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Identifying and Characterising the Social Assets of the Natural Resource Management System

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IDENTIFYING AND CHARACTERISING THE SOCIAL ASSETS OF THE NATURAL RESOURCE MANAGEMENT SYSTEM

June, 2008

Report Prepared for:
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TABLE OF CONTENTS

Executive Summary ii
1. Introduction 6
2. Project Background 6
3. Project Objectives 8
4. Defining Social Assets 8
4.1 An Assets Based Approach to NRM and Planning 9
4.2 Outcome Based Social Assets 13
4.3 Intermediate Based Social Assets 13
4.4 Social Assets and the National NRM MERI Framework 14
5. Previous Research on Social Assets in NRM 17
6. Characterising Social Assets 20
6.1 NRM Outcomes 22
6.2 Social Entities 24
6.3 Social Networks 25
6.4 Attributes 27
6.5 Relationships (Ties) 28
7. A Methodology to Asses Social Assets 30
7.1 Scale of Analysis 30
7.2 Identification of Social Entities 33
7.3 Collection of Relationship and Attribute Data 33
8. Demonstration Project 36
8.1 Influence Network 37
8.2 Resource Exchange Network 44
8.3 Implications for NRM Programs and Investment 45
8.4 Implications for Monitoring and Evaluation 46
9. Conclusions and Future Directions 48
APPENDIX A: Web based identification of social assets 50
APPENDIX B: Web based - criteria for identifying social assets 53
APPENDIX C: Demonstration project – Task instructions 55
APPENDIX D: Demonstration project – Task 1 instructions (Assessing exchange) 60
APPENDIX E: Demostration project - Task 2 instructions (Assessing on-ground activities) 61
APPENDIX F: Demonstration project – Task 3 instructions (Assessing influence) 62
APPENDIX G: Weak influence ties amongst social entities 64
APPENDIX H: Resource exchange (strong ties) 66
APPENDIX I: The identification of factions in network exchange data 68
References 68

EXECUTIVE SUMMARY

The aim of the project was to identify, assess and characterise the social assets of the NRM system which enable (or in some cases inhibit) the achievement of NRM outcomes. The project was to inform those involved in NRM and those involved in the development and implementation of NRM policies and programs by:

- improving the understanding of the role different social assets play in achieving, or inhibiting, NRM outcomes;
- providing foundation information on the current social assets, including their role, capacity, focus and area of influence, key relationships and potential future changes to these;
- identifying which social assets could be targeted to achieve specific NRM outcomes; and
- detecting where there may be opportunities to improve achievement of NRM outcomes through strengthening relationships between social assets.

Furthermore, and as identified in the project brief, additional objectives of the project were to:

- provide a visual representation or 'mapping' of social assets;
- identify those social assets which should be monitored during the implementation of NRM programs; and
- identify those social assets which policy and program managers should target for the purpose of future NRM investments.

A review of the use and application of the term social assets within the context of an assets based planning framework as developed and applied in Victoria; the National NRM MERI framework; and previous research which has addressed the concept of social assets, indicated the term 'social assets' should be used to describe:

1. Those characteristics of the social system which enable the longer term conservation, repair or replenishment of natural assets (NRM outcomes), and which
2. Comprise those characteristics of the social system which include:
    a. specific social entities, such as resource managers, NRM organisations and institutions (Australian Government, 2008b);
    b. the attributes or characteristics of social entities, which may also reflect their capacity to adopt sustainable management practices (Australian Government, 2008b); and
    c. the relationships and partnerships amongst social entities, including the capacity of social entities to influence others in the achievement of sustainable NRM outcomes.

In this definition a social asset is not represented by a single component of the social system; it is not represented as one or more NRM organisations; it is not solely a specific attribute of these organisations such as their capacity; nor is it found solely in the quality or the type of relations amongst NRM organisations. The social asset is represented by all of these characteristics and as such it is more appropriate to refer to a social asset system.

Although social assets are not described as a system of social assets in the Australian Government (2008a; 2008b) MERI framework, this framework does allude to a systems approach in defining social assets. In the MERI framework social asset classes are identified, which include NRM organisations and institutions; attributes or assets are defined in terms of the capacity of institutions and organisations to change and adopt sustainable practices; and the relationships or social capital amongst NRM organisations and institutions are also considered an important asset.

A conceptual approach is used to describe the social asset system, which is based on five key concepts which included:

1. **NRM outcomes,** which are the changes in the quality and condition of natural assets achieved by addressing the threats to these assets;
2. **Social entities,** which include identifiable groups of individuals or organisations who have common NRM objectives and undertake coordinated actions to achieve NRM outcomes;
3. **Social networks,** which represent more or less stable patterns of relations amongst social entities which take shape around those social entities who have a common interest and involvement in NRM policies and programs;
4. **Attributes,** which represent the characteristics of social entities which influence the achievement of NRM outcomes. One of the most common attributes of interest in NRM is the capacity of individuals and organisations to change to sustainable management practices; and
5. **Relationships** or the ties amongst social entities which can be defined on the basis of the level of resource exchange between social entities or on the basis of the level of 'influence' one entity has over another.

A methodology has been proposed for assessing and describing the social asset system, which is based on examining social entities along a continuum which links social entities involved in on–ground NRM activities at the local and regional level, with those at the State and national level. Each continua would be examined in relation to NRM outcomes associated with the natural asset classes of land, biodiversity and inland and marine waters. A sample of 42 continua are proposed as a basis for examining the social asset system across NRM regions, jurisdictions and natural asset classes.

For each continua the methodology uses key informants at the national, State and regional level to identify social entities, identify the 'influence' relationships amongst social entities and assess the attributes of each social entity.

While a quantitative approach is used to describe the social network underpinning the social asset system, qualitative information derived from semi-structured interviews with key informants is also used to describe the social entities, their attributes and relationships. Using an integrative quantitative and qualitative approach ensures that the outcomes of the analysis are more likely to have applied value in relation to NRM program development, design and implementation; targeted investment and monitoring and evaluation.

A demonstration project is used to illustrate how the conceptual approach and methodology may be applied. The demonstration project, which uses key informants, identifies social entities at the local/regional, State and National scale in relation to the development, implementation or provision of policies, programs, investments or on-ground activities associated with the management of weeds.

A social network analysis is undertaken on the information collected through the demonstration project and both qualitative and quantitative information used to describe the social asset system. On the basis of the demonstration project an illustration of how the findings may be applied in NRM program design, development and implementation and targeted investment is presented. The implications of the approach for NRM monitoring and evaluation are also discussed.

While a demonstration project has been used to illustrate the proposed methodology for assessing the social asset system, the next steps involved in further developing the project would include:

- jurisdictional workshops to further refine the methodology and gain jurisdictional agreement and participation in the development of the project methodology and outcomes; and
- pilot testing the proposed methodology using a minimum of four strata and undertaking an analysis of the pilot data to again illustrate its application and use.

On the basis of the jurisdictional review and further pilot testing of the methodology the project could then be implemented at the national scale.

1. INTRODUCTION

This paper provides an initial description of the social assets within the NRM system and discusses the conceptual and methodological issues associated with identifying and describing these assets. A demonstration methodology is used to illustrate and describes one approach to defining social assets. Examples of how this information may be used in NRM program design development and implementation and NRM monitoring and evaluation are also provided.

The paper is based on web based comments provided in relation to social assets (Appendix A and B), a literature review, the outcomes of a workshop held on the 10th of April 2008, and information provided by the project steering committee and consultations with key stakeholders.

2. PROJECT BACKGROUND

The project is managed by the Social and Institutional Research Program (SIRP) within Land and Water Australia (LWA) and is funded through the Australian Government's Natural Heritage Trust (NHT). The project concept was initiated and is supported by the Australian Government NRM policy and program areas and the National Land and Water Resources Audit (NLWRA).

The importance of the social[1] component in natural resource management (NRM) is evident in the objectives of the Extension of the Natural Heritage Trust (NHT), the National Action Plan for Salinity and Water Quality (NAPSWQ) and the recently announced Caring for our Country program.

For instance, the three overarching objectives of the Extension of the NHT (NRM Ministerial Council, 2002) were:

1. 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;

2. 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

3. community capacity building and institutional change - support for individuals, landholders, communities, industry and organisations with skills, knowledge, information and institutional frameworks to increase capacity to implement biodiversity conservation, and sustainable resource use and management.

[1] *The term 'social' in this document refers to all aspects of individuals and society including their characteristics and interrelationships. It includes economic, cultural and institutional issues and both objective and subjective social attributes*

The third objective of the NHT, namely 'community capacity building and institutional change', emphasises the importance of the social dimensions in NRM. However what is also important as indicated in this objective is that achieving community capacity building and institutional change *enables* the achievement of biodiversity conservation and the sustainable use of natural resources. Clearly if the social dimensions of NRM, which include capacity building and institutional change and which involve people, communities and organisations are not addressed as foundation activities, this will significantly impair our ability to achieve important NRM outcomes, including the sustainable use of natural resources and biodiversity conservation.

Similarly the goal of the NAPSWQ was "to motivate and enable regional communities to use coordinated and targeted action to prevent, stabilise, and reverse trends in dryland salinity…[and] improve water quality and secure reliable allocations for human uses, industry and the environment." (Council of Australian Governments, 2000). In this program, like the extension to the NHT, social attributes are again emphasised in enabling the achievement of core NRM outcomes.

Although there is currently limited information available on the new "Caring for our Country" program, which is to commence in July 2008, the goal of this program is to "have an environment that is healthy, better-protected, well-managed, resilient and that provides essential ecosystem services in a changed climate" (Australian Government, 2008c). Of the six national priority areas within the new program, the first three, as shown below, focus on biophysical outcomes while the latter three focus on the broader social foundations underpinning the achievement of these biophysical outcomes.

(i) the development of a national reserve system;
(ii) biodiversity and natural icons;
(iii) coastal environments and critical aquatic habitats;
(iv) sustainable farm practices;
(v) natural resource management in remote and northern Australia; and
(vi) community skills, knowledge and engagement.

The NHT, the NAPSWQ and the future 'Caring for our Country' program all emphasise the role and importance of social attributes in *enabling* the achievement of NRM outcomes. However the social attributes of the NRM system are not always clearly identified and articulated, making them difficult to target for the purpose of investment and monitoring.

