data analyses (Chapters 5 and 6) suggested that local participant communities in both initiatives perceived that:

1. While these community engagement initiatives were effective at engaging them in the biophysical aspects of social learning for achieving sustainable NRM, and in helping them to share such acquired knowledge and understanding within and between their local groups, they were less effective at helping them to engage in the social-institutional-governance aspects of such learning.
2. These initiatives were even less effective at helping them to share such deeper knowledge and understanding of sustainable NRM, which they had acquired through these initiatives, with those groups responsible for sustainable NRM at greater

geographical and temporal scales (mainly government and quasi-government agencies and organizations).

Data analyses concluded that, as such, both projects and programs might have unwittingly “contained” community engagement in social learning for achieving sustainable NRM to the local community level. It also suggested reasons for such containment, that: (1) local participant communities’ capacity to engage in social learning for achieving sustainable NRM is based on the extent of their prior experiences in Landcare and NRM, especially in the area of partnership-building; (2) such differentials have been little understood and hence poorly managed in Landcare and sustainable NRM local community engagement projects and programs; and (3) this led to misplaced assumptions being made about the capacity of all local community groups to engage equally well in such learning. Analyses then suggested a schema that both rural and urban local community engagement projects and programs might have developed in a more favourable sustainable NRM policy environment to address these issues. This schema might have helped the respective project and program managers to:

1. Better identify, understand and utilise these differentials in practice from the outset of their respective Landcare and NRM projects and programs, and avoid making such misplaced assumptions.
2. Improve the “scaling-up” of community engagement/social learning such that their respective projects and programs might better contribute towards sustainable NRM policy development and implementation in Australia.

This evaluation, then, attempted to shed light on some of the underlying reasons for the proposed disjuncture in scales of social learning and the hiatus in progress towards reinvigorating community engagement in social learning for achieving sustainable NRM more broadly. It has thus further demonstrated the usefulness of the proposed heuristic framework (Chapters 2 and 3) for better understanding and managing such complexity, and thus for contributing towards international social-ecological research in its endeavours to achieve more sustainable NRM in practice. This evaluation of community engagement/social learning data in conjunction with the evolving learning methodology, within this heuristic framework, guided the development of the proposed (rudimentary) collaborative monitoring tool.

8.3 DEVELOPMENT of a RUDIMENTARY COLLABORATIVE MONITORING TOOL

The most recent urban case study/action research based surveys and their corresponding results form the basis of the proposed collaborative monitoring tool (Chapters 1, 5 and 6 and Appendix 6). The ongoing development and implementation of this tool could be based on improved collaboration and a strengthening of the nexus between contemporary social-ecological research and practice in the area of sustainable NRM. This rudimentary design and implementation process for the proposed collaborative monitoring tool was finalized following interviews with the regional catchment councils (Chapters 4 and 7). These interviews led to the following conclusions concerning any possible further development and implementation of this basic monitoring tool:

1. Such a tool could not be further developed and implemented, at least initially, at the local community level. While local communities, sub-regional and project managers surveyed in this thesis saw the relevance of such a monitoring tool, they believed that they lacked the necessary time, expertise and/or confidence to become too heavily involved in the ongoing development and implementation of this tool. They see this as being the responsibility of senior management at the relevant regional catchment council and/or governmental levels.
2. As such, this tool has the potential to be further developed and implemented, initially, at the regional catchment council level. While the regional catchment councils interviewed had reservations about aspects of the proposed monitoring tool, they also saw its relevance. They opined, though, that such a tool would be most relevant if it 'fitted in' with their existing regional NRM planning and practices, as opposed to being too theoretical and/or involving the need to make any radical changes to such planning and practice.
3. On balance, the proposed monitoring tool would best be developed and implemented at the regional catchment council level:
 - (i) These councils "lie mid-way" between NRM policy development at the national scale and NRM policy implementation at the local scale. They are, therefore, best placed to facilitate and co-ordinate the ongoing development and implementation of such a tool, the prime objective of which is to improve the 'scaling up' and 'scaling' of community engagement in social learning pathways to help better achieve more sustainable NRM policy development and implementation in practice.
 - (ii) Moreover, though, such a tool could 'fit in' with existing regional catchment council planning and practice. That is, most recently Caring for Our Country has focused on improving monitoring and evaluation in NRM via its MERI program. MERI is implemented in practice through Program Logic. The proposed monitoring tool,

then, with further development, could become a part of such monitoring and evaluation, planning and practice in Western Australia (WA).

In summary, the proposed collaborative monitoring tool might facilitate contemporary sustainable NRM research and practice in WA by sharing community engagement/social learning data. Through the ensuing data sharing/collaborative learning processes a stronger nexus between sustainable NRM research and practice in WA might develop. This stronger nexus might then drive an evolving learning methodology that underpins the ongoing development and implementation of the proposed collaborative monitoring tool. Applied thus, this tool might then assist local community engagement projects and programs in achieving more sustainable NRM policy development and implementation in Australia. The final section in this chapter summarises the implications of developing this rudimentary collaborative monitoring tool for further social-ecological research and practice in this area of sustainable NRM.

8.4 IMPLICATIONS for FURTHER SUSTAINABLE NRM RESEARCH and PRACTICE

This thesis proposes that further research in this area of collaborative monitoring should integrate the social-ecological and related human geographical research examined in this thesis with further research into Geographic Information Systems (GIS) and associated software development (Chapter 7; see especially Hooshangi *et al* 2013; Lefroy *et al* 2012; Cundill *et al* 2012; Leys and Vanclay 2011; Cundill 2010; Cundill and Fabricius 2010; Proctor *et al* 2010; Cundill and Fabricius 2009; Measham 2009; Measham *et al* 2009; Measham 2008; and, relatedly, Rodela *et al* 2012; Mitchel *et al* 2012; MacKenzie *et al* 2012; Fendt and Kaminska-Labbé 2011; Schiele and Krummaker 2011; Franklyn and Blyton 2011; Huber 2007; see also Ens 2012). It suggests that such interdisciplinary social-environmental-engineering research and practice is best placed to facilitate and coordinate the ongoing development and implementation of the proposed hands-on collaborative monitoring tool with the regional catchment councils. Given that such a tool should be able to discern the needs of individuals and local community groups and collect and transfer accumulated or aggregated data at and between all scales, then technical and engineering based solutions — e.g. interlinked mobile devices, web sites and data analyses software — offer the best possibilities for achieving this (see the summarised “how-to” manual in Appendix 6). The regional catchment councils are positioned “mid-way” between the national policy making and local community levels. They are, therefore best placed to facilitate such community

engagement in social learning for achieving sustainable NRM. This thesis suggested that while, under *Caring for Our Country*, these groups have begun to facilitate this process they still have some way to go with respect to strengthening information flows from the regional to the local community scale.

The rudimentary collaborative monitoring tool devised and foreshadowed in this thesis could, with further development, be applied in the context of *Caring for Our Country* to strengthen these “vertical” learning pathways. While there are signs of such research developing – i.e. sustainable NRM research that seeks to become more involved in associated NRM practice through the development of tools — it is still very much in its infancy. There is also a sense among researchers that any forays into this area, where the boundaries between research and practice become much more nebulous, should proceed with caution. Their misgivings have much to do with overcoming the difficulties associated with maintaining academic rigour in sustainable NRM research while also embracing the entrepreneurial spirit and increased risk taking associated with sustainable NRM practices that are increasingly being based on business models. This thesis has made a point of examining these fundamental methodological issues. The thesis suggests that interdisciplinary research between social-ecological, human geographical, GIS and associated software engineering, into the further development and implementation of the proposed collaborative monitoring tool, involving, initially, the regional catchment councils, can further bridge this gap between theory and practice. Indeed, this thesis suggests that such integrated research and practice should underpin the ongoing development and implementation of this monitoring tool.

In summary, in achieving its three main objectives this thesis has developed a practical way of closing ineffective communications feedback loops in Australian NRM (see Lefroy 2008). In so doing, this thesis has also contributed towards broader contemporary Australian and international research in this area that examines how to manage such social-ecological complexity in practice.

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APPENDIX 1

Information Sheet for Participants in the Doctoral Research Project

Working Title

Down to Earth Aiming High: Developing Essential Learning Qualities in Community Engagement Projects for Improving Ecological Health

By

Graham Thompson

(Doctoral Student, Department of Social Sciences, Faculty of Media, Society and Culture, Curtin University of Technology, Perth, Western Australia)

The purpose of this sheet is to provide participants with information that clearly describes the aims of the above research project, the rights of participants and any risks/benefits associated with participation in this project.

1) *The main aim of this research project is to measure the effectiveness of rural and urban nature conservation projects/groups.*

This will be achieved in the first instance by recording the views and opinions of individuals, communities, farmers, families, community leaders/officials, scientists and industry representatives involved in nature conservation projects/groups.

Wherever possible, individuals, communities, farmers, families and community leaders/officials in the region that have not been involved in such projects conservation projects will then be interviewed.

To measure the overall effectiveness of such projects/groups, all responses from participants will be compared and contrasted.

If possible, an attempt may then be made to see how these responses compare with the actual state of the local ecology/natural environment.

215

2) As a participant in this research project you may be required to become involved in:

- a) Informal discussions, and/or
- b) Formal interviews (this usually involves answering a set of more structured questions that arose from informal discussions), and/or
- c) Surveys posted to households for individuals to complete and/or focus groups (a structured questionnaire that is usually completed with others in a group situation and returned to the researcher on the same day).
- d) **Only if you wish**, take/interpret photos, describe your experiences using creative and/or non-fiction writing (for example, short stories/poetry, oral histories) or express them through any other art form of your choosing. Becoming involved in the research project using these approaches will, hopefully, give participants a greater sense of ownership in the project, and complement the more traditional methods already described. **It must be stressed that these approaches are not for everyone and are optional.**

Informal discussions, formal interviews and surveys/focus groups will record your views and opinions about:

- (a) People (b) Land (c) Wildlife (d) Money (e) Picture – The Visual Landscape

and their impacts on nature conservation.

To try and measure changes over time, questions will seek participants' views and opinions of the above items at the beginning, during and after the intervention of nature conservation projects/groups. Questions put to those who have never participated in nature conservation planning projects/groups will also be based on the above categories.

The times to complete discussions, interviews and/or surveys will be kept to a minimum. It is envisaged that initial questionnaires should take no more than 30 minutes to complete, while interviews should take no more than 1 – 1.5 hours to complete (maximum).

3) At all times confidentiality and security of the information provided by participants will be ensured.

- a) All information provide by participants will first be recorded in field notebooks, questionnaire booklets and/or, whenever participants give their permission, on a tape recorder. Information will then be coded if necessary and stored on a dedicated computer. All information will be held under lock and key for five years with access to the researcher only.

214

b) Participants will not be identified in any way in any published material. All confidential information that is published will be coded in such a way that identification of the persons concerned will not be possible. Any information that is thought to potentially identify participants will not be used in published material.

c) The information participants provide will be used, primarily, in this Doctoral thesis. However, this information may also be used subsequently in books, journal articles, papers and/or reports associated with the Doctoral thesis.

4) *Voluntary Participation*

The information provided by participants is completely voluntary. Participants are at liberty to withdraw at any time without prejudice or negative consequences. Participants are also at liberty to retract and/or alter any statements, opinions and/or views they have made at any time, again without prejudice or negative consequences.