The aim of the current project is to identify, assess and characterise the social attributes or assets[2] of the NRM system which enable (or in some cases inhibit) the achievement of NRM outcomes. It is anticipated that the project will inform those involved in NRM and those involved in the development and implementation of NRM policies and programs by:

- improving the understanding of the role different social assets play in achieving, or inhibiting, NRM outcomes;

[2] *A definition and review of the term 'social asset' is provided later in the paper.*

- providing foundation information on the current social assets, including their role, capacity, focus and area of influence, key relationships and potential future changes to these;
- identifying which social assets could be targeted to achieve specific NRM outcomes; and
- detecting where there may be opportunities to improve achievement of NRM outcomes through strengthening relationships between social assets.

Furthermore, and as identified in the project brief, the project will also attempt to

- provide a visual representation or 'mapping' of social assets;
- identify those social assets which should be monitored during the implementation of NRM programs; and
- identify those social assets which policy and program managers should target for the purpose of future NRM investments.

3. PROJECT OBJECTIVES

As identified in the project brief, this project is to have a national focus, and will address the following objectives:

1. Develop an outline of how the NRM social assets will be identified and assessed. The outline should include a set of criteria with related rationale, the recommended scale of analysis and information on how outputs can be used by NRM decision makers;
2. Collate information related to current NRM social assets (as at 2007-08), including their role, capacity, focus and area of influence, key relationships and potential future changes to these;
3. Identify areas where specific social assets could be targeted or strengthened to achieve specific natural resource management outcomes; and
4. Provide advice on the critical social assets of the NRM system to measure over time and the methodology that could be used.

4. DEFINING SOCIAL ASSETS

Within the context of NRM, the concept of a 'social asset' has been derived from an assets based framework to NRM and planning, in which natural assets are identified as the basis for NRM planning, target setting and investment. For instance, within a regional NRM target setting process the National Framework for Standards and Targets indicates that an integrated NRM plan should identify "the natural resource assets to be managed and the threatening process or risks to them" (Australian Government, 2002 p. 6).

Prior to the adoption of an asset-based planning framework many NRM plans and strategies were problem or threat based and focussed on addressing identifiable problems such as salinity, river heath, soil condition etc. However, the problem based framework to developing NRM plans did not provide a strategic approach to regional planning, with 'problems' being addressed in localised areas and contexts whenever they occurred.

Rather than NRM plans and strategies being based on identifiable problems, natural assets are now identified in most plans and strategies, where the objective of management actions is to maintain or enhance the assets and their values through identifying and developing management actions to directly address the threats to these assets.

The assets based framework to regional NRM and planning has been adopted extensively within Victoria (Annett & Adamson 2008; Department of Sustainability and Environment, 2005); Queensland (Queensland Government, 2004); and Western Australia (Western Australian Government, 2005)[3].

A summary of the key concepts of an asset-based approach to NRM and planning is provided, as several of the concepts and issues within this approach have important implications in defining social assets. In addition, many of the CMAs in Victoria who have applied the assets based approach have also attempted to identify social assets in addition to natural assets.

4.1 An Assets Based Approach to NRM and Planning

The application of an assets based approach to NRM and planning has had its greatest focus in Victoria, with most CMAs adopting the approach in their regional catchment strategies (RCSs). Furthermore, the Victorian Government has undertaken a detailed review of the asset based approach to NRM (DSE, 2005) and has recently published a framework for the assessment of land based assets (Annett & Adamson, 2008). It is from these documents in the Victorian context that a summary of the asset-based approach has been developed.

In the asset based approach, assets are defined as "the biophysical or physical elements of the environment we are trying to protect. The desire to protect these assets is due to the social, economic and environmental services they provide." (Annett & Adamson, 2008, p. 22). Assets themselves may be classified hierarchically into primary asset classes (i.e., land, water and air); secondary asset classes (i.e., water is further subdivided in rivers, wetlands and estuaries) and potentially a third level of asset items (i.e., rivers are further subdivided into specific river systems or river reaches).

From a State perspective, one of the difficulties that has emerged in applying the assets-based approach has been that CMAs in identifying regional assets have differed in the scale or the level in the hierarchy at which assets have been defined. DSE (2005) have indicated that the appropriate level at which assets are defined within the hierarchy must be based on the level at which investment, resourcing and management occurs. The scale at which assets are defined, including whether they are nested or hierarchical; or at the national, State or regional level is likely to also be an issue in the identification of social assets.

[3] *While an assets based framework is one of the common approaches to NRM and planning, the Pressure-State-Response framework is also used as a basis to NRM planning by some regional NRM bodies either separately to an asset based framework (i.e., Southern Rivers CMA) or integrated with an assets based framework (i.e., Northern Rivers CMA).*

As indicated in the definition of assets, assets are identified because of the social, environmental, and economic services that they provide. For instance, native flora may be identified as an asset to be protect because it provides environmental services (biodiversity, climate regulation, pollination); economic services (provision of food and fibre, tourism); and social services (cultural, aesthetic, recreational). The quantification of the value of specific assets is achieved by assigning a numeric value to each of the services it provides.

Threats represent the causes of degradation to the asset and to the services the natural asset provides (Figure 1). Examples of threats to assets and asset services include a decline in soil structure, salinity and the prevalence of pest plants and animals.

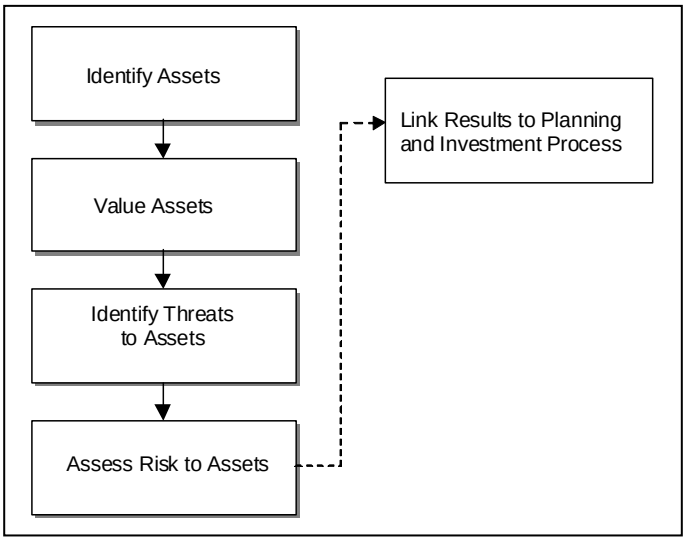

Figure 1: Steps of the asset-based approach framework process (DSE, 2005)

The assessment of risks to the asset and the services it provides is based on the likelihood and consequences of the threat to the asset (Figure 1). Likelihood "is a measure of the potential or probability that a particular threat can or will have on a particular asset service". Consequence "is an assessment of the impact that a threat can have on assets at a specific location" which can range from no impact, to a small impact to a catastrophic impact on the asset service (Annett & Adamson, 2008, p. 18).

Through the identification of assets, the threats to these assets and the risks of not addressing these threats, management of the asset can be undertaken through the development of on-ground actions, investments and the implementation of monitoring and evaluation protocols.

While the focus for most regional plans and strategies has been on identifying biophysical assets (land, water, biodiversity and atmosphere), many plans and strategies also identify social assets and potential threats to these assets. In Victoria, where the assets based approach to NRM and planning is most commonly adopted, all 10 CMAs in their regional catchment strategies refer to both natural and social assets.

However, a review of these regional catchment strategies indicates some uncertainty about the role of social assets in NRM. As Colliver (2006) has indicated, regional NRM bodies have "been wary of setting targets for social assets for fear of taking on responsibility for the state of the whole community, which is clearly not their brief and for which they are not resourced" (p. 4).

When social assets are identified and described in regional catchment strategies in Victoria, the social asset itself can generally be classified as either an (i) impacted, (ii) outcome or (iii) intermediate based social asset.

The three types of social asset are not always mutually exclusive or independent and in many regional catchment strategies there appears to be some uncertainly about the concept of a social asset, including how it is to be defined; whether it is to be defined in the same way as a natural asset; and the scale at which it is defined. In many instances it appears that social assets are included because there is an 'obligation' to include them. In reviewing how social assets are conceptualised alongside natural assets in an assets based framework it also appears that many CMAs struggle to include the concept of a social asset. While it is recognised that social attributes are to be addressed as they enable the achievement of NRM outcomes, the concept of a social 'asset', as evident in many of the regional catchment strategies, does not 'fit' easily within the assets based framework that is being used.

Impact Based Social Assets

In regional catchment strategies impacted social assets like natural assets are objective features and places within the environment and have generally included infrastructure and cultural heritage sites (Table 1). These social assets may be impacted by threatening processes which include (i) natural processes and (ii) those processes associated with NRM interventions and management actions. For example, and as shown in Table 1, cultural heritage sites and social infrastructure[4] are typical of impacted social assets that may be degraded by such natural processes as salinity and erosion.

[4] *Social infrastructure assets are themselves often a threatening process for natural assets. For example "industry and tourism infrastructure and housing developments can have negative effects on biodiversity, waterway health, land health and air quality" (South West Catchment Council, 2005).*

Table 1. Victorian CMAs: The identification of social assets in Regional Catchment Strategies

	Type of Social Asset		
	Impacted	Outcome	Intermediate
North Central			
Community			X
Cultural heritage		X	
Infrastructure	X		
Corangamite			
Infrastructure	X		
Heritage	X		
Recreation	X		
Community			X
North East			
Indigenous heritage		X	
Historical sites		X	
Knowledge and capacity			X
Demographics		X	
Transport infrastructure	X		X
Built infrastructure services		X	X
Mallee			
Cultural heritage and landscape sites	X	X	
Community capacity			X
Port Phillip and Westernport			
People and organisations			X
Goulburn Broken			
Economic assets (general)		X	
Social assets (general)		X	
Cultural heritage		X	
Glenelg Hopkins			
Infrastructure	X		
Aboriginal and European cultural heritage	X	X	
Community networks and support			X
Intellectual and research capacity			X
East Gippsland			
Community capacity			X
Cultural heritage	X	X	
Built infrastructure		X	
West Gippsland			
People and communities			X
Infrastructure	X		X
Production		X	
Wimmera			
Agricultural land		X	
Cultural change			X
Heritage sites		X	

Source: EBC (2008)

The National Framework for NRM Standards and Targets (Australian Government, 2002) also indicates that within the regional target setting process an assessment should be made of the social and economic impacts of any proposed NRM interventions or management actions. In this context, it is the threat to social assets from NRM interventions and management actions that are of interest. There has been some focus in Queensland on the social impacts of NRM interventions

and management actions (Stanley, Clouston & Binney, 2004) with the Bilateral Agreement between the Commonwealth and Queensland for the delivery of the NHT also requiring an assessment of these impacts (Commonwealth of Australia and State of Queensland, 2004). The type of 'social assets' identified through the impact assessment process includes a wide range of behavioural, attitudinal and land use impacts (Fenton, 2006).

4.2 Outcome Based Social Assets

Social assets, which are outcome-based social assets, are similar to biophysical assets in so far as it is these assets that management actions aim to maintain or enhance for their inherent value. As shown in Table 1, examples of outcome based social assets identified in the regional catchment strategies of Victorian CMAs include Aboriginal and European cultural heritage sites and social assets associated with agricultural land and production.

In some instances, as in the Goulburn Broken CMA, outcome based social assets are identified as those which rely on the 'natural resource base' itself (Goulburn Broken CMA, 2003). In other words, improving and maintaining the condition of natural assets will in itself lead to a consequent improvement in social and economic assets. This includes for example such social and economic assets as farm production, irrigation and drainage infrastructure, food processing, transport, retail, services, tourism, recreation and public transport.

Such an approach regards the improvement and maintenance of natural assets as itself an intermediate outcome, which enables an improvement in the condition of social assets within the region as a final outcome. Their regional catchment strategy states, "The regions' social assets, consisting of its people (individually and as communities of interest) and its economic assets (physical and financial assets) depend upon ecosystem services provided by our natural assets. Threats to natural assets are threats to our social and economic assets." (Goulburn Broken CMA, 2003, p. 27).

Although not explicitly using an assets based framework, the State-wide Standards and Targets developed by the Natural Resources Commission (2005) in NSW refers to Target 12, a community target which generally reflects an outcome based social asset. Target 12 states that, "natural resource decisions contribute to improving or maintaining economic sustainability and social wellbeing" (p. 126). In this context, improvements to the condition of natural assets again play an intermediate or enabling role in improving and maintaining the social assets of economic sustainability and social well being.

4.3 Intermediate Based Social Assets

Many regional plans and strategies also identify intermediate social assets, in which the asset is identified to be of value, as it will *enable* the achievement of NRM outcomes, including the protection and maintenance of natural and other social assets. It is identified as an intermediate social asset in so far as the intent of improving or enhancing the asset is an intermediate step which will lead to maintaining or enhancing NRM outcomes.

Table 1 shows that many of the intermediate based social assets identified in regional catchment strategies in Victoria focus on the capacity of communities and the organisations and networks that exist within communities to support NRM outcomes. Although Table 1 is specific to CMAs in Victoria, because of their emphasis on an asset-based framework to NRM and planning, intermediate based social assets are also identified in many other regional plans and strategies in other States and Territories.

For example, the Southern Rivers CMA in NSW places a strong emphasis on community partnerships between the CMA, Local Government, State Government agencies, Landcare and other regional and local community groups and organisations and has developed targets and actions to ensure effective support of community partnerships in the delivery of NRM outcomes (Southern Rivers CMA, 2006).

Similarly the Southern Rivers CMA in NSW, the South West Catchment Council and Terrain NRM Pty Ltd (Wet Tropics Aboriginal Plan Project Team, 2005) in Queensland have also emphasised the use of indigenous knowledge of ecological systems and processes in achieving progress towards NRM outcomes.

The State-wide Standards and Targets developed by the Natural Resources Commission (2005) in NSW also refers to Target 13 which is essentially and intermediate social asset which states, "there is an increase in the capacity of natural resource managers to contribute to regionally relevant natural resource management" (p. 127).

Certainly many of the intermediate social assets at the regional and State levels focus on capacity, engagement and partnerships amongst organisations and groups at the regional and State level. Furthermore, the recent national assessment of the social foundations of NRM by the NLWRA also focussed on the capacity of regional NRM bodies, regional engagement and partnerships between Australian and State Governments and regional bodies (Fenton and Rickert, 2008).

Some NRM strategies using the asset based approach have also identified risks to intermediate social assets. For example, the Port Phillip and Westernport CMA in Victoria (Port Phillip and Westernport CMA, 2004) identifies people and organisations as a social asset and identifies specific risks to this asset which includes:

- Insufficient physical, financial and human resources
- Inadequate community engagement
- Inadequate knowledge and skills
- Ineffective support and coordination
- Unsustainable consumption patterns (high ecological footprint)

4.4 Social Assets and the National NRM MERI Framework

Although no specific definition is provided, the recent draft National Natural Resource Management Monitoring, Evaluation, Reporting and Improvement (MERI) Framework (Australian Government, 2008a), which replaces the previous National Framework for Standards

and Targets, extends the concept of natural assets to include social assets. In the glossary accompanying this framework assets are defined as:

> "a useful thing or quality; something that has value [and in the NRM context] assets can be classified as follows:
>
> - human capital – labour and influences on the productivity of labour, including education, skills and health;
> - social capital – claims on others by virtue of a social relationship;
> - natural capital – land, water, atmosphere and biological resources;
> - physical capital – value produced by economic activity, including infrastructure equipment and technology;
> - financial capital – savings and credit" (Australian Government, 2008a, p. 23)

Although it is somewhat unclear, there appears to be an indication that social assets would essentially include components of human and social capital, which include both the attributes of individuals (human capital) and the relationships amongst individuals (social capital).

An additional document which describes from the perspective of the MERI framework, the recommended national assets and indicators for Natural Resource Management (Australian Government, 2008b) identifies several asset classes, assets and indicators headings (see Table 2). In this context social assets as defined through the identification of asset classes, and as distinct from the specific biophysical assets of land, biodiversity, and inland and marine waters; includes resource managers and NRM organisations and institutions.

The asset associated with these asset classes is further identified as the capacity of individuals, communities, institutions and organisations to change and adopt sustainable management practices with the indicators as provided in Table 2 providing some direction as to what the relevant characteristics of capacity are that need to be assessed within a monitoring and evaluation context.

Furthermore, and within the context of the NRM program logic (Australian Government 2008a), it is the characteristics of resource managers, NRM organisations and institutions as social assets, including their capacity, engagement, awareness, and partnerships which enable the achievement of aspirational outcomes associated with "conserving, repairing and replenishing Australia's natural capital" (p. 5). To this extent the term social asset is akin to an 'intermediate social asset' as defined in many of the regional NRM plans and strategies (see Section 4.1).

The NRM program logic is a theory of actions and what the causal relationships are amongst the various components of the NRM program (Funnell, 1997). The outcomes hierarchy is essentially a cause-effect hierarchy in which changes over time (foundational, immediate, intermediate, long term) in social assets lead in the long term to change and improvement in the natural assets of interest. The complex cause-effect and contingency relationships amongst social assets over time as identified within the NRM program logic are not well understood. Clearly if the 'network' or 'system' of social assets that are integral to the achievement of aspirational outcomes associated with improving the condition of natural assets can be identified and described, then programs can be designed to better target these social assets within the broader context of NRM program logic.

Table 2. Social assets and indicators for NRM

Asset Class	Asset	Indicator Heading	Recommended Indicators
Resource Managers	NRM capacity in individuals and communities	Capacity of individuals and communities to change and adopt sustainable management practices	* Type of change in aspirations of resource managers * Capacity of rural decision makers *Attributes of management practice * Rural livelihood context * Extent and type of enhanced capacity of resource managers to undertake sustainable resource management practices * Level of resource managers skills and knowledge to promote sustainable NRM * Extent of adoption of recommended sustainable NRM practices by resource managers
NRM Organisations & Institutions	NRM capacity in institutions and organisations	NRM capacity in institutions and organisations to change and adopt sustainable management practices	* Best practice business management * No of partnerships (engagement) * Extent of leverage (partnerships) * Quality of partnerships between parties to NRM program agreements * No. of resource managers Accessing NRM programs * Effectiveness of knowledge distribution systems * No of Indigenous Australians accessing NRM

Source: Australian Government (2008b)

A review of the use and application of the term social assets within the context of an assets based planning framework as developed and applied in Victoria and in the context of the National NRM MERI framework, indicates the term 'social assets' should be used to describe:

1. Those characteristics of the social system which enable the longer term conservation, repair or replenishment of natural assets (NRM outcomes), and which

2. Comprise those characteristics of the social system which include:
    a. specific social entities, such as resource managers, NRM organisations and institutions (Australian Government, 2008b);
    b. the attributes or characteristics of social entities, which may also reflect their capacity to adopt sustainable management practices (Australian Government, 2008b); and
    c. the relationships and partnerships amongst social entities, including the capacity of social entities to influence others in the achievement of sustainable NRM outcomes.

5. PREVIOUS RESEARCH ON SOCIAL ASSETS IN NRM

While social assets have been recognised and identified in many regional NRM plans and strategies there is little previous social research or conceptual description of social assets in NRM[5]. Within the context of NRM two approaches to understanding social assets, which have been developed in Western Australia and Victoria, are described.

The first approach to defining social assets is found in the work of URS (2003), which attempted to define social assets within the context of the salinity investment framework in Western Australia. Within this approach, social assets were defined through several regional workshops in the Avon region. In this approach it appears that the definition of a 'social asset' was left to workshop participants with little consideration being given as to how it may differ from other social constructs used to define the attributes of social systems. For instance, URS (2003) state:

> "The regional communities' definitions of social assets revolved around the critical mass in rural communities, the quality of communications, internal and external networks, levels of service provision for farm businesses, knowledge and skills in agricultural management, health and education services and the pivotal role of recreational pursuits in maintaining a sense of community. Cultural and spiritual assets received attention – both those based on natural features of the landscape and those derived from built infrastructure. In particular, Aboriginal heritage is receiving attention and is being recognised for its importance." (URS, 2003, p. 2)

The social assets identified and which are described in Table 2 are relatively broad and appear to be inclusive of nearly every aspect of a functioning social system[6]. As Colliver (2006) notes, the framework developed by URS (2003) "…mixes logical categories. 'Values' are one dimension of social systems; 'community well-being' is a quality of local communities; 'governance capacity' is an outcome of the functioning of relationships around current NRM priorities, social networks in NRM and organisational capacity; 'knowledge and skills' function within each social system; and 'networks and organisations' are distinct social systems that ought to be considered separately." (p. 2)

While the social assets identified in Table 2 may be further defined as intermediate social assets in that they contribute to improving salinity outcomes, the framework also indicates that in some contexts the social asset may inhibit NRM outcomes. An example is given where there is an 'underlying cultural value' [or more correctly a belief system] against community participation in the identification of NRM goals and objectives, which is not in accord with the normative belief system that supports community participation in NRM. In another example, a belief may be held

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[5] *The term social asset is occasionally used in research and other publications to refer to some social attribute or process which is of value. For example, friendship has been defined as an important social asset and as a source of social capital (Ridge, 2002); as have voluntary partnerships (Habisch, Jonker, Wegner & Schmidpeter, 2005); and the aggregate of all physical assets, human assets, political, social and legal rules controlled by society (Deng, 2007)*

[6] *The range of community responses to the somewhat open-ended definition of a social asset, is not too dissimilar to the range of responses received through participant involvement in the web based description and definition of social assets as reported in Appendix A.*

that saline land is useless and has no value, whereas another belief maybe that saline land may be useful for salt land grazing or the desalination of available water.