5) *Risks and Benefits*

a) There are no apparent physical risks for participants in this research project. Given the measures put in place to maintain confidentiality and security of information, any negative social, economic and/or psychological impacts on individuals, families and communities have been minimised.

b) Possible benefits of the project are long term rather than immediate. Long-term benefits may include the development of a user friendly/participatory assessment tool that may help identify and/or fix potential problems at the start of and during a project. Also, environmental indicators that more effectively integrate the broader needs of local communities with conservation of the natural environment may be developed from this. Overall, this research may contribute to the development of improved nature conservation management strategies and policies.

215

6) Contact details of researcher.

Please do not hesitate to contact the researcher, or supervisors, should you require further information.

RESEARCHER:

Graham Thompson

Telephone: (08) 9266 2125 (Curtin)

Fax: (08) 9266 3166 (Curtin)

Email: graham.thompson@postgrad.curtin.edu.au

SUPERVISORS:

Associate Professor Alan Pilgrim

Telephone: (08) 9266 2477

Fax: (08) 9266 3166

Email: A.Pilgrim@curtin.edu.au

Dr George Curry

Telephone: (08) 9266 3310

Fax: (08) 9266 3166

Email: G.Curry@exchange.curtin.edu.au

Professor Roy Jones

Telephone: (08) 9266 3737

Fax: (08) 9266 3166

Email: R.Jones@curtin.edu.au

216

7) Should participants wish to make a complaint on ethical grounds please contact the Human Research Ethics Committee Secretary:

Sinead Darley

Address: Human Research Ethics Committee,
C/- Office of Research and Development,
Level 1, Building 100,
Curtin University of Technology,
GPO Box U1987,
PERTH WA 6845

Telephone: (08) 9266 2784

Fax: (08) 9266 3793

Email: S.Darley@curtin.edu.au

8) This research project has been approved by the Curtin University Human Research Ethics Committee

Protocol Approval Number: MSC - 01 - 03

(Please quote Protocol Approval Number in any correspondence)

FACULTY OF MEDIA, SOCIETY AND CULTURE
Department of Communication and Cultural Studies
Department of Media and Information
Department of Social Sciences



GPO Box U1987 Perth
Western Australia 6845
TELEPHONE -61 8 9266 7211
-61 8 9266 7094
FACSIMILE -61 8 9266 3166
CRICOS Provider Code 00301J

Consent Form for Participants in the Doctoral Research Project

Working Title
Down to Earth Aiming High: Developing Essential Learning Qualities in Community
Engagement Projects for Improving Ecological Health

By

Graham Thompson

(Doctoral Student, Department of Social Sciences, Curtin University of Technology,
Perth, Western Australia)

I/We Confirm that:

- 1) I/We have been informed of and understand the purposes of the study
- 2) I/We have been given an opportunity to ask questions
- 3) I/We understand that I can withdraw at any time without prejudice
- 4) I/We understand that I can retract and/or alter any statements, opinions and/or views
I have made at any time, again without prejudice or negative consequences
- 5) I/We understand that any information which might potentially identify me will not be
used in published material
- 6) I/We agree to participate in the study as outlined to me

Name(s) of Participant(s): _____

Signature(s): _____

Name of Researcher: _____

Signature: _____

Date: _____

249



INITIAL RURAL CASE STUDY SURVEY (LIVING LANDSCAPES)

GUIDELINES FOR COMPLETING THIS SURVEY

All questions follow a similar format so that, hopefully, the length of time you spend on each question will not be too great (no longer than 2-5 minutes per question is anticipated). It will probably take approximately 1 hour to complete the survey. The following example shows how all questions can be answered:

I would like *Living Landscapes* to help me continue sharing my awareness of the possible effects of any or all of the relationships listed above with others:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area	1	2	3	3	5
From other rural areas	1	2	3	4	5

Thank you for taking the time to complete this questionnaire.

PERSONAL DETAILS

Please provide the following information:

1) NAME:

2) MALE FEMALE

3) AGE 18-30

31-40

41-50

51-60

60+

(4) Name of your *Living Landscapes* group/community:

PART 1
LAND

1) Farming Practices that Help Nature Conservation

1(a) Working with *Living Landscapes* has improved my knowledge of farming practices that help nature conservation.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

1(b) Through working with *Living Landscapes* I have gained more knowledge of farming practices that help nature conservation:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area generally	1	2	3	4	5
In other rural areas	1	2	3	4	5

1(c) I have also gained knowledge of these farming practices through:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups <i>(Please state here)</i>	1	2	3	4	5
Other sources <i>(Please state here)</i>	1	2	3	4	5

1(d) How do you rate *Living Landscapes'* efforts to improve your knowledge of the farming practices that help nature conservation compared to:

	Much Worse	Worse	Same	Better	Much Better
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups <i>(Please state here)</i>	1	2	3	4	5
Other sources <i>(Please state here)</i>	1	2	3	4	5

2) Sharing Your Awareness of Farming Practices that Help Nature Conservation

Living Landscapes has helped me to share with others, in the context of *Landcare*, my knowledge of farming practices that help nature conservation?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

- If **“Agree”** or **“Strongly Agree”**, please go to Section 2(a) on Page 8 (Page 294).
- If **“Disagree”** or **“Strongly Disagree”**, please go to Section 2(b) on Page 12 (Page 298).
- If **“Undecided”**, please go straight to Question 3 on Page 15 (Page 301).

Section 2(a)

(i) *Living Landscapes* often helps me to share my knowledge of farming practices that help nature conservation.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(ii) *Living Landscapes* has helped me to share my knowledge of farming practices that help nature conservation mostly with:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Others my family	1	2	3	4	5
Other local farming families/friends	1	2	3	4	5
Communities, industries and/or organisations from outside your local area <i>(Please state here)</i>	1	2	3	4	5
Others not listed above <i>(Please state here)</i>	1	2	3	4	5

(iii) Sharing my knowledge of farming practices that help nature conservation, through *Living Landscapes*, has helped me to strengthen:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Family relationships	1	2	3	4	5
Local community relationships	1	2	3	4	5
Working relationships with other local farmers	1	2	3	4	5
Working relationships with non-farming communities and organisations	1	2	3	4	5
Other relationships <i>(Please state here)</i>	1	2	3	4	5

(iv) Sharing my knowledge of farming practices that help nature conservation, through *Living Landscapes*, has helped me develop a greater sense of ownership and pride:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
In our farm	1	2	3	4	5
In our local area	1	2	3	4	5
In other rural areas	1	2	3	4	5

(v) Sharing my knowledge of farming practices that help nature conservation, through *Living Landscapes*, has helped me to feel part of a stronger farming community.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(vi) Sharing my knowledge of farming practices that help nature conservation, through *Living Landscapes*, has helped to improve the state of our local bushland:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On farm	1	2	3	4	5
Off farm	1	2	3	4	5

(vii) I would like *Living Landscapes* to help me continue sharing my knowledge of farming practices that help nature conservation with others:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area	1	2	3	4	5
From other rural areas	1	2	3	4	5

(viii) How do you rate *Living Landscapes* efforts to help share your knowledge of farming practices that help nature conservation compared to:

	Much Worse	Worse	Same	Better	Much Better
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups (Please state here)	1	2	3	4	5
Other sources (Please state here)	1	2	3	4	5

(If you completed this section please go straight to Question 3 on Page 15, Page 301)

Section 2(b)

(i) I feel that *Living Landscapes* has NOT helped me share my knowledge of farming practices that help nature conservation because:

(ii) I would like *Living Landscapes* to help me share my knowledge of farming practices that help nature conservation.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

- If **“Agree”** or **“Strongly Agree”**, please answer Question (iii) on the next page, and then continue answering the questions that immediately follow.

- If **“Disagree”** or **“Strongly Disagree”**, please state why here, and then go straight to the **“WILDLIFE”** section:

- If “**Undecided**”, please go straight to Question 3 on Page 15 (Page 301).

(iii) I would like *Living Landscapes* to help me share my knowledge of the following farming practices that help nature conservation:

- Why these?

(iv) I would be more willing to share my knowledge of farming practices through *Living Landscapes* if it helped nature conservation:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area generally	1	2	3	4	5
In other rural areas	1	2	3	4	5

(v) Sharing my knowledge of farming practices that help nature conservation, through *Living Landscapes*, may help me to feel part of a stronger farming community?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(vi) Sharing my awareness of farming practices that help nature conservation, through *Living Landscapes*, may help me to develop a greater sense of ownership and pride:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
In our farm	1	2	3	4	5
In our local area	1	2	3	4	5
In other rural areas	1	2	3	4	5

(vii) Sharing my knowledge of farming practices that help nature conservation, through *Living Landscapes*, may help improve the state of our local bushland:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On farm	1	2	3	4	5
Off farm	1	2	3	4	5

3) Changes in Your Knowledge of Farming Practices that Help Nature Conservation

3(a) The efforts of *Living Landscapes*, **over time**, has improved, and may improve in the near future, my knowledge of farming practices that help nature conservation:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
At the start of the project	1	2	3	4	5
Currently	1	2	3	4	5
Is likely to improve more over next 10 years or so?	1	2	3	4	5

PART 2

WILDLIFE

1) The Positive and Negative Impacts of Animal and Plant Wildlife in Farming

1(a) Working with *Living Landscapes* has improved my understanding of the positive and negative impacts of animal and plant wildlife in farming.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

1(b) Working with *Living Landscapes* has given me a better understanding of the positive and negative impacts of animal and plant wildlife:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area generally	1	2	3	4	5
In other rural areas	1	2	3	4	5

1(c) I have also gained an understanding of the positive and negative impacts of animal and plant wildlife in farming through:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups <i>(Please state here)</i>	1	2	3	4	5
Other sources <i>(Please state here)</i>	1	2	3	4	5

1(d) How do you rate *Living Landscapes'* efforts to improve your understanding of the positive and negative impacts of animal and plant wildlife in farming compared to:

	Much Worse	Worse	Same	Better	Much Better
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups <i>(Please state here)</i>	1	2	3	4	5
Other sources <i>(Please state here)</i>	1	2	3	4	5

2) Sharing Your Awareness of the Positive and Negative Impacts of Animal and Plant Wildlife in Farming

Living Landscapes has helped me to share with others, in the context of *Landcare*, my understanding of the positive and negative effects of animal and plant wildlife in farming?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

- If **“Agree”** or **“Strongly Agree”**, please go to Section 2(a) on Page 21 (Page 308).

- If **“Disagree”** or **“Strongly Disagree”**, please go to Section 2(b) on Page 25 (Page 312).

- If **“Undecided”**, please go straight to Question 3 on page 28 (Page 315).

Section 2(a)

(i) *Living Landscapes* often helps me to share my understanding of the positive and negative impacts of animal and plant wildlife in farming.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(ii) *Living Landscapes* has helped me to share my understanding of the positive and negative impacts of animal and plant wildlife in farming mostly with:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Others my family	1	2	3	4	5
Other local farming families/friends	1	2	3	4	5
Communities, industries and/or organisations from outside your local area <i>(Please state here)</i>	1	2	3	4	5
Others not listed above <i>(Please state here)</i>	1	2	3	4	5

(iii) Sharing my understanding of the positive and negative impacts of animal and plant wildlife in farming, through *Living Landscapes*, has helped me to strengthen:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Family relationships	1	2	3	4	5
Local community relationships	1	2	3	4	5
Working relationships with other local farmers	1	2	3	4	5
Working relationships with non-farming communities and organisations	1	2	3	4	5
Other relationships <i>(Please state here)</i>	1	2	3	4	5

(iv) Sharing my understanding of the positive and negative impacts of animal and plant wildlife in farming, through *Living Landscapes*, has helped me develop a greater sense of ownership and pride:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
In our farm	1	2	3	4	5
In our local area	1	2	3	4	5
In other rural areas	1	2	3	4	5

(iv) Sharing my understanding of the positive and negative impacts of animal and plant wildlife in farming, through *Living Landscapes*, has helped me to feel part of a stronger farming community.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(v) Sharing my understanding of the positive and negative impacts of animal and plant wildlife in farming, through *Living Landscapes*, has helped me to improve the state of our local bushland:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On farm	1	2	3	4	5
Off farm	1	2	3	4	5

(vi) I would like *Living Landscapes* to help me continue sharing my understanding of the positive and negative impacts of animal and plant wildlife in farming with others:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area	1	2	3	4	5
From other rural areas	1	2	3	4	5

(vii) How do you rate *Living Landscapes'* efforts to help share your understanding of the positive and negative impacts of animal and plant wildlife in farming compared to:

	Much Worse	Worse	Same	Better	Much Better
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups (Please state here)	1	2	3	4	5
Other sources (Please state here)	1	2	3	4	5

(If you completed this section please go to Question 3 on Page 28, Page 315)

Section 2(b)

(i) I feel that *Living Landscapes* has NOT helped me to share my understanding of the positive and negative impacts of animal and plant wildlife in farming because:

(ii) I would like *Living Landscapes* to help me share my understanding of the positive and negative impacts of animal and plant wildlife in farming?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

- If **“Agree”** or **“Strongly Agree”**, please answer Question (iii) on the next page, and then continue answering the questions that immediately follow.
- If **“Disagree”** or **“Strongly Disagree”**, please state why here, and then go straight to the **“MONEY”** section:

- If **“Undecided”**, please go straight to Question 3 on Page 28 (Page 315).

(iii) I would like *Living Landscapes* to help me share my understanding of the following positive and/or negative impacts of animal and/or plant wildlife in farming:

- Why these?

(iv) I would be more willing to share my understanding of the positive and negative impacts of animal and plant wildlife in farming, through *Living Landscapes*, if it helped nature conservation:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area generally	1	2	3	4	5
In other rural areas	1	2	3	4	5

(v) Sharing my understanding of the positive and negative impacts of animal and plant wildlife, through *Living Landscapes*, may help me to feel part of a stronger farming community?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(vi) Sharing my understanding of the positive and negative impacts of animal and plant wildlife, through *Living Landscapes*, may help me to develop a greater sense of ownership and pride:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
In our farm	1	2	3	4	5
In our local area	1	2	3	4	5
In other rural areas	1	2	3	4	5

(vii) Sharing my understanding of the positive and negative impacts of animal and plant wildlife, through *Living Landscapes*, may help me improve the state of our local bushland:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On farm	1	2	3	4	5
Off farm	1	2	3	4	5

3) Changes in Your Understanding of the Positive and Negative Impacts of Animal and Plant Wildlife in Farming.

3(a) The efforts of *Living Landscapes*, **over time**, has improved, and may improve in the near future, your understanding of the positive and negative impacts of animal and plant wildlife in farming:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
At the start of the project	1	2	3	4	5
Currently	1	2	3	4	5
Is likely to improve more over next 10 years or so?	1	2	3	4	5

PART 3

MONEY

1) The Financial Impacts of Planning for Nature Conservation in Farming

1(a) Working with *Living Landscapes* has increased my awareness of the financial costs and benefits of planning for nature conservation in farming.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

1(b) Through working with *Living Landscapes* I have gained more awareness of the financial costs and benefits of planning for nature conservation:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area generally	1	2	3	4	5
In other rural areas	1	2	3	4	5

1(c) I have also gained an awareness of the costs and benefits of planning for nature conservation in farming through:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups <i>(Please state here)</i>	1	2	3	4	5
Other sources <i>(Please state here)</i>	1	2	3	4	5

1(d) How do you rate *Living Landscapes'* efforts to improve your awareness of the financial costs and benefits of planning for nature conservation in farming compared to:

	Much Worse	Worse	Same	Better	Much Better
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups <i>(Please state here)</i>	1	2	3	4	5
Other sources <i>(Please state here)</i>	1	2	3	4	5

2) Sharing Your Awareness of the Financial Impacts of Planning for Nature Conservation in Farming

Living Landscapes has helped me to share with others my awareness of the financial costs and benefits of planning for nature conservation in farming?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

- If **“Agree”** or **“Strongly Agree”**, please go to Section 2(a) on Page 34 (Page 322).

- If **“Disagree”** or **“Strongly Disagree”**, please go to Section 2(b) on Page 38 (Page 326).

- If **“Undecided”**, please go straight to Question 3 on Page 41 (Page 329).

Section 2(a)

(i) *Living Landscapes* often helps me to share my awareness of the costs and benefits of planning for nature conservation in farming.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(ii) *Living Landscapes* has helped me to share my awareness of the financial costs and benefits of planning for nature conservation in farming mostly with:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Others my family	1	2	3	4	5
Other local farming families/friends	1	2	3	4	5
Communities, industries and/or organisations from outside your local area <i>(Please state here)</i>	1	2	3	4	5
Others not listed above <i>(Please state here)</i>	1	2	3	4	5

(iii) Sharing my awareness of the financial costs and benefits of planning for nature conservation in farming, through *Living Landscapes*, has helped me to strengthen:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Family relationships	1	2	3	4	5
Local community relationships	1	2	3	4	5
Working relationships with other local farmers	1	2	3	4	5
Working relationships with non-farming communities and organisations	1	2	3	4	5
Other relationships (Please state here)	1	2	3	4	5

(iv) Sharing my awareness of the financial costs and benefits of planning for nature conservation in farming, through *Living Landscapes*, has helped me to develop a greater sense of ownership and pride:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
In our farm	1	2	3	4	5
In our local area	1	2	3	4	5
In other rural areas	1	2	3	4	5

(v) Sharing my awareness of the financial costs and benefits of planning for nature conservation in farming, through *Living Landscapes*, has helped me to feel part of a stronger farming community.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(vi) Sharing my awareness of the financial costs and benefits of planning for nature conservation in farming, through *Living Landscapes*, has helped me to improve the state of our local bushland:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On farm	1	2	3	4	5
Off farm	1	2	3	4	5

(vi) I would like *Living Landscapes* to help me continue sharing my awareness of the financial costs and benefits of planning for nature conservation in farming with others:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area	1	2	3	4	5
From other rural areas	1	2	3	4	5

(vii) How do you rate *Living Landscapes'* efforts to help you share your awareness of the financial costs and benefits of planning for nature conservation in farming compared to:

	Much Worse	Worse	Same	Better	Much Better
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups <i>(Please state here)</i>	1	2	3	4	5
Other sources <i>(Please state here)</i>	1	2	3	4	5

(If you completed this section please go to Question 3 on Page 41, Page 329)

Section 2(b)

(i) I feel that *Living Landscapes* has NOT helped me to share my awareness of the financial costs and benefits of planning for nature conservation in farming because:

(ii) I would like *Living Landscapes* to help me share my awareness of the financial costs and benefits of planning for nature conservation in farming?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

- If **“Agree”** or **“Strongly Agree”**, please answer Question (iii) on the next page, and then continue answering the questions that immediately follow.
- If **“Disagree”** or **“Strongly Disagree”**, please state why here, and then go straight to the **“PICTURE”** section:

- If **“Undecided”**, please go straight to Question 3 on Page 41 (Page 329).

(iii) I would like *Living Landscapes* to help me share my understanding of the following financial costs and benefits:

- Why these?

(iv) I would be more willing to share my awareness of the financial costs and benefits of planning for nature conservation in farming, through *Living Landscapes*, if it helped nature conservation:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area generally	1	2	3	4	5
In other rural areas	1	2	3	4	5

(v) Sharing my awareness of the financial costs and benefits of planning for nature conservation in farming, through *Living Landscapes*, may help me to feel part of a stronger farming community?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(vi) Sharing my awareness of the financial costs and benefits of planning for nature conservation in farming, through *Living Landscapes*, may help me to develop a greater sense of ownership and pride:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
In our farm	1	2	3	4	5
In our local area	1	2	3	4	5
In other rural areas	1	2	3	4	5

(vii) Sharing my awareness of the financial costs and benefits of planning for nature conservation in farming, through *Living Landscapes*, may help me improve the state of our local bushland:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On farm	1	2	3	4	5
Off farm	1	2	3	4	5

3) Changes in Your Awareness of the Financial Impacts of Planning for Nature Conservation in Farming

3(a) The efforts of *Living Landscapes*, **over time**, has increased, and may likely further increase, your awareness of the financial costs and benefits of planning for nature conservation in farming:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
At the start of the project	1	2	3	4	5
Currently	1	2	3	4	5
Is likely to increase more over next 10 years or so?	1	2	3	4	5

PART 4

PICTURE

(The Visual Landscape)

1) Your Feelings about the Impacts Nature Conservation in Farming is Having on the Visual Landscape

1(a) *Living Landscapes* has helped me to feel good about the impacts nature conservation in farming is having on the visual landscape.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

1(b) *Living Landscapes* has, in particular, helped me to feel good about the impacts nature conservation in farming is having on the visual landscape:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area generally	1	2	3	4	5
In other rural areas	1	2	3	4	5

1(c) Any good feelings I have about the impacts of nature conservation in farming on the visual landscape have also been developed through:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups <i>(Please state here)</i>	1	2	3	4	5
Other sources <i>(Please state here)</i>	1	2	3	4	5

1(d) How do you rate *Living Landscapes'* efforts to encourage you to feel good about nature conservation in farming and its impacts on the visual landscape compared to:

	Much Worse	Worse	Same	Better	Much Better
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups <i>(Please state here)</i>	1	2	3	4	5
Other sources <i>(Please state here)</i>	1	2	3	4	5

2) Sharing Your Feelings about the Impacts Nature Conservation in Farming is Having on the Visual Landscape

Living Landscapes has helped me to share with others, in the context of *Landcare*, my feelings about the impacts nature conservation in farming is having on the visual landscape?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

- If **“Agree”** or **“Strongly Agree”**, please go to Section 2(a) on Page 47 (Page 336).

- If **“Disagree”** or **“Strongly Disagree”**, please go to Section 2(b) on Page 51 (Page 340).

- If **“Undecided”**, please go straight to Question 3 on Page 54 (Page 343).