For the social assets identified in Table 2 this becomes somewhat of a complex problem in so far as a social asset may enable as well as inhibit the achievement of NRM outcomes. In other words a social asset may not be a social asset at all, but a 'social liability' in its contribution to achieving NRM outcomes. In some cases this distinction clearly becomes a value judgement which may change across time and context. For instance, the Murray Darling Basin Commission is now working on resnagging projects to improve native fish habitat, as previously woody debris were removed as they were believed to increase flooding and erosion (MDBC, 2007).

Furthermore the social assets as described in Table 2 are difficult to target in terms of on-ground actions or investment. For instance, what is the form or type of investment that is required in NRM values, sense of place or the quality of social interaction and how would investment in these assets lead to the achievement of NRM outcomes?

Table 2. Social assets identified in the Western Australian salinity investment framework

Asset type	Asset items
Knowledge and skills	Knowledge and skills available Ability to grow knowledge and skills Robustness and availability
Values/ culture	NRM values Sense of place, cultural heritage Robustness, persistence, resilience and availability
Community well-being	Community health Cohesiveness
Networks/ organizations	NRM values Quality of social interaction Information flow Learning capacity
Economic resources	Investment available from businesses reliant on natural resources Investment available from sources not reliant on the natural resources
Governance capacity	Institutional arrangements for NRM

Source: URS (2003). Defining social assets for the salinity investment framework. Water and Rivers Commission, East Perth.

In contrast to URS (2003), the approach adopted to defining and identifying social assets used by Colliver (2006), focuses more specifically on communities of practice (Wenger, 2000) and he appears to identify this as *the* social asset which consists of individuals, organisations, social networks and working relationships that form a community of practice working towards a common objective of achieving NRM outcomes.

The concept of a 'community of practice' is an important concept raised by Colliver (2006). As Wegner (2000) points out, a community of practice consists of people, (i) acting as a joint enterprise with a common objective, (ii) who mutually interact and engage with others and (iii) who have a shared repertoire of communal resources, including a shared terminology, language, tools, styles etc.

In the context of a community of practice associated with NRM, Colliver (2006) describes the following four components which includes:

1. *Working relationships around current NRM priorities*. This includes effective partnerships, collaboration, consultation and informing.
2. *Social networks*. Social networks enable people to obtain information, advice and support and it is through social networks that they are able to influence decision makers.
3. *Effective organisations*. Effective organisations contribute to NRM through having the appropriate management and program capacity (Fenton, 2004) to achieve organisational outcomes in relation to NRM
4. *Effective individuals* contribute to NRM planning and take action in their own sphere of influence. The capacity of individuals in the community at large has an impact on what can be achieved in NRM. People's knowledge, skills and attitudes in relation to sustainable practices affect how readily changes targeted in NRM planning are translated into action.

Colliver's (2006) approach is clearly a more structured and focussed approach to defining social assets than that presented within the URS (2003) framework. In addition, if the description of *the* social asset as described by Colliver (2006) is examined in further detail, he is essentially referring to a 'community of practice' in which there are individuals and organisations, which have specific attributes and relationships which enable the achievement of NRM outcomes.

As such, the community of practice is the container or social asset in which individuals, organisations, their characteristics and interrelationships are found and which through mutual interaction and interdependence work towards achieving common NRM outcomes.

Although it is articulated somewhat differently, the concept of social assets is very similar to at the definition of a social asset presented at the conclusion of Section 4.

6. CHARACTERISING SOCIAL ASSETS

A review of the literature provides little assistance in *directly* identifying and describing social assets in NRM. On the basis of the previous discussion it could be argued that the term 'social asset' itself is of little value in identifying and describing the function and structure of important social attributes within the NRM system. Given the assets based framework being developed for regional catchment strategies in Victoria, there is also the possibility that the terminology may create some confusion if not clearly integrated within this framework.

While there is evidence to suggest that the term 'social assets' may not be the most appropriate, the term has be used within the Australian Government's MERI framework (Australian Government 2008a; 2008b) and for this reason its use is retained in the current paper.

On the basis of the research of Colliver (2006); the use of the term within the context of an assets based planning framework and in the context of the National NRM MERI framework the term 'social assets' should be used to describe:

1. Those characteristics of the social system which enable the longer term conservation, repair or replenishment of natural assets (NRM outcomes), and which

2. Comprise those characteristics of the social system which include:
    a. specific social entities, such as resource managers, NRM organisations and institutions (Australian Government, 2008b);
    b. the attributes or characteristics of social entities, which may also reflect their capacity to adopt sustainable management practices (Australian Government, 2008b); and
    c. the relationships and partnerships amongst social entities, including the capacity of social entities to influence others in the achievement of sustainable NRM outcomes.

In the definition that has been used, a social asset is not represented by a single component of the social system; it is not represented as one or more NRM organisations, it is not solely a specific attribute of these organisations such as their capacity, nor is it found in the quality or the type of the relations amongst organisations. The social asset is represented by all of these characteristics and as such it is perhaps better to refer to the social asset system which underpins and enables the achievement of NRM outcomes.

Figure 2 shows in simplistic form an example of a social asset system, which includes four social entities consisting of their own attributes and inter-relationships.

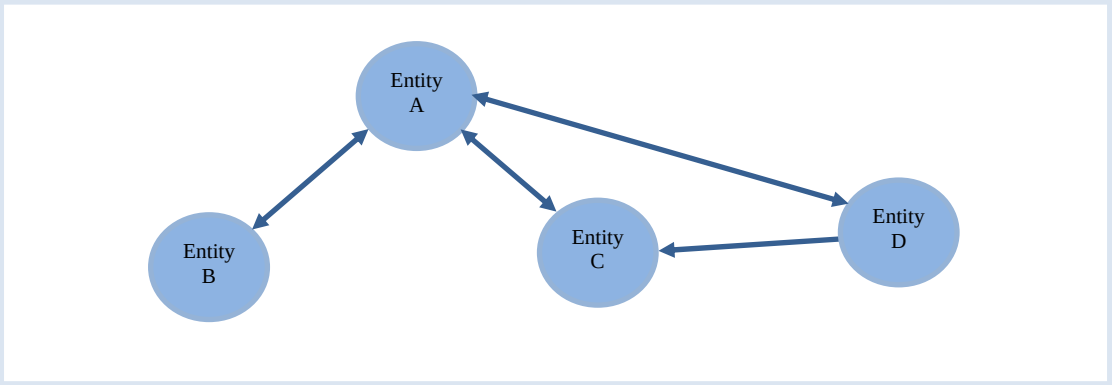


Figure 2. A simple schematic of social asset system

In developing the concept of social assets further there is also a need to better define the objectives, context and constraints under which the concept is to be examined. Reference to the objectives for the current project provides an indication of the NRM policy and program requirements underpinning the use of the concept. These requirements have been identified as relating to (i) methodology; (ii) description; (iii) monitoring and evaluation and (iv) application and use. For instance, the project brief indicates that the concept of a social asset must be sufficiently described so as to enable the following objectives to be addressed.

1. **Methodology**
    1. An outline of how the NRM social assets will be identified and assessed. The outline should include a set of criteria with related rationale and the recommended scale of analysis;
    2. The social assets are to be described at a national scale;
    3. Social assets to be 'mapped' or visually described;

2. **Description**
    4. Information is to be collated and related to current NRM social assets (as at 2007-08), including their role, capacity, focus and area of influence, key relationships and potential future changes to these;

3. **Monitoring and evaluation**
    5. Assets to be monitored during the implementation of specific NRM programs;
    6. The measurement of social assets for the purpose of monitoring and evaluation;
    7. Provide advice on the critical social assets of the NRM system to measure over time and the methodology that could be used.

4. **Application and use**
    8. Information on how outputs can be used by NRM decision makers;
    9. Social assets to be targeted to achieve specific NRM outcomes;
    10. Policy and program managers to target NRM investments at social assets;
    11. Identify areas where specific social assets could be targeted or strengthened to achieve specific natural resource management outcomes; and

In an attempt to meet the project requirements, a framework has been proposed which provides a basis for identifying and describing social assets within the NRM system. This framework draws on the concept of Entity-Attribute-Relationship modelling (EAR Model) used extensively in relational database modelling of complex systems (Chen, 1976); interorganisational theory (Levine and White, 1961) and social network theory (Freeman, 2004).

One of the key concepts underpinning this approach, following to some extent the work of Colliver (2006), is that a social asset is essentially a system of social resources and while individual components of this system may be identified and described, it is the system itself which is the social asset.

There are five key concepts that will be used to describe the social asset systems framework. These concepts, include:

6. NRM outcomes
7. Social entities
8. Social networks
9. Attributes
10. Relationships

6.1 NRM Outcomes

Reference is made in this paper to how investment in social assets may enable the achievement of NRM outcomes, with outcomes not only being a change in the quality and condition of the natural asset but also threats to those assets. For example, social assets may not only be used to improve the quality and condition of the soil (land asset) but the threatening processes of soil acidification, erosion and salinity.

In addition the NRM program logic and the associated outcomes hierarchy in the MERI framework identifies social assets as enabling the achievement of NRM outcomes. Given this logic or theory of program action, the question then becomes, in what elements of the social asset system should we invest to achieve these NRM outcomes; which social entities within the social asset system should be targeted to achieve NRM outcomes and how can we monitor the investment in these entities?

There are two important issues that need to be addressed in terms of the processes through which social assets may contribute to NRM outcomes. These two issues include:

1. Differential salience of social asset system to NRM outcomes; and
2. Cause-effect relationship between social asset systems and NRM outcomes

Differential Salience of Social Asset System on NRM Outcomes

The social asset system has been defined in terms of (i) social entities (resource managers and NRM organisations), (ii) their attributes and (iii) their relationships. These characteristics of the social asset system will differ and will vary in the extent to which they contribute towards the achievement of different NRM outcomes.

For instance, some social entities may contribute broadly to the achievement of a wide range of NRM outcomes (i.e., regional NRM bodies; State and Australian Government NRM agencies and organisations); while other social entities will be more specialised and focus on very specific NRM outcomes. Local weed management committees, the CRC for Weeds, and the National Weeds Management Facilitator are very specific social entities which have a very clear focus on addressing the weeds threat and threats to biodiversity as a natural asset. Clearly these social entities are important characteristics of the social asset system, but they are only important in relation to a very specific NRM outcome, namely biodiversity conservation.

Furthermore, and in order for these social entities to be considered as a valuable asset in the context of weed management, these social entities have developed important attributes (i.e., roles, functions and capacities) and relationships related specifically to the management of weeds. For example, local weed management committees provide considerable human resources towards weed management; the CRC for Weeds provides technical expertise and knowledge; and the NRM Weeds Management Facilitator is able to broker partnerships to support weed management. Without these important attributes and relationships these social entities would have limited *impact* (Funnell, 1997) on NRM outcomes.

Cause-Effect Relationship between Social Assets and NRM Outcomes

The social entities themselves including the resource managers and NRM organisations, may contribute either directly or indirectly to specific NRM outcomes. On a continuum of 'on-ground' and 'off-ground' works, some social entities will be more focussed on direct "on-ground" works, while others will be more focussed on "off-ground" works. For example, and in addressing the threat of weeds with a specific region; Landcare groups, local weed management committees and Local Government will often undertake much of the 'on-ground' works. However this 'on-ground' work will be strongly influenced by the 'off-ground' work of regional NRM bodies and other State and Australian Government agencies.

The social entities, including the resource managers and NRM organisations across the 'on-ground' 'off-ground' continuum will have developed different attributes (i.e., roles, functions and capacities) and relationships amongst themselves related to weed management. For example, the capacity requirements for those organisations undertaking 'on-ground' activities (i.e., local Landcare groups) will be very different to those undertaking weeds research (i.e., CRC Weeds) and those involved in the development of weeds policy and programs (i.e., DAFF and DEWHA)[7].

Figure 3 shows in a simple schematic form, the social entities and relationships amongst entities on a continuum from 'on-ground' to 'off ground' works.

[7] *What is also apparent when examining social assets in this context is that there are some parallels with the cause-effect outcomes hierarchy within a program logic context as originally described by Funnell (1997) and the generic NRM outcomes hierarchy within the MERI framework (Australian Government 2008a) which considers outcomes from project activities (strategies, plans etc) to improvements in the state of the asset.*

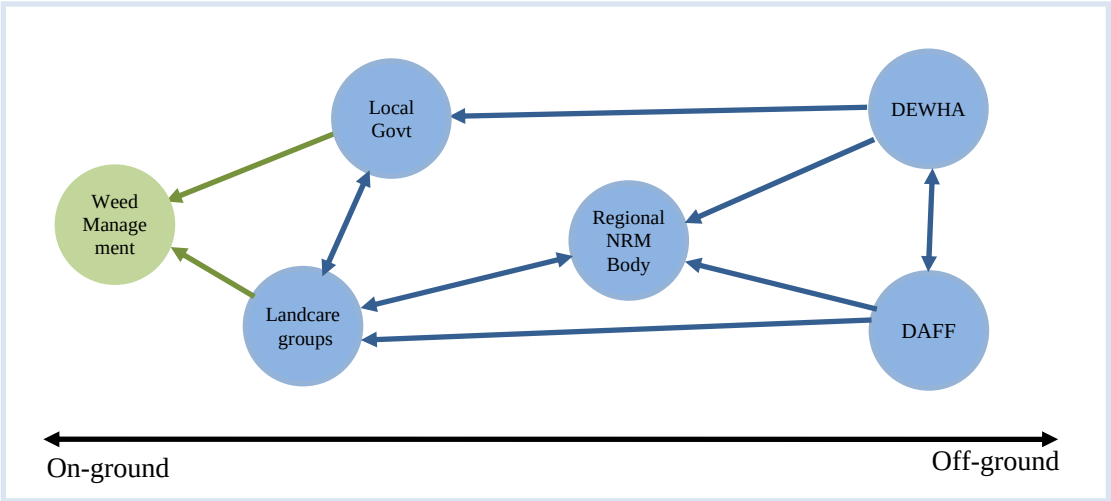


Figure 3. Schematic of a social asset system with cause-effect relationships amongst entities

The focus of much of the previous asset based NRM and planning has been on land assets. The focus for the new Caring for our Country program is also on natural assets associated with coastal environments, critical aquatic habitats and NRM in northern and remote Australia. Given these new national priorities, there are also implications for the social asset systems that should be the focus of investment, program implementation and M&E in addressing these new NRM proprieties.

6.2 Social Entities

In an NRM context social entities represent identifiable groups of individuals who have a common objective and undertake coordinated actions to achieve their goals. The terms 'organisations' and 'institutions' have not been used, as there is often considerable confusion over their meaning (i.e., is the CSIRO a research organisation or institution?)[8]. Social entities themselves provide structure and coordination to the social landscape which would otherwise be occupied by individuals all seeking their own individual NRM objectives.

The term 'social entity' is also synonymous with the term 'actors' as is also often used in stakeholder and actor analysis. In a discussion of the agricultural knowledge system within Australia, Campbell (2006) has also used the term actors as a starting point for the analysis of this system. The term 'actors' has also been used as an explanatory concept when describing components of the social system supporting water resource management (Hermans, 2005) and in natural resource management more generally (Bots & Van Daalen, 2007).

Actors are defined as "persons, groups, organisations…that are capable of making decisions and acting in a more or less coordinated way" (Burns, Baumgartner & DeVille, 1985, p. x); with each actor associated with the implementation of an NRM program controlling one or more of the resources needed for successful implementation of the program.

[8] *The term institution is defined as "an underlying, durable pattern of rules and behaviour" (Connor and Dovers, 2002) and consists of "formal constraints (eg. rules, laws, constitutions), informal constraints (eg. norms of behaviour, conventions, self imposed codes of conduct), and their enforcement characteristics."(North, 1994)*

What is clear from the definition of actors, is that a social entity is simply the container or the packaging. It is not the packaging that is critical, but more so what is contained within the package including the power, control, attributes, characteristics and interrelationships amongst social entities which will allow the achievement or otherwise of specific NRM outcomes. An NRM organisation can only be of value because of the attributes and relationships it possesses; whether these are for example in relation to its capacity to provide funds, provide technical expertise or its capacity to influence and induce change.

There are several methodological issues associated with the identification and description of social entities in an NRM context which are discussed later in Section 7. However one of the key issues, which also has some conceptual relevance, is that social entities often exist as nested hierarchies or to use the analogy as sets of 'Russian dolls'.

For example, there would be little argument that the Department of Agriculture Fisheries and Forestry (DAFF) is an important social entity which contributes in many ways to the achievement of a wide range of NRM outcomes. Similarly, there would also be little argument that the Joint NRM Team, the State NRM Teams and the Australian Government NRM Facilitator Network would also be important social entities in themselves. However, in this example the social entities are themselves all nested within DAFF. There are many other similar examples of the nesting of social entities at the State and regional level. While the issue is partly a methodological one, the 'graininess' of the required analysis is very much dependent upon the NRM policy and program requirements underpinning the analysis of social assets.

6.3 Social Networks

Social networks are also similar to policy networks as described by Kickert, Klijn and Koppenjan (1997) and consist of "more or less stable patterns of social relations between interdependent actors, which take shape around policy problems and/or policy programmes" (p. 6). In the current context the social network represents the relationships amongst social entities who have a common interest and involvement in NRM policies and programs.

The application of information drawn from social network analysis to NRM has only occurred relatively recently, although the analysis of social networks has been an important areas of social science enquiry since the mid 1970's (White, Boorman & Breiger 1976). For instance Pell, Hubacek and Reed (2007) provide a detailed discussion of the method, analysis and indicators used in social network analysis and its application to an NRM context.

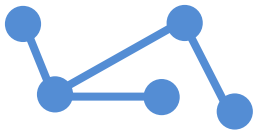
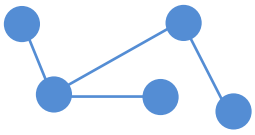
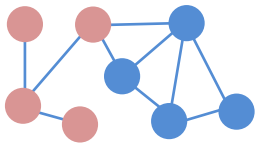
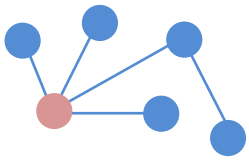
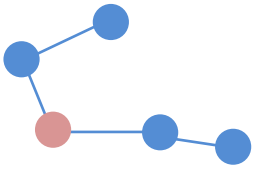
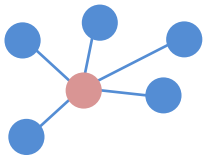
Love and Carroll (2008) have also recently stressed the importance of social networks in building social capital in sustainable production and NRM in Australia. In particular they have emphasised how participation in social networks contributes to group learning, the capacity to lever, attract and share resources, and the ability to cost share amongst participants.

Once a social network is displayed, as for example is shown Figures 2 and 3, it is possible to analyse the network structure from both a qualitative and quantitative perspective. From a qualitative perspective and given specific objectives, a narrative can be used to describe the social entities, their attributes and their network of relationships. This is perhaps the most useful approach in terms of using the social network analysis to assist in targeting NRM investment and

programs or providing information to strengthen the social asset to achieve specific NRM outcomes (see Section 6.6).

In addition it is also possible to use specific network concepts and quantitative indicators to describe the social network as shown in Table 3.

Table 3 Social network concepts and indicators (based on Pell, Hubacek and Reeed, 2007)

Network Concept	Illustration	NRM Implications
Strong ties		• High levels of communication and exchange of NRM information, with often high levels of trust. • May be less exposed to new NRM ideas, less willing to change and adopt new ideas and practices.
Week ties		• Maintains the reach and range of connections with different social entities • Week ties often play a bridging role in maintaining parts of the network together
Homophily (similar entities attracted to one another)		• Social entities that are similar are better able to inform and address NRM issues together • Restricts diversity of new ideas and inclusion of range of stakeholders in NRM processes
Degree Centrality (how many others an entity is directly connected to. Maybe in or out ties)		• Important diffusers of NRM information and capable or mobilising others • Because they often have many ties, the ties are often week and there is often little capacity to influence others
Betweenness Centrality (entities between others in the network that are disconnected)		• Social entities having high betweenness centrality are important in bringing together disconnected components of the network and proving an 'brokering' role in NRM. • Entities with high betweenness centrality have significant influence over what information flows and does not (gatekeepers)
Closeness (extent to which the entity can access all nodes in the network)		• These entities are critical to include in NRM decision making as they close to all other entities, able to monitor information flow in the network and have the best visibility into what is happening in the network

6.4 Attributes

Each of the entities in the social network have attributes and characteristics that are important in enabling the achievement of NRM objectives. The document entitled 'Recommended National Assets and Indicators for NRM' (Australian Government, 2008b) indicates that the primary attribute or asset characteristic of interest is the capacity of individuals and organisations to change to sustainable management practices. Table 2 also shows the recommended indicators that should be used to assess the characteristics of these organisations, with many of these indicators being developed from the work of the National Land and Water Resources Audit (NLWRA) between 2003 and 2008.