Section 2(a)

(i) *Living Landscapes* often helps me to share my feelings about the impacts nature conservation in farming is having on the visual landscape.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(ii) *Living Landscapes* has helped me to share my feelings about the impacts nature conservation in farming is having on the visual landscape mostly with:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Others in my family	1	2	3	4	5
Other local farming families/friends	1	2	3	4	5
Communities, industries and/or organisations from outside your local area <i>(Please state here)</i>	1	2	3	4	5
Others not listed above <i>(Please state here)</i>	1	2	3	4	5

(iii) Sharing my feelings about the impacts nature conservation in farming is having on the visual landscape, through *Living Landscapes*, has helped me to strengthen:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Family relationships	1	2	3	4	5
Local community relationships	1	2	3	4	5
Working relationships with other local farmers	1	2	3	4	5
Working relationships with non-farming communities and organisations	1	2	3	4	5
Other relationships (Please state here)	1	2	3	4	5

(iv) Sharing my feelings about the impacts nature conservation in farming is having on the visual landscape, through *Living Landscapes*, has helped me develop a greater sense of ownership and pride:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
In our farm	1	2	3	4	5
In our local area	1	2	3	4	5
In other rural areas	1	2	3	4	5

(v) Sharing my feelings about the impacts nature conservation in farming is having on the visual landscape, through *Living Landscapes*, has helped me to feel part of a stronger farming community.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(vi) Sharing my feelings about the impacts nature conservation in farming is having on the visual landscape, through *Living Landscapes*, has helped me to improve the state of our local bushland:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On farm	1	2	3	4	5
Off farm	1	2	3	4	5

(vii) I would like *Living Landscapes* to help me continue sharing my feelings about the impacts nature conservation in farming is having on the visual landscape with others:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area	1	2	3	4	5
From other rural areas	1	2	3	4	5

(viii) How do you rate *Living Landscapes* efforts to help share your feelings about the impacts nature conservation in farming is having on the visual landscape compared to:

	Much Worse	Worse	Same	Better	Much Better
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups <i>(Please state here)</i>	1	2	3	4	5
Other sources <i>(Please state here)</i>	1	2	3	4	5

(If you completed this section please go to Question 3 on Page 54, Page 343)

Section 2(b)

(i) I feel that *Living Landscapes* has NOT helped me share my feelings about the impacts nature conservation in farming is having on the visual landscape because:

(ii) I would like *Living Landscapes* to help me share my feelings about the impacts nature conservation in farming is having on the visual landscape?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

- If **“Agree”** or **“Strongly Agree”**, please answer Question (iii) on the next page, and then continue answering the questions that immediately follow.
- If **“Disagree”** or **“Strongly Disagree”**, please state why here, and then go straight to the **“PICTURE”** section:

- If **“Undecided”**, please go straight to Question 3 on Page 54 (Page 343).

(iii) I would like *Living Landscapes* to help share my feelings about the following impacts on the visual landscape:

- Why these?

(iv) I would be more willing to share my feelings about the impacts nature conservation in farming is having on the visual landscape, through *Living Landscapes*, if it helped nature conservation:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area generally	1	2	3	4	5
In other rural areas	1	2	3	4	5

(v) Sharing my feelings about the impacts nature conservation in farming is having on the visual landscape, through *Living Landscapes*, may help me to feel part of a stronger farming community?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(vi) Sharing my feelings about the impacts nature conservation in farming is having on the visual landscape , through *Living Landscapes*, may help me to develop a greater sense of ownership and pride:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
In our farm	1	2	3	4	5
In our local area	1	2	3	4	5
In other rural areas	1	2	3	4	5

(vi) Sharing my feelings about the impacts nature conservation in farming is having on the visual landscape, through *Living Landscapes*, may help improve the state of our local bushland:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On farm	1	2	3	4	5
Off farm	1	2	3	4	5

3) Changes in the Way You Feel About the Impacts Nature Conservation in Farming is Having on the Visual Landscape

3(a) *Living Landscapes*, **over time**, has helped you, and may help you in the near future, to feel good about the impacts of nature conservation on the visual landscape:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
At the start of the project	1	2	3	4	5
Currently	1	2	3	4	5
Over the next 10 years or so?	1	2	3	4	5

PART 5

PEOPLE

1) Relationships Between People and How they Can Affect Planning for Nature Conservation in Farming

1(a) PERSONALITIES

Living Landscapes has helped to raise my awareness of how relationships between individuals, families and/or local groups can affect planning for nature conservation in farming.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

1(b) TRADITIONS

Living Landscapes has helped to raise my awareness of how relationships between my farming community and other communities with different ways of life (e.g., non-farming, urban, aboriginal etc) can affect planning for nature conservation in farming.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

1(c) GOVERNMENT

Living Landscapes has helped to raise my awareness of how relationships between my farming community and Local, State and/or Federal governments can affect planning for nature conservation in farming.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

1(d) OTHER KINDS OF RELATIONSHIPS BETWEEN PEOPLE (not included above)

You may if you wish list up to three other relationships next to (a), (b) and/or (c) below:

(a) _____ (b) _____ (c) _____

Or, if NONE, write "None" here: _____

Living Landscapes has helped to raise my awareness of how the relationships I have listed in Question 1(d) can affect planning for nature conservation in farming.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
(a)	1	2	3	4	5
(b)	1	2	3	4	5
(c)	1	2	3	4	5

1(e) *Living Landscapes* has helped me to become more aware of how any or all of the relationships listed above can affect planning for nature conservation:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area generally	1	2	3	4	5
In other rural areas	1	2	3	4	5

1(f) I have also developed an awareness of the possible effects of any or all of the relationships listed above through:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups <i>(Please state here)</i>	1	2	3	4	5
Other sources <i>(Please state here)</i>	1	2	3	4	5

1(g) How do you rate *Living Landscapes'* efforts to raise your awareness of the possible effects of any or all of the relationships listed above compared to:

	Much Worse	Worse	Same	Better	Much Better
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups <i>(Please state here)</i>	1	2	3	4	5
Other sources <i>(Please state here)</i>	1	2	3	4	5

2) Sharing Your Awareness of How Relationships between People can Affect Planning for Nature Conservation in Farming

Living Landscapes has helped me to share with others, in the context of *Landcare*, my awareness of how any or all of the relationships listed above can affect planning for nature conservation in farming?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

- If **“Agree”** or **“Strongly Agree”**, please go to Section 2(a) on Page 61 (Page 351).

- If **“Disagree”** or **“Strongly Disagree”**, please go to Section 2(b) on Page 66 (Page 356).

- If **“Undecided”**, please go straight to Question 3 on Page 70 (Page 368).

Section 2(a)

Living Landscapes has helped me to share with others my awareness of:

(i) PERSONALITIES (How relationships between individuals, families and/or local groups can affect planning for nature conservation in farming).

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(ii) TRADITIONS (How relationships between my farming community and other communities with different ways of life - e.g., non-farming, urban, aboriginal etc - can affect planning for nature conservation in farming).

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(iii) GOVERNMENT (How relationships between my farming community and Local, State and/or Federal governments can affect planning for nature conservation in farming).

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(iv) OTHER KINDS OF RELATIONSHIPS BETWEEN PEOPLE (not included above)

You may list up to three other relationships next to (a), (b) and/or (c) below:

(a) _____ (b) _____ (c) _____

Or, if NONE, write "None" here: _____

Living Landscapes has helped me to share my awareness of how the relationships I have listed in Question (iv) can affect planning for nature conservation in farming.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
(a)	1	2	3	4	5
(b)	1	2	3	4	5
(c)	1	2	3	4	5

(v) *Living Landscapes* has helped me to share my awareness of the possible effects of any or all of the relationships listed above mostly with:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Others in my family	1	2	3	4	5
Other local farming families/friends	1	2	3	4	5
Communities, industries and/or organisations from outside your local area <i>(Please state here)</i>	1	2	3	4	5
Others not listed above <i>(Please state here)</i>	1	2	3	4	5

(vi) Sharing my awareness of the possible effects of any or all of the relationships listed above, through *Living Landscapes*, has helped me to strengthen:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Family relationships	1	2	3	4	5
Local community relationships	1	2	3	4	5
Working relationships with other local farmers	1	2	3	4	5
Working relationships with non-farming communities and organisations	1	2	3	4	5
Other relationships (Please state here)	1	2	3	4	5

(vii) Sharing my awareness of the possible effects of any or all of the relationships listed above, through *Living Landscapes*, has helped me to develop a greater sense of ownership and pride:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
In our farm	1	2	3	4	5
In our local area	1	2	3	4	5
In other rural areas	1	2	3	4	5

(viii) Sharing my awareness of the possible effects of any or all of the relationships listed above, through *Living Landscapes*, has helped me to feel part of a stronger farming community.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(ix) Sharing my awareness of the possible effects of any or all of the relationships listed above, through *Living Landscapes*, has helped me to improve the state of my local bushland:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On farm	1	2	3	4	5
Off farm	1	2	3	4	5

(x) I would like *Living Landscapes* to help me continue sharing my awareness of the possible effects of any or all of the relationships listed above with others:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area	1	2	3	4	5
From other rural areas	1	2	3	4	5

(xi) How do you rate *Living Landscapes'* efforts to help share your awareness of the possible effects of any or all of the relationships listed above compared to:

	Much Worse	Worse	Same	Better	Much Better
Family and friends	1	2	3	4	5
Formal education	1	2	3	4	5
Work	1	2	3	4	5
<i>Landcare</i>	1	2	3	4	5
Other conservation groups <i>(Please state here)</i>	1	2	3	4	5
Other sources <i>(Please state here)</i>	1	2	3	4	5

(If you completed this section please go straight to Question 3 on Page 70, Page 360)

Section 2(b)

(i) I feel that *Living Landscapes* has NOT helped me to share my awareness of how relationships between people can affect planning for nature conservation in farming because:

(ii) I would like *Living Landscapes* to help me share my awareness of how relationships between people can affect nature conservation planning in farming?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

- If **“Agree”** or **“Strongly Agree”**, please go to Question (iii) directly below, and the continue answering the questions that immediately follow.
- If **“Disagree”** or **“Strongly Disagree”**, please state why here, and then go straight to **“LAND”** section:

- If **“Undecided”**, please go straight to Question 3 on Page 70 (Page 360).

(iii) I would like *Living Landscapes* to help me share my awareness of how the following relationships between people can affect nature conservation planning in farming:

PERSONALITIES (How relationships between individuals, families and/or local groups can affect planning for nature conservation in farming).

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

TRADITIONS (How relationships between my farming community and other communities with different ways of life - e.g., non-farming, urban, aboriginal etc - can affect planning for nature conservation in farming).

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

GOVERNMENT (How relationships between my farming community and Local, State and/or Federal governments can affect planning for nature conservation in farming).

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

OTHER KINDS OF RELATIONSHIPS BETWEEN PEOPLE (not included above)

You may list up to three other relationships next to (a), (b) and/or (c) below:

(a) _____ (b) _____ (c) _____

Or, if NONE, write "None" here: _____

I would like *Living Landscapes* to help me share my awareness of the relationships listed in (a), (b) and/or (c):

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
(a)	1	2	3	4	5
(b)	1	2	3	4	5
(c)	1	2	3	4	5

(iv) I would be more willing for *Living Landscapes* to help me share my awareness of the possible effects of any or all of the relationships listed above if they affected planning for nature conservation:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On our farm	1	2	3	4	5
In our local area	1	2	3	4	5
In other rural areas	1	2	3	4	5

(v) Sharing my awareness of the possible effects of any or all of the relationships listed above, through *Living Landscapes*, may help me feel part of a stronger farming community?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

(vi) Sharing my awareness of the possible effects of any or all of the relationships listed above, through *Living Landscapes*, may help me to develop a greater sense of ownership and pride:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
In our farm	1	2	3	4	5
In our local area	1	2	3	4	5
In other rural areas	1	2	3	4	5

(vii) Sharing my awareness of the possible effects of any or all of the relationships listed above, through *Living Landscapes*, may help me to improve the state of my local bushland:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
On farm?	1	2	3	4	5
Off farm?	1	2	3	4	5

3) Changes in Your Awareness of How Relationships between People can Affect Planning for Nature Conservation in Farming

The efforts of *Living Landscapes*, **over time**, has improved, and may improve in the near future, my awareness of:

3(a) PERSONALITIES (How relationships between individuals, families and other local groups can affect planning for nature conservation in farming.)

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
At the start of the project	1	2	3	4	5
Currently	1	2	3	4	5
Is likely to improve more over the next 10 years or so?	1	2	3	4	5

3(b) TRADITIONS (How relationships between your farming community and other communities with different ways of life - e.g., non-farming, urban, aboriginal etc - can affect planning for nature conservation in farming.)

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
At the start of the project	1	2	3	4	5
Currently	1	2	3	4	5
Is likely to improve more over the next 10 years or so?	1	2	3	4	5

3(c) GOVERNMENT (How relationships between your community and Local, State and/or Federal governments can affect planning for nature conservation in farming.)

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
At the start of the project	1	2	3	4	5
Currently	1	2	3	4	5
Is likely to improve more over the next 10 years or so?	1	2	3	4	5

3(d) OTHER KINDS OF RELATIONSHIPS BETWEEN PEOPLE (not included above)

You may list up to three other relationships next to (a), (b) and/or (c) below:

(a) _____ (b) _____ (c) _____

Or, if NONE, write "None" here: _____

The efforts of *Living Landscapes*, **over time**, has improved, and may improve in the near future, my awareness of the relationships I have listed in Question 3(d):

(a)

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
At the start of the project	1	2	3	4	5
Currently	1	2	3	4	5
Is likely to improve more over the next 10 years or so?	1	2	3	4	5

(b)

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
At the start of the project	1	2	3	4	5
Currently	1	2	3	4	5
Is likely to improve more over the next 10 years or so?	1	2	3	4	5

(c)

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
At the start of the project	1	2	3	4	5
Currently	1	2	3	4	5
Is likely to improve more over the next 10 years or so?	1	2	3	4	5

COMMENTS, CRITICISMS AND SUGGESTIONS FOR FUTURE PLANNING

In keeping with *Greening Australia's* approach to conservation planning, it would be great to involve you in the ongoing planning and implementation of this research project. To begin this process, space has been provided below for your invaluable comments, suggestions and criticisms (and praise!). Please feel free to become involved if you wish.

To help you provide additional comments, the research process has been divided into three steps:

Step 1

The *Plow Map* Questionnaire (completed today).

1) How easy was it to complete the questionnaire?

Very Difficult	Difficult	Undecided	Easy	Very Easy
1	2	3	4	5

Comments, Criticisms, Suggestions and/or Praise

Step 2

The major issues to arise out of Step 1 will be used as basis for discussions in follow up surveys. These discussions/surveys may take place on a one-to-one basis and/or as *Living Landscapes'* groups. In either case, the priority is to organise these discussions in ways that suit you as individuals or *Living Landscapes* groups as a whole. Your comments today will therefore be invaluable in helping to plan for any future discussions/surveys.

1) Would you mind being interviewed individually about any of the issues raised in the questionnaire?

YES UNDECIDED NO

Comments, Criticisms, Suggestions (For example, if you answered YES or UNDECIDED, you may wish to indicate why; or, if you answered NO, you may wish to consider any specific issues for discussion, times, places and/or interview formats)

2) Would you mind taking part in a *Living Landscapes'* group discussion about any of the issues raised in the questionnaire?

YES UNDECIDED NO

Comments, Criticisms, Suggestions (For example, if you answered YES or UNDECIDED, you may wish to indicate why; or, if you answered NO, you may wish to consider any specific issues for discussion, times, places and/or discussion formats)

Step 3

The idea is that over the next year or two farmers and their families provide their own accounts of the topics/issues raised in the questionnaires (i.e., People, Land, Wildlife, Money and/or Picture) in creative ways of their choice. Completed works could then be used in the research report in conjunction with results from the questionnaires, discussions/surveys. Hopefully, this would be a fun way (for some!) to become involved in the research project, and also provide an opportunity for children to have their say. Maybe towards the end of the research project we could organise an exhibition/social, maybe even a competition!

Please indicate below (by ticking the appropriate box or boxes) if you or any member of your family, including children, might be interested in becoming more involved in the this research project through:

Comments, Criticisms, Suggestions

Photography

Painting/drawing

Filming

Drama

Writing and/or Recording:

Oral histories

Diaries/journals

Poetry

Story writing

Songwriting

Other (Please State)

APPENDIX 2

FACULTY OF MEDIA, SOCIETY AND CULTURE
Department of Communication and Cultural Studies
Department of Media and Information
Department of Social Sciences



GPO Box U1987 Perth
Western Australia 6845
TELEPHONE +61 8 9266 7211
 +61 8 9266 7094
FACSIMILE +61 8 9266 3166
CRICOS Provider Code 00301J

ROOM 119, BUILDING 209
TELEPHONE: 9266 2125 FASCIMILE: 9266 3166
EMAIL: graham.thompson@student.curtin.edu.au

..... October 2005

To:
.....
.....
.....
.....

Dear

Thankyou very much for agreeing to talk with me about environmental issues that are relevant to farming. Please find below a summary of the issues that I hope to discuss with you on 2005 followed by a more detailed list of questions to be used as a basis for informal discussion. The discussion should take no longer than 2 Hours.

- How *Landcare*, and then the *Living Landscapes* project, have helped you to become more aware of land degradation and other environmental issues both on-farm and off-farm.
- Your familiarity, just prior to *Landcare*, with any of these environmental issues; whether they were discussed among farmers and in the wider community; your concern at this time for any possible future environmental problems on your farm and/or in other areas.
- The environmental awareness of previous generations of farmers in your family; whether they discussed these issues among themselves and in the wider community; their concerns for the future in this regard.
- Your environmental concerns for the next ten years or so.

303



RURAL CASE STUDY

QUESTIONS as a BASIS for FURTHER DISCUSSION

During *Landcare* and *Living Landscapes*

- 1) How has *Landcare* helped you solve land degradation problems (e.g. scalds, gullies, problem soils) on your farm?
- 2) How has *Living Landscapes* helped you in this regard?
- 3) How have both projects helped you solve other environmental problems on your farm (e.g. related to water, trees, birds, roos, weeds, feral animals etc)?
- 4) How have these projects helped you to become familiar with other issues relevant to protecting the environment on your farm (e.g. relationships with neighbours, and with government agency people; development of government policy; financial costs and benefits; impacts on the visual landscape)?
- 5) How has *Living Landscapes* helped you to become familiar with these issues in your catchment and beyond?
- 6) How do the outcomes achieved through *Living Landscapes* compare with work undertaken with other groups, organisations and/or government departments trying to achieve similar goals?

Just Prior to *Landcare*

- 7) When did you first become involved in *Landcare*?
- 8) How (why) did you become involved?
- 9) Prior to your involvement with *Landcare*, how familiar were you with any of the land degradation and other environmental issues that we've been discussing?
- 10) Prior to your involvement with *Landcare*, did you talk to, or work with, other farmers to discuss and/or fix any of these environmental issues and problems?
- 11) Did you talk to, or work, with people or groups other than farmers to discuss and/or fix any of these environmental issues and problems?
- 12) Did you worry about potential future environmental problems on your farm, and/or in other areas, at this time?

Previous Generations of Farmers

If you are a second (or more) generation farming family, please continue on through Questions 13 -16 otherwise go to Question 17.

13) What do you recall about your father's or grandfather's generation? Were they aware of any of the environmental concerns discussed earlier?

14) Did they talk to, or work with, other farmers to discuss or address any of these concerns?

15) Did they talk to, or work with, people or groups other than farmers to discuss or address any of these environmental concerns?

16) Did they worry about the future in this regard?

The Future

17) With respect to all that we have talked about today, what are your concerns for the future?

APPENDIX 3

To all members of the *Bannister Creek Catchment Group*

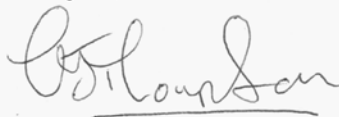
My name is Graham Thompson. I am currently studying for my PhD in geography at Curtin University of Technology in Perth (please see the enclosed Information Sheet for Participants and Consent Form). I am also currently employed as a part-time water management officer for the *South East Regional Centre for Urban Landcare (SERCUL)*.

A major practical component of my research involves developing a tool for evaluating urban and rural community engagement projects that are involved in natural resource/nature conservation planning and management. The *Bannister Creek Catchment Group* has been selected as a key group for trialling the evaluation tool in the community. The results obtained will be made available to the *Bannister Creek Catchment Group* in the form of a report.

I would very much welcome your participation in completing the enclosed questionnaire. The questionnaire should take no longer than 30 minutes to complete. Once completed, please place the questionnaire in the addressed prepaid envelop provided and return to Curtin University of Technology.

As a valuable member of the *Bannister Creek Catchment Group* your assistance in completing the questionnaire is greatly appreciated. Please do not hesitate to contact either myself (at Curtin University of Technology or at SERCUL) or my supervisors should you require any further information, help or advice.

Kind regards,



Graham Thompson

Tel: Curtin University of Technology 9266 2125 (Thursday and Friday)

SERCUL 9458 5664 (Monday, Tuesday, Wednesday)

309

PLEASE NOTE

1. Urban survey “Information Sheet for Participants” and “Consent Form for Participants” that accompanied this letter of introduction as for *Living Landscapes*.
2. *TRCG* cover letter as for the *BCCG*.

**MODIFIED URBAN CASE STUDY SURVEY
(*BANNISTER CREEK CATCHMENT GROUP* EXAMPLE)**

GUIDELINES FOR COMPLETING THIS QUESTIONNAIRE

The questions are designed to assess three learning qualities: (1) Improved Knowledge (2) Shared Optimism (3) Sustained Motivation. These are suggested by the researcher to be some of the essential qualities needed for contributing to the success of urban and rural nature conservation community engagement projects. A fourth section entitled 'On Reflection' provides an opportunity for you to compare the effectiveness of the *BCCG* with other groups. Geographical methods of enquiry are used in this assessment.

The following example shows how the questions can be answered:

1) The *BCCG* has helped *improve* my knowledge of the following urban wetland conservation issues:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
PEOPLE <i>(Eg, Social, Cultural, Political, Values, Morals, Ethics)</i>	1	2	3	4	5
LAND <i>(Eg, Soils, Planting Techniques, Landscaping, Equipment Used)</i>	1	2	3	4	5
WILDLIFE <i>(Native Animals and Plants)</i>	1	2	3	4	5
MONEY <i>(Financial Costs and Benefits)</i>	1	2	3	4	5
PICTURE <i>(Impacts on the Visual Landscape)</i>	1	2	3	4	5

2) The BCCG has helped me *share* my knowledge of the urban wetland conservation issues above with other relevant individuals and/or groups in:

(Each box represents a geographical area. You may tick more than one.)