The description of specific attributes (indicators) associated with the capacity of land managers has been documented extensively by Nelson, Webb and Byron (2005). Similarly, Fenton (2004) and Fenton & Rickert (2008) have also identified indicators of the capacity and performance of regional NRM organisations within the context of (i) NRM program capacity; (ii) management capacity; (iii) engagement and (iv) partnerships. Love and Carroll (2008) have also developed indicators for social capital components in NRM and their relevance to sustainable production.

The difficulty that emerges is that while many of the indicators that have been identified in previous research are important in their own right, they are generally specific to a type or group of social entity. There exists for instance well defined indicators for land mangers, regional NRM organisations and facilitators and coordinators. It is difficult and perhaps not possible (or even a necessity) to identify a generic set of indicators of capacity which are equally applicable across a wide range of social entities including for instance regional NRM bodies, NRM community groups and State and Australian Government agencies. Even if such a set of indicators were developed it is likely that their usefulness in terms of NRM policy and program development and implementation would be limited.

In order to provide useful information about the attributes of social entities, rather than using a quantitative approach to the measurement and assessment of indicators, this is clearly an instance where a strong qualitative approach would be more useful. Importantly while the network analysis and description (section 6.3) would be based on a quantitative assessment, the qualitative assessment would essentially be a descriptive layer across the more quantitative network analysis.

The following four headings provide a basis for the qualitative assessment of the attributes of social entities:

1. **Description:** This would include general information which describes the social entity. It may include for example information on:
    - The size of the entity (its staffing levels and level of funding)
    - Its location (whether it has central and/or regional offices)
    - Its funding sources
    - The number of years of operation

2. **NRM Function.** What is the function of each entity in the network? What do they do? Do some entities have multiple functions in relation to achieving NRM outcomes?
    - Some entities will focus more specifically on on-ground activities and others will focus on off-ground activities, including for example coordination, and the development of plans and strategies
    - Some entities will be specialists (i.e., focus on weeds control) while other entities will be generalists (i.e., weed control, funding applications, partnership coordination, research)
    - Some entities will focus on the large scale in addressing NRM issues, while others will focus on small micro issues within the local scale.

3. **Resources**. What are the primary resources held and utilised by each social entity in achieving their objectives?
    - Each entity will differ in the resources it utilises and controls. Some entities will hold considerable local knowledge; others will hold knowledge of the social network; while others will hold formal NRM knowledge, funds, data, and other forms and types of NRM information. Still other entities may be effective in achieving their NRM objectives because they have access to specific geographic areas, or because they have the required number and type of personnel to address specific NRM issues.

4. **Capacity.** What capacity does the social entity have to implement an NRM program or to address a specific NRM issue?
    - Given the use of the analysis in targeting NRM investment and program implementation, it is important to consider the management capacity and NRM program capacity of each of the social entities.
    - Management Capacity:
        - What level of financial management and human resource management capacity does the social entity have?
    - NRM Program Capacity:
        - What level of knowledge and skills does the social entity have in relation to the NRM issue of interest?

6.5 Relationships (Ties)[9]

The relationships or ties amongst social entities can be defined on the basis of resource exchange or on the basis of the 'influence' one entity has over another.

On the one hand we can speak of a relationship amongst social entities based on the exchange of goods and services, which includes all those resources required for each social entity to meet their NRM objectives. The type of goods and services that may be exchanged is highly variable and may include funds, information, human resources, knowledge or material objects. From a methodological standpoint, assessing relationships on basis of the specific types of goods and

[9] *A discussion of the type of relationships to be assessed amongst social entities was the subject of considerable discussion in the project workshop and within the project steering committee. This discussion indicated that relationships could be defined on the basis of the exchange of resources or on the basis of influence..*

services exchanged becomes exceedingly complex and time consuming and for this reason it is usually the case that an aggregate measure of exchange is used which is inclusive of all the different types of goods and services that maybe exchanged between entities (Prell, Hubacek and Reed, 2007)

The exchange of goods and services may occur at an informal level or more formal level.

An example of the formal exchange of goods and services amongst social entities occurs between the Commonwealth and State and Territory Governments in the NAPSWQ and NHT bilateral agreements. There are also more formal agreements between the States and Territories and regional NRM bodies. In Victoria for instance, regional NRM bodies on the basis of funding provided by the State have to undertaken specific activities and obligations as defined under a Statement of Obligations and the Catchment and Land Protection Act (1994).

Underpinning the more formal exchange of NRM related goods and services amongst entities within the network are the more informal connections, relations and social obligations amongst entities; what has generally been defined as social capital (Adler and Kwon, 2002; Dekker and Uslander, 2001). However as recognised by Borgatti and Foster (2003), "social capital is 'just' a powerful renaming and collecting together of a large swath of network research from the social support literature to social resource theory." (p. 993)

As illustrations of the social capital approach in an NRM context, Fenton and Rickert (2008) have recently examined the level of trust, transparency and flexibility in decision making between Australian Government, State Government and regional NRM bodies. Coral and Love (2008) have also identified indicators of exchange based on the core concepts of social capital including (i) participation in networks; (ii) reciprocity; (iii) trust; (iv) social norms; and (v) proactivity.

Whilst exchange can be examined from both a formal and informal perspective, a particularly useful measure of the relationship amongst social entities is that of influence, or the extent to which one entity is able to influence the actions and behaviours of another (Prell, Hubacek and Reed, 2007). Given the importance of change and in particular the capacity of NRM organisations to change and adopt sustainable practices (Australian Government, 2008b), the extent to which one social entity is able to influence another entity in changing practices or behaviour is critically important in terms of targeting NRM investment and the implementation of policy and programs.

7. A METHODOLOGY TO ASSESS SOCIAL ASSETS

Section 6 provided a conceptual framework for describing the social asset system, which included key concepts related to (i) NRM outcomes; (ii) social entities; (iii) social networks; (iv) attributes and (v) relationships.

The proposed methodology provides an outline describing how the social asset system could be identified and assessed. The methodology has had some application in a demonstration project (See Section 8) and issues arising from this process have also been used to assist in the development of the methodology.

7.1 Scale of Analysis

One of the project objectives was to describe social assets at the national scale. Given a conceptual framework based on social networks, the role of specific social entities (as outlined in Section 6), and the need to link the framework to NRM outcomes; the scale of analysis would include all social entities on a continuum from those with a national focus to those with a local focus.

As identified in the workshop for this project, there is a need to examine social entities along a continuum which essentially links those social entities involved in on–ground NRM activities with those involved in the development, administration of implementation of NRM policies and programs at the national scale. Furthermore examining social entities along this continuum allows, as discussed in the project workshop and as identified in the project brief, social assets to be targeted to achieve specific NRM outcomes (i.e., see Figure 3).

As shown in Figure 4, social entities within the NRM system have a 'range of influence' which may be described as being either national, State, regional or local.

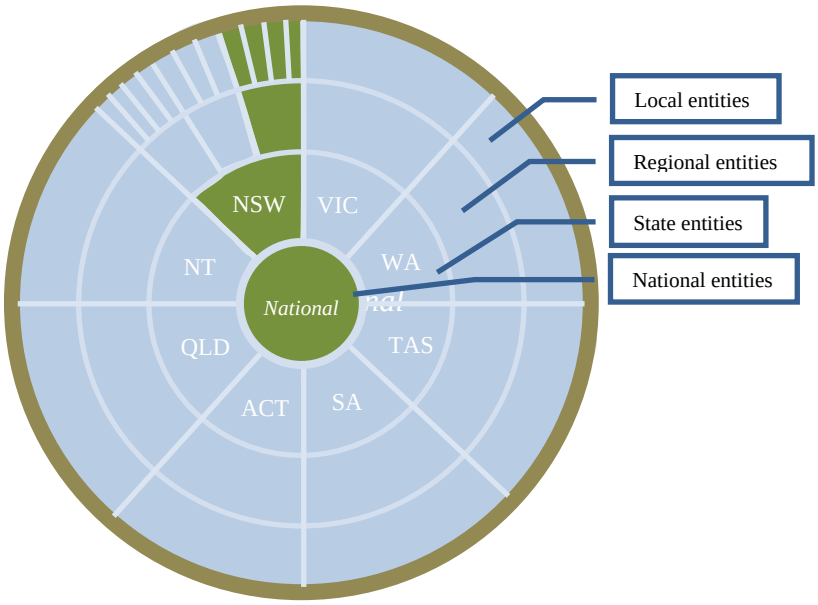


Figure 4. Scale of social asset assessment

To undertake a complete analysis at a national scale would require the identification and assessment of social entities at the national level and within each of the jurisdictions, regions and local areas. Such an analysis would provide a very detailed ‘map’ of the social entities involved in NRM, their attributes and relationships. However, such an approach would also be exceedingly complex and time consuming to implement.

A feasible alternative would be to sample two NRM regions from within each jurisdiction (excluding the ACT and NT which would have a single continua) and ensure that a range of social entities are examined from the national through to the local level. This approach would provide a sample of 12 continua of social entities from the national to the local level.

In addition, and as indicated in Section 6.1 the type of social entities to be identified and assessed will be dependent upon the type of NRM outcomes of interest. While 12 continua of social entities have been identified, each continua needs to be specific to an NRM outcome. Given the number of potential NRM outcomes, the process can again becomes exceedingly complex and time consuming to implement.

Rather than having a single continua of social entities from the national to the local scale for 12 selected regions, each of the 12 continua could be further separated on the basis of three continua representing those social entities that have a specific focus on addressing threats to the three natural asset classes of land, biodiversity, and inland and marine waters (Australian Government, 2008b). Table 4 provides an illustration of the 42 continua that could be used.