Banister Creek Catchment	Swan Canning Catchments	Southwest Regional WA	WA State	Australia and Overseas	Unsure	No Help At All
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PERSONAL DETAILS

Please provide the following information by ticking the appropriate boxes:

1) MALE FEMALE

2) AGE

18-30	<input type="checkbox"/>
31-40	<input type="checkbox"/>
41-50	<input type="checkbox"/>
51-60	<input type="checkbox"/>
60+	<input type="checkbox"/>

(1) IMPROVED KNOWLEDGE

There are five categories in Question 1a (People, Land, Wildlife, Money and Picture). Each category includes a brief explanation in brackets. However, the following examples provide you with some further guidance as to their meaning.

PEOPLE: *Cultural, Values* - the values of indigenous cultures and peoples in urban wetland conservation; *Social* - building better relationships with each other and other groups to improve urban wetland conservation; *Political* - working effectively with governments and other public and private organisations involved in urban wetland conservation, power relations; *Moral Dilemmas* - the rights of local peoples to gain access to parkland along the river versus the need to re-vegetate these areas with native species.

LAND: *The more practical land management issues associated with urban wetland conservation, along riverbanks and/or on floodplains for example.*

WILDLIFE: *Not just the identification of local native and non-native species of plants and animals but also their positive and negative impacts in urban wetlands.*

MONEY: *The amount of funding available for urban wetland conservation, applying for funding, managing the funds appropriately.*

PICTURE: *The impacts of work done, or yet to be done, on the visual landscape bearing in mind the different opinions within communities about what constitutes a pleasing view.*

1a. The BCCG has helped *improve* my knowledge of the following urban wetland conservation issues:

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
PEOPLE <i>(Eg, Social, Cultural, Political, Values, Moral, Ethical)</i>	1	2	3	4	5
LAND <i>(Eg, Soils, Planting Techniques, Landscaping, Equipment Used)</i>	1	2	3	4	5
WILDLIFE <i>(Native Animals and Plants)</i>	1	2	3	4	5
MONEY <i>(Financial Costs and Benefits)</i>	1	2	3	4	5
PICTURE <i>(Impacts on the Visual Landscape)</i>	1	2	3	4	5

1b. You may wish to provide brief comments here in support of your answers:

(2) SHARED OPTIMISM

2a. The BCCG has helped me *share* my knowledge of the urban wetland conservation issues above with other relevant individuals and/or groups in:

(Each box represents a geographical area. You may tick more than one.)

Banister Creek Catchment	Swan Canning Catchments	Southwest Regional WA	WA State	Australia and Overseas	Unsure	No Help At All
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2b. If appropriate, please describe briefly how and with which individuals and/or groups you have shared this knowledge.

(You need not name individuals; a position within a group will suffice.)

2c. Sharing my knowledge of these urban wetland conservation issues through the BCCG has helped me develop the following key learning qualities:

(You may tick more than one box on each line. If you feel 'Unsure' or that you have received 'No Help At All', please leave the boxes blank giving reasons why in Question 2d)

	In Banister Creek Catchment	In Swan Canning Catchments	In Southwest Regional WA	In WA State	In Australia and Overseas
A deeper understanding of the links between the natural & human environments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A greater sense of ownership and pride in natural environments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Better working relationships with other individuals and groups involved in nature conservation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confidence in becoming part of a stronger, more effective urban <i>Landcare</i> group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Any other key learning qualities that you may feel are relevant <i>(Please Suggest Here)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2d. You may wish to provide brief comments here in support of your answers:

3) SUSTAINED MOTIVATION

3a. How would you rate your *motivation* as a member of the *BCCG* to improve your knowledge of urban wetland conservation issues, *and, if applicable*, share this knowledge to develop the above key learning qualities?

	Very Low	Low	Unsure	High	Very High
When the <i>BCCG</i> first formed	1	2	3	4	5
In the <i>BCCG</i> currently	1	2	3	4	5
In the <i>BCCG</i> over the next five to ten years?	1	2	3	4	5

3b. You may wish to provide brief comments here in support of your answers:

4) ON REFLECTION

4a. How do you rate the effectiveness of the *BCCG* to help develop all of these learning qualities (Questions 1 – 3) compared to:

	Much Worse	Worse	Same	Better	Much Better
Family and Friends	1	2	3	4	5
Formal Education (<i>High School, TAFE, Uni</i>)	1	2	3	4	5
Work (<i>You May State Type(s) Here</i>)	1	2	3	4	5
Other Sources (<i>You May State Which Here</i>)	1	2	3	4	5

4b. You may wish to provide brief comments here in support of your answer

EVALUATING THE QUESTIONNAIRE

5) How easy was it to complete the questionnaire?

Very Difficult	Difficult	Unsure	Easy	Very Easy
1	2	3	4	5

Comments, Criticisms, Suggestions

FOLLOW-UP SURVEYS

6) I am happy to take part in an informal discussion about any of the issues raised in the questionnaire:

6a. One-on-One: YES NO

6b. As a Group: YES NO

Comments, Criticisms, Suggestions

FURTHER CREATIVE INVOLVEMENT

7) Please indicate below (by ticking the appropriate box or boxes) if you or any member of your family might be interested in becoming more involved in this assessment of the *BCCG* through:

ADDITIONAL COMMENTS

Photography

Painting/drawing

Filming

Drama

Writing and/or Recording:

Oral histories

Diaries/journals

Poetry

Story writing

Songwriting

Other
*(Please State
Which Here)*

THANK YOU VERY MUCH FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

APPENDIX 4

PLEASE NOTE

In contrast to the *Living Landscapes* interviews (see beginning of Appendix 2) permission to interview *BCCG* and *TRCG* members was sought in person through approaching the respective chairpersons. Venues and times were also arranged, and questions as a basis for discussion were also first reviewed, in this way.

URBAN CASE STUDY

QUESTIONS as a BASIS for INFORMAL DISCUSSION

A for the *Living Landscapes* follow-up interviews, these questions have been developed on the basis of the results of the previous quantitative survey. However, the ongoing analysis of community engagement in social learning data and the associated methodological learning outcomes identifies specific problems of learning and scale. These questions, then, are much more focussed on trying to understand the underlying nature of these problems and on the development of a collaborative monitoring solution. Three sets of related opened-ended questions are used as a basis for further discussion along these lines:

- 1. Do you agree with the findings of the survey? If so, why do you think your catchment group has not been as successful share with those groups that responsible for NRM at greater scales? If you do not agree the findings, why not?**
- 2. What aspects of your engagement in Landcare and NRM are monitored and evaluated? Is learning monitored and evaluated? Why? Why Not?**
- 3. What do you think of the idea of developing a tool for monitoring and improving learning in Landcare and NRM? Would you like to be involved in the ongoing development and implementation of such a tool?**

APPENDIX 5

REGIONAL CATCHMENT COUNCIL INTERVIEWS

QUESTIONS as a BASIS for DISCUSSION

As for the participant local community follow-up questions, these questions are based on the ongoing data analyses, to try and understand the underlying nature of the complex problems of learning and scale from the perspective of the relevant regional catchment councils.

Q1. What do the following terms mean to you/your organisation?

- i) Community Engagement*
- ii) Capacity Building*
- iii) Sharing Knowledge and Understanding*

Q2. What/who do the above processes involve; how are they implemented?

- i) Community Engagement*
- ii) Capacity Building*
- iii) Sharing Knowledge and Understanding*

Q3. How effective have the above processes been in working towards your regional catchment council's vision statement?

Q4. Do you/does your organisation monitor and evaluate these processes?

Q5. Could this monitoring and evaluation be improved in any way?

APPENDIX 6

COLLABORATIVE MONITORING TOOL “HOW-TO” MANUAL

SYNOPSIS

This Appendix presents the rudimentary collaborative monitoring tool outlined in this thesis into a “how-to” manual. The purpose of this manual is to provide a more complete picture of what the tool might look like and how it might be implemented in practice. It provides a guide for the reader of this thesis to refer to either before examining or while examining the more detailed descriptions, discussions and proposals of this tool as they are presented in the text. This will assist the reader to develop a better understanding of what the tool is and how it might work in practice. This manual also provides a guide for the trialling of this collaborative monitoring tool. To achieve these aims this “how-to” manual is divided into three sections: (1) Form and Function, (2) Working Mechanisms and (3) Operation and Facilitation.

FORM AND FUNCTION

WHAT WOULD THE TOOL LOOK LIKE AND HOW COULD IT BE APPLIED?

The proposed collaborative monitoring tool can:

1. take the form of a quantitative survey (see below and Appendix 3) that is either: web-based; incorporated into an “App” for download onto a computer, laptop or Smart Phone; an independent piece of software or specialist piece of hardware or some combination of these media;
2. be based on Geographic Information Systems (GIS) technology and expertise and/or related computer software technology and expertise. (GIS technology is deemed most appropriate because of its capacity to capture, store, collate and spatially analyse biophysical and socioeconomic data and combinations thereof.)

In broad terms, then, the proposed collaborative monitoring tool would take the form of a user-friendly communications technology-based product. This product would be used to collect, collate and analyse primary community engagement/social learning data. The product could be used in this way by:

1. sustainable NRM researchers (who at least initially would be driving and/or facilitating the development and implementation of this tool for research purposes);
2. sustainable NRM practitioners (who might wish to use the tool to collect, collate and analyse community engagement/social learning data more immediately in project or program reporting); and, by,
3. local participant communities in these projects and programs (who at the “front end” of such collaborative monitoring must be able to access and answer survey questions quickly and easily at their own convenience).

This GIS-based collaborative monitoring tool, then, must also be able to capture and store survey results (complex data sets; see the “Working Mechanisms” section below) for analyses and/or use by these groups. It must also, therefore, given that it is a monitoring tool:

1. contain a built-in mechanism/piece of software for facilitating data transfer between researchers and/or the relevant practitioners, agencies and organisations;
2. contain a built-in mechanism/piece of software for visually representing findings of analyses of community engagement/social learning data conducted by researchers and/or practitioners; these visual representations might:
 - a. be based, for example, on the Evolving Sustainable Systems model or variations thereof, whereby each stage of the evolution of a project in terms of its capacity to engage its participant communities in social learning for achieving sustainable NRM is visually represented; to then

- b. facilitate the communication of results not only among researchers and practitioners but also among local participant communities (for example such visual representations might be used to communicate results in broader community settings - in follow-up interviews, discussions and/or community presentations as a basis for the ongoing interactions of all parties);
3. allow local participant communities opportunities to critique and thus to contribute towards the ongoing development and implementation of the tool itself; the proposed collaborative monitoring tool must therefore be able to collect relevant data and facilitate broader community feedback along these lines; results of such feedback could be represented/presented/communicated as suggested above.

The following sections outline how this monitoring tool could be internally organised to function in this capacity.

WHAT IS THE TOOL'S BASIC ARCHITECTURE OR STRUCTURE?