Table 4 provides an illustration of the sampling of continua

National	State	NRM Region	Natural asset class	Continua #
National	NSW	NRM Region 1	Land	Continua 1
			Biodiversity	Continua 2
			Inland/Marine Waters	Continua 3
		NRM Region 2	Land	Continua 4
			Biodiversity	Continua 5
			Inland/Marine Waters	Continua 6
	Vic	NRM Region 1	Land	Continua 7
			Biodiversity	Continua 8
			Inland/Marine Waters	Continua 9
		NRM Region 2	Land	Continua 10
			Biodiversity	Continua 11
			Inland/Marine Waters	Continua 12
	WA	NRM Region 1	Land	Continua 13
			Biodiversity	Continua 14
			Inland/Marine Waters	Continua 15
		NRM Region 2	Land	Continua 16
			Biodiversity	Continua 17
			Inland/Marine Waters	Continua 18
	Tas	NRM Region 1	Land	Continua 19
			Biodiversity	Continua 20
			Inland/Marine Waters	Continua 21
		NRM Region 2	Land	Continua 22
			Biodiversity	Continua 23
			Inland/Marine Waters	Continua 24
	SA	NRM Region 1	Land	Continua 25
			Biodiversity	Continua 26
			Inland/Marine Waters	Continua 27
		NRM Region 2	Land	Continua 28
			Biodiversity	Continua 29
			Inland/Marine Waters	Continua 30
	QLD	NRM Region 1	Land	Continua 31
			Biodiversity	Continua 32
			Inland/Marine Waters	Continua 33
		NRM Region 2	Land	Continua 34
			Biodiversity	Continua 35
			Inland/Marine Waters	Continua 36
	ACT	NRM Region 1	Land	Continua 37
			Biodiversity	Continua 38
			Inland/Marine Waters	Continua 39
	NT	NRM Region 1	Land	Continua 40
			Biodiversity	Continua 41
			Inland/Marine Waters	Continua 42

7.2 Identification of Social Entities

As discussed in Section 7.1, the identification of social entities should be based on the continua of social entities from the national through to the regional/local level for specific natural asset classes (as shown in Table 4).

Two methods, including a document review and key informant interviews, should be used to identify social entities for each continua.

The document review should precede the key informant interviews and would include a review of documents at the national, State and regional/local scale:

a. *National Level.* A review of National documents, including overarching frameworks and strategies;
b. *State Level.* A review of State documents, including overarching frameworks and strategies;
c. *Local and Regional Level.* A review of regional documents including plans, investment strategies, community engagement strategies and other documents (including research documents), which may assist in identifying social entities.

The initial identification of social entities across all levels within each continua should occur through the document review process. The initial identification of social entities would then be reviewed by key informants at the national, State and regional/local level.

Three key informants should be used at the national level, three at each of the State levels and three at each of the NRM regional levels. The selection of key informants should be based on their knowledge of social entities at each of the levels. For instance at the regional NRM level one key informant who is knowledgeable of those social entities working with each of the three natural asset classes should be used.

The outcome from this first step would be a list of social entities across national, State and regional/local levels for each of the continua.

7.3 Collection of Relationship and Attribute Data

One of the difficulties in undertaking a network analysis is the amount of data required for an analysis with even a small number of social entities. For instance, with 20 entities, attribute data would not only be required for these entities, but there would be 190 pairs of social entities for which some judgment about the relationship between them would be required. With 40 social entities there would be 780 paired comparisons.

Furthermore, the relationship in terms of the exchange of good and services and level of influence between any two social entities is asymmetric rather than symmetric. This means that the relationship between two entities is not equal. For instance, entity A may influence entity B which is different to the influence entity B may have on entity A. In this example, because of the

asymmetric nature of the relationship amongst entities, rather than there being 780 paired comparisons with 40 entities there are now 1,560 comparisons to be made[10].

Relationship Data

The same key informants who identified social entities at the national, State and regional level would again be used to define the relationships amongst social entities. Rather than all key informants undertaking comparisons across all social entities, the data would be partitioned so that each key informant would only make those comparisons amongst social entities within the level at which they were familiar. For instance, key informants at the regional level would only make judgements in relation to those social entities at the regional level, key informants at the State level would only make judgments amongst entities at the State level and key informants at the national level would only make judgments in relation to social entities at the national level.

The relationship amongst social entities should be defined on the basis of two criteria:

1. **Resource Exchange[11].** The level of resources exchanged amongst social entities, where resources are defined as information, funds, people, ideas or material objects. Appendix C provides an example of a matrix of social entities involved in weed management at the regional, State and national level. Key informants were given instructions which stated:

   Resources may include information, funds, people, ideas or material objects.
   Think about the exchange of resources between social entities
   in the last 12 months. Score the level of resource exchange between the two entities
   0 = None/very little
   1 = Minor
   2 = Moderate
   3 = Large

   In this example, key informants are told the exchange of information between A and B may not be the same as between B and A and in these cases they are asked to find an average.

2. **Influence:** The level of influence one social entity has in relation to another. Influence means affecting, or changing the way individuals, groups and organisations behave, act and think; including the actions they undertake, the decisions they make and the way they do things. Appendix D provides an example of a matrix of social entities involved in weed management at the regional, State and national levels. Key informants were given instructions which stated:

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[10] *Although the number of comparisons may appear large, many of the comparisons amongst entities will be represented by no information exchange.*

[11] *Although a measure of resource exchange is included in the proposed methodology, the demonstration project has indicated that relying on a measure of 'influence' to describe network relationships may be sufficient to meet the project objectives.*

Influence means affecting, or changing the way individuals, groups and organisations behave, act and think; including the actions they undertake, the decisions they make and the way they do things. Think about the management of weeds in the SRCMA region. In relation to weed management in the SRCMA, what influence does the entity in the column have on the entity in the row? In terms of weed management in the SRCMA region would you say the influence is...
0 = None/very little
1 = Minor
2 = Moderate
3 = Large

Attribute Data

Attribute data would be defined on the basis of a document review, interviews with the same key informants who had undertaken an assessment of the relationships amongst social entities (Section 7.3) and where necessary other key informants who may be knowledgeable of specific social entities.

The approach would be to review documents which would provide information in relation to the attributes of social entities and to undertake semi-structured key informant interviews.

As indicated in Section 6.4 the assessment of attribute data would be based on the qualitative analysis of information obtained from the document review and key informant interviews and would focus on the following four areas which include:

1. A description of the social entity;
2. NRM function;
3. Resources; and
4. Capacity

The demonstration project (Section 8) provides some illustration of how qualitative information may be used in describing the social entities in the context of the network analysis.

8. DEMONSTRATION PROJECT

The objective of the demonstration project was to provide an illustration of the type of outputs that were possible from the analysis of the social asset system. The data used in the demonstration is only illustrative and is not based on the full methodology as described in Section 7.

For the purpose of the demonstration project the following constraints were applied:

1. The natural asset examined was biodiversity and specifically the threat of weeds to biodiversity (See Section 4.1). To this extent the identification of social entities, their attributes and relationships focussed on weed management;
2. The continua included the national level, New South Wales State and the Southern Rivers NRM region within NSW;
3. Three key informants were used, which included a key informant for the national level; NSW State and the Southern Rivers CMA.

Each of the three key informants completed four tasks.

1. **Identification of Social Entities:** In the first task (Appendix C) each key informant was presented with an initial list of social entities and asked to add, remove or change social entities so that a complete list of social entities associated with weed management could be identified. The initial list of social entities which key informants used as a basis for further review was derived from existing documentation and included entities drawn from the national, NSW State and Southern Rivers NRM region.

2. **Resource Exchange:** In this task each of the three key informants were required to score the level of resource exchange amongst pairs of social entities (See Section 7.3) using a four point scale from none/very little to large (Appendix D). The matrix was partitioned so that the regional informant only completed the task for local and regional entities; the State informant only completed the tasks for State entities; and the national informant only completed the task for national entities.

3. **On-Ground Activities:** In this task all three key informants identified which social entities were involved in on-ground weed management activities and which social entities had either no, limited or some influence on these on-ground activities (Appendix E). Although all three informants completed the scoring, it was found that informants at the regional level were more knowledgeable and better able to make these judgements. As such only the scores from the regional informant were used.

4. **Influence:** This task was similar to the resource exchange task, however in this task all three informants scored the level of influence one entity had on all another entities in relation to weed management in the Southern Rivers NRM region (Appendix F). Like the resource exchange task, the matrix was partitioned so that informants only completed the task in relation to those social entities for which they were familiar.

8.1 Influence Network[12]

The first analysis is based on an examination of the influence network in relation to weed management and the data drawn from the task as shown in Appendix F. In order to illustrate this network and the role of social entities in addressing weed management outcomes, the network is shown through several incremental levels. These levels include:

1. **Level 1:** Social entities involved in on-ground weed management activities;
2. **Level 2:** Social entities involved in on-ground weed management activities; and social entities with 'some' influence on on-ground activities;
3. **Level 3:** Social entities involved in on-ground weed management activities; and social entities with 'some' and 'limited' influence on on-ground activities; and
4. **Level 4:** All social entities, including those with 'no' or 'very limited' influence on on-ground activities.

While the social network analysis itself has been developed through a quantitative approach, the description of the social network as shown in the following discussion and as described in Section 6.4 is best undertaken through a more qualitative approach[13].

Level 1 influence on weed management

Figure 5A shows the four social entities that undertake on-ground activities in relation to weed management in the Southern Rivers NRM region. These entities include Local Governments, landholders and Landcare groups in the Southern Rivers NRM region and at the NSW State level it includes the Department of Environment and Climate Change (DECC).

As shown in Figure 5A there are few 'strong' influence ties[14] amongst social entities which are involved in on-ground weed management activities. As illustrated in Figure 5A, Local Government and Landcare organisations have a relatively strong influence on landholders in relation to weed management. DECC at this level appears somewhat isolated from the other entities which is most likely due to DECC focussing on weed management solely in National Parks.

Figure 5A only shows the strong influence ties. Appendix G (Figure G1) shows the same four social entities, but in this case shows only the 'weak' influence ties amongst them. In Figure G1, DECC exerts a relatively weak influence over Local Government Authorities, Landcare groups and landholders in relation to weed management. Local Government is also shown as having a relatively 'weak' influence over Landcare groups in relation to weed management.