Social learning has been broadly defined and discussed in this thesis. But what types of knowledge and understanding comprise social learning in the sustainable NRM context? Of course this question is open for debate. However, social learning should incorporate more than knowledge and understanding of the biophysical environment. Therefore, for the purpose of this thesis, social learning comprises five interrelated knowledge aspects: "People", "Land", "Wildlife", "Money" and "Picture" (knowledge of the visual landscape). Table 1 defines these terms.

Table 1: Designated Aspects of Social Learning for achieving Sustainable NRM in an Urban Wetland Context

Designated Social Learning Aspects	Descriptors of Knowledge and Understanding
People	<i>Cultural, Values</i> - the values of indigenous cultures and peoples in urban wetland conservation; <i>Social</i> - building better relationships with each other and other groups to improve urban wetland conservation; <i>Political</i> - working effectively with governments and other public and private organisations involved in urban wetland conservation, power relations; <i>Moral Dilemmas</i> - the rights of local peoples to gain access to parkland along the river versus the need to re-vegetate these areas with native species.
Land	<i>The more practical land management issues associated with urban wetland conservation, along riverbanks and/or on floodplains for example.</i>
Wildlife	<i>Not just the identification of local native and non-native species of plants and animals but also their positive and negative impacts in urban wetlands.</i>
Money	<i>The amount of funding available for urban wetland conservation, applying for funding, managing the funds appropriately.</i>
Picture	<i>The impacts of work done, or yet to be done, on the visual landscape bearing in mind the different opinions within communities about what constitutes a pleasing view.</i>

The first section in a proposed collaborative monitoring tool survey (see Appendix 3 for a preliminary survey structure) might be structured thus. As such, this section would monitor how well a particular project or program engaged its participant communities in each and/or all of these social learning aspects. Distinctions could then be made about a project or program’s capacity to engage its participants in learning about biophysical environments in, and the human side of, Landcare/sustainable NRM. Such monitoring would be useful in helping to verify any claims of success and/or as a basis for improvement along these lines. However social learning is much more than accumulating knowledge and understanding; it is (as its name suggests) about sharing that knowledge and understanding. Therefore, any tool designed to monitor how well a particular project or program engaged its participant communities in social learning, should also be able to monitor how well they helped the participants to share that knowledge and understanding. It follows, then, that the proposed tool should also be able to monitor a project’s or program’s success in such community engagement (1) over time and (2) compared to other possible sources of similar learning. There are, then, certain scalar elements to social learning and thus to monitoring a project’s or program’s progress in this area. The first section (described above) and the remaining

three sections of the collaborative monitoring tool survey (Appendix 3) were structured along these lines. This survey structure is explained as follows.

The proposed collaborative monitoring tool survey questions (Appendix 3) are grouped under four main headings, each of which is scale-based: Section 1 “Improved Knowledge”, Section 2 “Shared Optimism”, Section 3 “Sustained Motivation” and Section 4 “On Reflection” (see also Appendix 3). The application of scale in this context is explained below.

1 .Improved Knowledge

This first part of the collaborative monitoring tool survey (see Appendix 3 and above) is structured to monitor a project’s or program’s progress in engaging its participants in, and improving their knowledge and understanding of, the five interrelated aspects of social learning. However, this section of the survey is also scale-based in that it is designed to monitor a project’s or program’s capacity to improve participants’ breadth and depth of knowledge and understanding of Landcare and/or sustainable NRM. The five designated social learning aspects *per se* demonstrate broad coverage; that they engage participants in learning about biophysical and arguably the more complex human side of Landcare/sustainable NRM adds depth to this learning experience. The three remaining scale-based elements of the survey are described under the following headings.

2. Shared Optimism

This second section of the survey is designed to monitor how well a project or program has helped local participant communities to share their acquired knowledge and understanding with relevant groups from outside their local areas. Such groups are mainly government, quasi-government and non-government agencies and organisations that are responsible for managing the natural environment at much greater geographical and temporal scales. The descriptor *Shared Optimism*, then, is based on the notion that all participants would be feeling either very positive if a project was demonstrably very successful at helping all groups to share their knowledge and understanding, and much less positive if this were not the case. This section of the collaborative monitoring tool survey (Appendix 3) thus monitors a project’s or program’s progress in helping participants to engage in social learning on a larger geographical scale. This section is pivotal in quantifying community engagement in social learning for achieving sustainable NRM as it indicates a project’s or program’s capacity to “scale-up” this process from the local to the regional scale and beyond.

3. Sustained Motivation

This third section of the collaborative monitoring tool's survey (Appendix 3) monitors a project's or program's progress in engaging its participants in improved learning (Section 1) and in shared learning (Section 2) over the entire life of project. It thus monitors community engagement in social learning on a temporal scale. The descriptor *Sustained Motivation* is based on the following notions: (1) that, if participants felt very good about a project's or program's capacity to engage them in social learning at its inception, still feel this way, and are positive about the future, then their levels of motivation are high, and (2) that, if the converse were true, their levels of motivation would be low. This section of the survey therefore has the potential to yield useful data indicating participants' underlying drive for wanting to continue to engage in social learning for achieving sustainable NRM. For example, if results for Section 1 and Section 2 of the survey were good, but were poor for this section (Section 3), this might indicate that participants' feelings about the future success of a project are ebbing. This information could be used as a basis for a discussion to find out why this is the case, and to salvage an otherwise highly successful project.

4. On Reflection

This final section (Section 4) of the collaborative monitoring tool survey seeks to establish how well a particular project or program engaged its participants in social learning compared to similar sources of learning with which they might have engaged. This section of the survey asks respondents to look back and to reflect on the capacity of their respective project or program to engage them in all the above social learning aspects and processes (Sections 1-3). It then asks them to compare their project or program experience with what they might have gained from similar sources of learning. This section lists a few possibilities: informally through family and friends; through formal education programs; in the workplace; and through other conservation projects and programs. It also provides space for respondents to select a source for themselves (see Appendix 3). The descriptor for this section is thus entitled *On Reflection*. Including this section in the survey is based on the assumptions that; participants must have gained and/or are gaining similar knowledge and understanding from other sources; and that learning does not occur in isolation. Providing survey respondents with opportunities to differentiate between sources of learning thus helps to substantiate the results of the previous three sections of the survey. Section 4 can also act as a basis for discussion between groups to find out what one group is doing right or wrong when it comes to engaging participants in social learning, and to then to share this information as a basis for making improvements.

Provision is also made in the survey for respondents to provide feedback about the design of the monitoring tool itself and how it was applied (see Appendix 3). This is crucial if the proposed collaborative monitoring tool is to be continually applied and developed as part of an evolving learning methodology, as suggested in this thesis (Chapter 1, especially Figure 1.2 and Chapter 8, especially Figure 8.1). Quantitative data collected and analysed on this basis can then be used to develop questions as a basis for follow-up discussions about: (1) the community engagement/social learning issues raised (the questions used as bases for discussion in Appendices 2, 4 and 5 are examples), and; (2) the design and implementation of the collaborative monitoring tool itself. Tables for analysing and reporting quantitative community engagement/social learning data have also, therefore, been configured on the basis of scale. Most of the work done by the collaborative monitoring tool, then, will be done by these tables. The table configurations are therefore explained under the heading “Working Mechanisms”.

WORKING MECHANISMS

It must be reiterated that the results presented in these tables have been calculated using simple statistics. They are therefore problematic and would be of limited use if the proposed collaborative monitoring tool were to be implemented in practice as it currently stands. These limitations are discussed in Chapter 5. However, notwithstanding these limitations, the results tables (as with the above survey) in this thesis still provide a sound basis for further discussion about (1) community engagement/social learning data collected and (2) the ongoing design, development and implementation of the proposed collaborative monitoring tool. The following explanations must therefore be seen in this context.

Results Table Configurations

Table 2, an extract from Table 5.15 is used here for the purpose of demonstration and provides first a ‘snapshot’ of how these tables are configured. It “reports”, then, the perceptions of the *BCCG* and the *TRCG* who engaged in urban Landcare under auspices of co management based regional sustainable NRM programs.

Table 2: Configurations for Interpreting BCCG and TRCG Urban Data (From Table 5.15, p.171)

SUB-CATCHMENT GROUPS	ASPECTS of "IMPROVED KNOWLEDGE"					TOTALS
1.BCCG (N=14)	a. Picture	b. Land	c. Wildlife	d. Money	e. People	(N=70)
Strongly Agree (100%)	10	6	6	4	4	30
Agree (75%)	3	6	7	5	5	26
Unsure (50%)		1		3	3	7
Disagree (25%)					1	1
Strongly Disagree (0%)				1		1
Number (n)	13	13	13	13	13	65
Average Response	93%	93%	93%	93%	93%	93%
Weighted Average	94%	85%	87%	71%	73%	82%
2.TRCG (N=12)						(N=60)
Strongly Agree	4	3	2	2	1	12
Agree	6	8	9	7	7	37
Unsure	1			1	1	3
Disagree		1		1	2	4
Strongly Disagree	1		1	1	1	4
Number (n)	12	12	12	12	12	60
Average Response	100%	100%	100%	100%	100%	100%
Weighted Average	75%	77%	73%	67%	60%	70%
BOTH GROUPS						(N=130)
NUMBER (n)	25	25	25	25	25	125
AVERAGE RESPONSE	96%	96%	96%	96%	96%	96%
WEIGHTED AVERAGE	85%	81%	80%	69%	67%	76%

NB: This table is a modified version of those presented in Section 5.2.

Table 2 demonstrates how the proposed collaborative monitoring tool survey results can be analysed and reported in table format in a research context and/or in practice. This particular example quantifies the *BCCG* and *TRCG* sub-catchment group responses to Question 1a. It demonstrates how these survey results can be used to demonstrate the progress of these groups in terms of their capacity to engage their members in each social learning aspect (Table 1) of urban Landcare/sustainable NRM in an urban NRM context. The table thus demonstrates the capacities of these groups to engage their members in "Improved Knowledge" in this context. Tables reporting *BCCG* and *TRCG* progress in terms

of their capacities to facilitate “Shared Optimism” and “Sustained Motivation” and how well they achieve this compared to other sources of similar learning (i.e. “On Reflection), are similarly configured. This sample results table, then, indicates that in this urban NRM context the BCCG was most effective at engaging its members in “Improved Knowledge”. The reason for presenting these data in a single table is so that these complex data sets can be readily compared and contrasted; that is, both within tables, with other tables, and, potentially, with similar data from elsewhere (Chapters 6 and 7). A major component of these tables in facilitating such analyses is their use of weighted averages.

Weighted Averages

Table 2 shows, respectively, numbers of responses (raw data), average response rates (%) and weighted averages (%) for each social learning aspect, for each sub-catchment group and for both sub-catchment groups (potentially, a “sub-regional” weighted average). Though problematic (see Chapter 5 for a consideration of this issue), these weighted averages are calculated as follows.

Firstly, each Likert scale response category in the original survey has been allocated a commensurate percentage weighting (Strongly Agree = 100%, Agree = 75%, Unsure = 50%, Disagree = 25% and Strongly Disagree = 0%). The following examples show how the (BCCG) weighted average for each social learning aspect was calculated on this basis:

$$\text{For 'Picture': } (10/13)*100 + (3/13)*75 + (0/13)*50 + (0/13)*25 + (0/13)*0 = 94\%$$

$$\text{For 'Land': } (6/13)*100 + (6/13)*75 + (1/13)*50 + (0/13)*25 + (0/13)*0 = 85\%$$

Weighted average categories, values and associated descriptors have been suggested (see Table 5.10, which is reproduced below). The weighted average values calculated/explained in this Appendix are assigned these descriptors. (Again, these are suggested values and descriptors and are thus open for discussion).

Table 3: Suggested Weighted Average Categories, Values and Associated Descriptors

Categories	Values	Descriptors	Notes
Very High	80%-100%	<p><u>Landscape and Community Development</u></p> <p>All relevant parties engaged in more substantive social learning for achieving sustainable NRM in Australia (see Notes 1-3).</p> <p>Deeper knowledge and understanding of more complex social-ecological problem situations (Pahl-Wostl 2007; Chapter 1) is shared very effectively at <i>and</i> between various levels and scales.</p> <p>Long-term and more sustainable landscape-scale solutions being developed. GIS could illustrate biophysical connections that are being made in the landscape (see Note 4).</p>	<p>7. Examples are rural and farm related and applied to <i>Living Landscapes</i>, but could be applied in other NRM contexts (e.g. urban).</p> <p>8. The proposed tool monitors a much deeper social learning processes, as opposed to learning related to biophysical, technical and planning issues, which are easier to quantify. Engaging participants in this level of learning is much more difficult to achieve. The values for each category reflect such difficulty. For example, 60% would be a more “moderate” value in conventional assessments, but is deemed a “high” value here.</p>
		<p><u>Transformed Catchment and Accelerated Development</u></p> <p>Some relevant parties engaged in social learning for achieving sustainable NRM in Australia, but at a more fundamental level.</p> <p>Deeper knowledge and understanding of more complex social ecological problem situations shared mainly <i>at</i> particular levels and scales (e.g. at the local community level). (See Note 5).</p> <p>Bases for achieving sustainable landscape-scale NRM solutions being developed.</p>	
High	60%-79%	<p><u>Original Catchment and Individual Development</u></p> <p>Learning centres primarily on biophysical, technical and/or planning issues, but is catchment focused.</p> <p>Local farming communities with the help of agencies beginning to engage in social learning and to extend their horizons thus.</p>	<p>9. The evolving sustainable systems conceptual model diagram is useful, also, for illustrating these values, and the tracking thereof, at much finer scales. For example, the overall <i>Living Landscapes</i> project weighted average (74%) is placed at the apex of the ‘transformed catchment’ illustration; this might indicate that the project was on the cusp of helping its participants to engage in social learning for more sustainable landscape-scale natural resource management. If the value was lower <i>in this range</i> (e.g. 65%), this figure might be placed at the base of the illustration, indicating that a project is beginning to engage participants in social learning at a level that is applicable for a ‘transformed catchment’.</p>
		<p><u>Pre-Catchment Development</u></p> <p>Learning centres on biophysical, technical and planning issues and is locally focussed (see Note 6).</p> <p>Increasing awareness of the need to share such knowledge and understanding with other local communities - i.e. at a catchment level.</p>	
Moderate	40%-59%	<p><u>On-Farm Development</u></p> <p>Learning centres on biophysical, technical and planning issues and is farm-based.</p>	<p>10. Given the advances in communications technology (e.g. in GIS), it may be possible to customise or re-illustrate this conceptual model to show, for example, the <i>actual</i> vegetation types planted in and/or species reintroduced to a particular local area or region, and thus, the actual levels of connectivity in the landscape that may accompany deeper social learning and complex problem-solving.</p>
		<p>Learning centres on biophysical, technical and planning issues and is locally focussed (see Note 6).</p> <p>Increasing awareness of the need to share such knowledge and understanding with other local communities - i.e. at a catchment level.</p>	
Low	20%-39%	<p><u>On-Farm Development</u></p> <p>Learning centres on biophysical, technical and planning issues and is farm-based.</p>	<p>11. Such ‘containment’ means that while many improvements are being made to the natural environment, across an entire catchment, communication is such that progress is impeded; biophysical connections that show, ultimately, that more sustainable collaborative and landscape-scale NRM is being achieved are still not being made.</p>
		<p>Learning centres on biophysical, technical and planning issues and is farm-based.</p>	
Very Low	0%-19%	<p><u>On-Farm Development</u></p> <p>Learning centres on biophysical, technical and planning issues and is farm-based.</p>	<p>12. Perhaps sub-divide ‘on-farm’ and ‘pre-catchment’ categories and values.</p>

Secondly, the total (*BCCG*) sub-catchment weighted average for all social learning aspects is calculated by ‘averaging out’ the weighted averages for each social learning aspect:

<i>BCCG</i>	Picture	Land	Money	Wildlife	People	TOTAL
WEIGHTED AVERAGES	94%	+ 85%	+ 87%	+ 71%	+ 73%	/5 = 82%

These weighted averages indicate that, at this stage of the monitoring cycle, the *BCCG* is helping its members to engage in the “Improved Knowledge” dimension of social learning, overall, to a “very high” level. (Indeed, the weighted average for “Picture” - 94% - indicates that the *BCCG* has helped its members to engage in this aspect of social learning/“Improved Knowledge” to an exceptionally high level.) Weighted averages for both groups (*BCCG* and *TRCG*) are then calculated. Firstly, a combined *BCCG* and *TRCG* weighted average for each social learning aspect is calculated. This is achieved by adding together the respective weighted averages for the *BCCG* and the *TRCG* and then by calculating an average score. So, for example, in Table 2 the *BCCG* weighted average for ‘Picture’ = 94% and for the *TRCG* = 75%. Averaged out, the combined weighted average for “Picture” = 85%. This combined weighted average, then, indicates that both groups are engaging their respective community members in the “Picture” aspect of social learning/“Improved Knowledge” to a “very high” level. Scores for each group, though, suggest that there is a significant difference between the *BCCG* and *TRCG* in this respect. These weighted averages, then, might be used in follow-up discussions (in more qualitative research) as a basis for finding out why this is so. The same procedure can be followed for ‘Land’ = 81%, etc. An overall weighted average for both groups is then similarly calculated:

<i>BOTH GROUPS</i>	a. Picture	b. Land	C. Money	d. Wildlife	e. People	TOTAL
WEIGHTED AVERAGES	85%	+ 81%	+ 80%	+ 69%	+ 67%	/5 = 76%

Potentially, this overall/sub-regional score for “Improved Knowledge” could be used (e.g. by regional catchment councils in collaboration with other stakeholders and researchers) to provide an indication of how well these groups are performing in this area at this stage of the monitoring cycle. It could also be used along with other monitoring and evaluation measures to provide an indication of how well the regional sustainable NRM approach is being implemented. Moreover the finer scale scores/weighted averages that make up this “sub-regional” weighted average could also be used in this context to shed more light on

the similarities and differences of opinion among sub-catchment groups about such engagement. These calculations and associated data have been entered into a Microsoft Excel spread sheet in this thesis. Spreadsheets can be used in this capacity should the proposed collaborative monitoring tool be further developed and implemented in practice. However, other similar packages/software more compatible with a GIS-based product might be used instead. In summary, these Spreadsheet weighted averages provide the basis for discussing ways in which community engagement/social learning data and feedback regarding the effectiveness of the monitoring tool itself, might be standardised to facilitate data sharing and comparative analyses within and between projects and scales.

OPERATION and FACILITATION

This thesis proposes that the development and implementation of this GIS-based collaborative monitoring tool be driven initially by sustainable NRM researchers (e.g. geographers, GIS researchers, social-ecologists) in collaboration with regional catchment councils (e.g. *Perth Region NRM* or *Wheatbelt NRM*). However, over time, researchers, while still playing a central role in the ongoing development and implementation of this tool, should facilitate rather than drive this process. Arguably, if applied in this way, the collaborative monitoring tool could facilitate the collection and sharing of more substantive data between sustainable NRM researchers, practitioners and the broader community from the outset of any associated community engagement project or program.

Sustainable NRM researchers usually analyse such quantitative and qualitative data sometime after data collection and often away from respondents in research settings (e.g. in a university). Research findings are published even later - in academic papers, reports, through conferences and/or in the broader community through public presentations. This of course is often unavoidable for logistical reasons; for example, it can take a lot of time to complete this kind of research. However, maintaining such distance between “researcher” and “researched” is also practiced in the interests of objectivity and academic rigour. While these actions are understandable, certainly from a research perspective, they can contribute towards “the researched” feeling somewhat left out of the research process. Compounding this situation, sustainable NRM practitioners and broader participant communities often gain access to research findings much later, either by reading the relevant publications and reports and/or through attending the relevant conferences and community presentations. This thesis argues that these “gaps” and “delays” in sharing

relevant information (in this case about community engagement/social learning) can also contribute towards the development of associated gaps and delays in acquiring the right kinds of knowledge and deeper understanding of the issues at stake (i.e. community/social learning); or of what is described in this thesis as ‘complex problem situations’ (Pahl-Wostl 2007; Chapter 1). They may even lead to misunderstandings developing about what the real problem is and/or too many assumptions being made about the right courses of action to take. This thesis argument centres on the following interrelated debates: *Ex-ante* predictions vs. *post hoc* analysis, *a priori* knowledge vs. *a posteriori* knowledge, inductive reasoning vs. deductive reasoning and action research vs. case study research. Broadly, though, this thesis argues that these gaps and delays between the “researcher” and “researched” acquiring deeper knowledge and understanding and sharing such learning are problems in sustainable NRM, and that the collaborative monitoring tool proposed in this thesis could narrow these gaps and shorten these delays. The proposed monitoring tool would achieve this in the following ways.

Firstly, the proposed GIS-based collaborative monitoring tool is designed to help bring sustainable NRM researchers and practitioners together in the collection and in the sharing of substantive data on community engagement/social learning *from the outset* of a project and/or program and for as long as monitoring is required. Collecting and sharing data in this way can bring those researchers and practitioners working on addressing complex problem situations together earlier in the piece as these problems arise. This leads to better ongoing management of these situations in practice. Moreover, the proposed GIS-based collaborative monitoring tool as well as being able to report findings for the benefits of research and practice is also designed to communicate these findings to broader participant communities. As such, these communities can also become more involved in such problem solving/decision-making, and better participate in the ongoing development of the monitoring tool itself. It is envisaged in this thesis that a GIS-based collaborative monitoring tool designed along these lines might help to build trust between the “researchers” and the “researched”, which in turn strengthens the nexus between sustainable NRM research and practice. Indeed, this thesis proposes that such underpinnings are necessary if such a tool is to be developed and implemented for the purposes suggested here on an ongoing basis.

In summary, this thesis suggests that the proposed collaborative monitoring tool driven/facilitated in this way contributes towards (1) addressing community

engagement/social learning issues locally and (2) scaling-up such achievements to influence sustainable NRM policy development and implementation in Australia. This thesis also proposes that, should such community engagement/social learning policies be developed and implemented they would contribute to addressing what this thesis describes as a developing hiatus in global sustainable NRM, whereby the development of big (policy)ideas is getting ahead of an appreciation of how best to implement them in practice. This “how-to” manual provides a guide to how this can be achieved in practice.