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[12] *The importance of assessing influence was identified by participants in the project workshop and through later discussion with Steering Committee members.*

[13] *Although qualitative information is presented in the following description of the social network, time constraints limited the depth of qualitative information that could be collected as part of the demonstration project.*

[14] *A strong influence tie is defined as influence score greater than two and a weak influence tie has having score of one (Appendix D)*

Level 2 influence on weed management

Figure 5B in addition to showing those social entities that undertake on-ground activities in relation to weed management, also shows those entities that have 'some' influence in relation to on ground weed management. This includes Weed Management Committees in the Southern Rivers NRM region, the NSW State Department of Primary Industries (DPI) and the Southern Rivers CMA.

What is clear from Figure 5B, which again only shows the strong influence ties, is the significant influence the Southern Rivers CMA and the DPI has on those entities undertaking on-ground weed management. Certainly in considering any targeted investment or new program initiatives or implementations, these two entities would play a significant and important role in ensuring on ground activities in relation to weed management were likely to be implemented in the region.

On the other hand, the Weed Management Committees, while they have some influence in relation to landholders do not appear to have a strong influence in relation to on–ground weed management activities. Given the role of these organisations in the development of strategies and plans for weed management, this analysis indicates that some consideration may need to be given to the effectiveness of Weed Management Committees in influencing on-ground weed management.

Level 3 influence on weed management

Figure 5C further extends the social network by including those entities which not only undertake on-ground activities in relation to weed management, but also those entities that have 'some' and 'limited' influence on on-ground weed management activities. For clarity, Figure 5C again only depicts those relationships where there is a 'strong' influence amongst social entities.

With the inclusion of additional social entities in the network, the on-ground activities of landholders also now appear to be influenced by the Rural Lands Protection Boards (RLPBs), while Landcare groups are also influenced by the Landcare networks and the Australian Government Department of Agriculture Forestry and Fisheries (DAFF). The NSW Department of Environment and Climate Change (DECC), while undertaking on-ground weed management in National Parks, appears to be little influenced by other entities in the network.

The Weed Management Committees, while being influenced by many other social entities within the network appear to have little influence themselves on others in the network.

The DPI and the Southern Rivers CMA continue to be two of the most important entities in the network. With the exception of DECC, the DPI not only influences the entities involved in on-ground weed management activities, but is also now shown as having a significant influence on the CRC Weeds, industry groups and Landcare networks in the Southern Rivers region. What is also interesting from Figure 5C, is that there is little if any 'strong' influence on DPI from other entities in the network.

As shown in Figure 5C, and unlike the DPI, the Southern Rivers CMA not only influences on ground activities in relation to weed management, but is itself 'strongly' influenced by other entities in the network including the Department of Agriculture Fisheries and Forestry (DAFF);

the Department of Water, Heritage and the Arts (DEWHA); industry groups in the region and the Australian Government Joint NRM Team. Figure G3 (Appendix G) also shows the Southern Rivers CMA does not have any 'weak influence' ties over other entities in the network, however there are numerous social entities which have a weak influence on the Southern Rivers CMA. In this sense the Southern Rivers CMA is clearly acting as a broker in the relationship amongst social entities in relation to weed management.

It is also clear from Figure 5C that from the Australian Government level, the influence on weed management in this region is through DAFF and DEWHA and the Southern Rivers CMA.

Interestingly and in terms of only the strong influence ties shown in Figure 5C, the National NRM Facilitator Networks appears to be performing more of a brokering role between DEWHA and DAFF. Although when the weak influence ties are considered (Appendix G, Figure G3), the National NRM facilitator Network exerts a weak influence over a number of social entities including Landcare groups, Landcare networks, landholders, Local Government, the Southern Rivers CMA and the Australian Government Joint NRM Team.

Level 4 influence on weed management

Figure 5D includes all social entities in the network and again shows the 'strong' influence ties amongst social entities. At this level the influence of the Natural Resource Management Ministerial Council (NRMMC) becomes apparent, with this entity now having a strong influence on DAFF, DEWHA, DECC and the NSW DPI.

Figure G4 (Appendix G) also shows the 'weak' influence ties amongst all social entities in the network. Landcare groups, Local Government, the Southern Rivers CMA and NSW DPI are all influenced by other social entities in the network through weak influence ties.

Figure 5A. Social entities and weed management: On-ground influence - strong ties

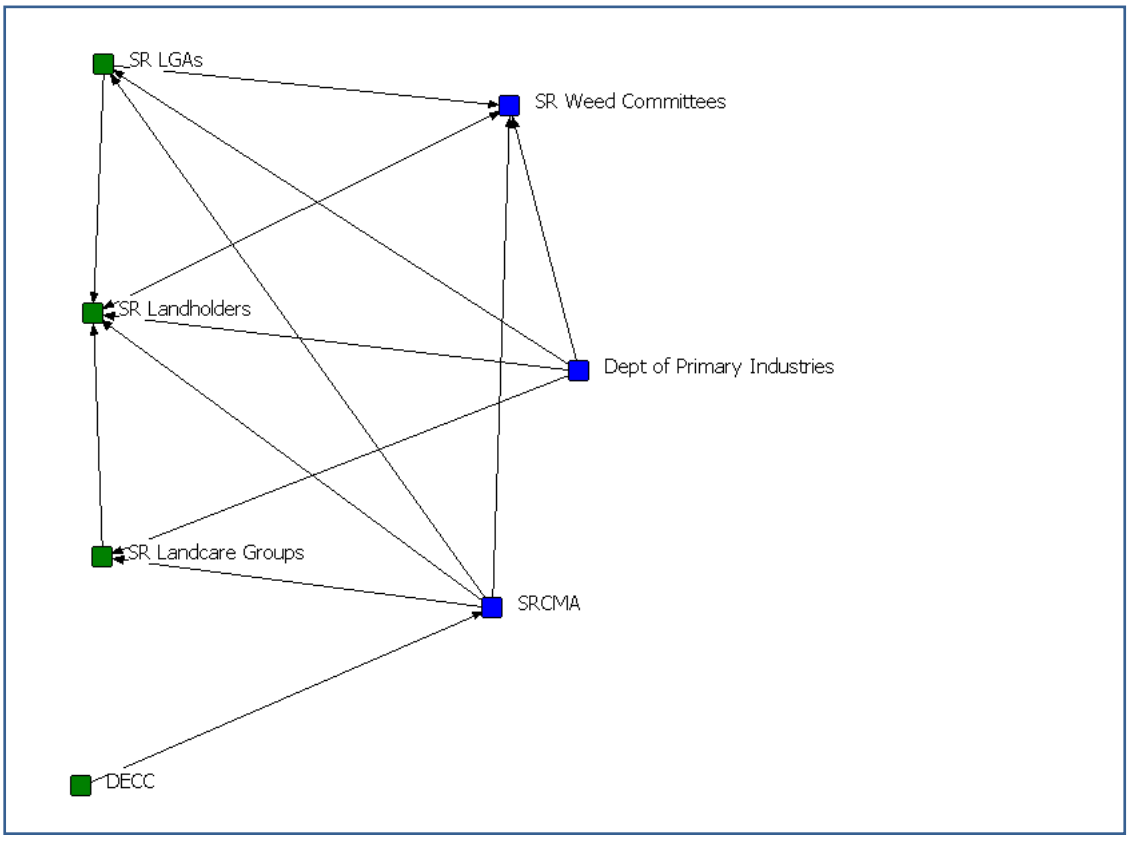

Figure 5B. Social entities and weed management: Some on-ground influence - strong ties

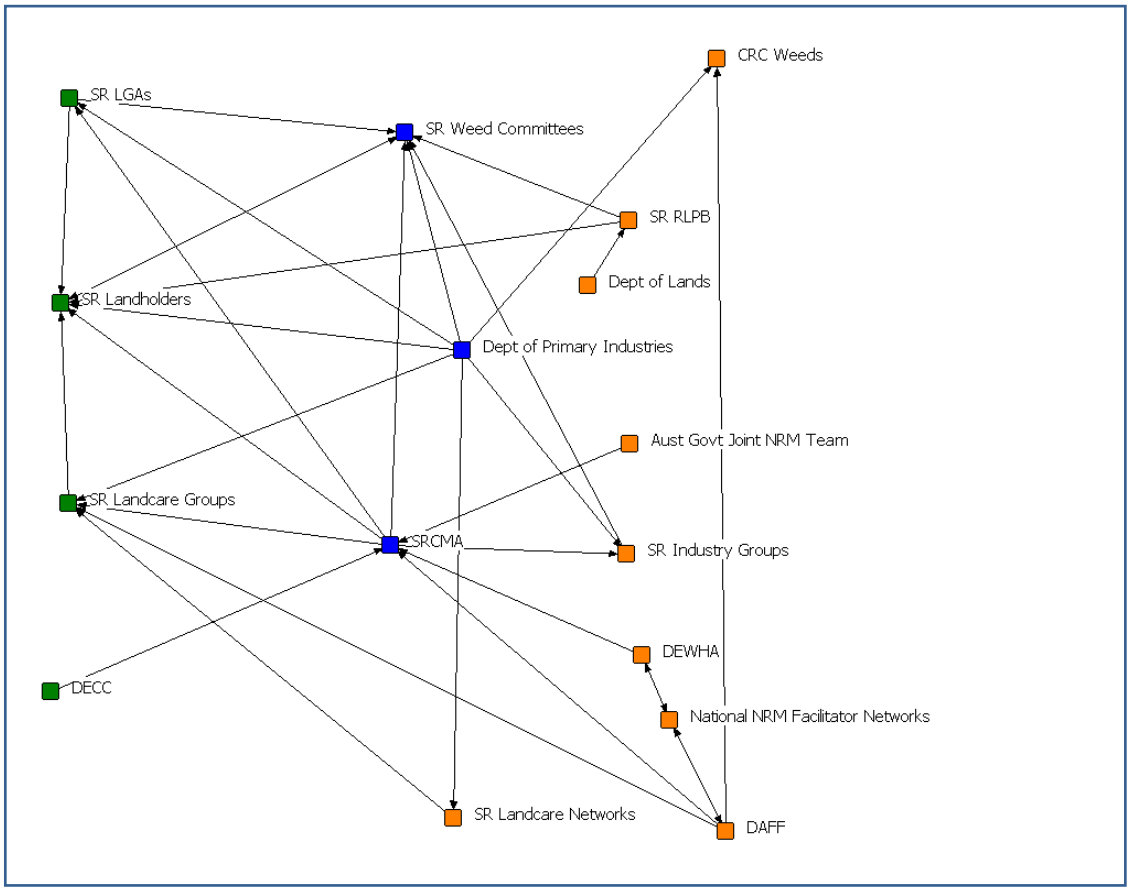

Figure 5C. Social entities and weed management: Limited on-ground influence - strong ties

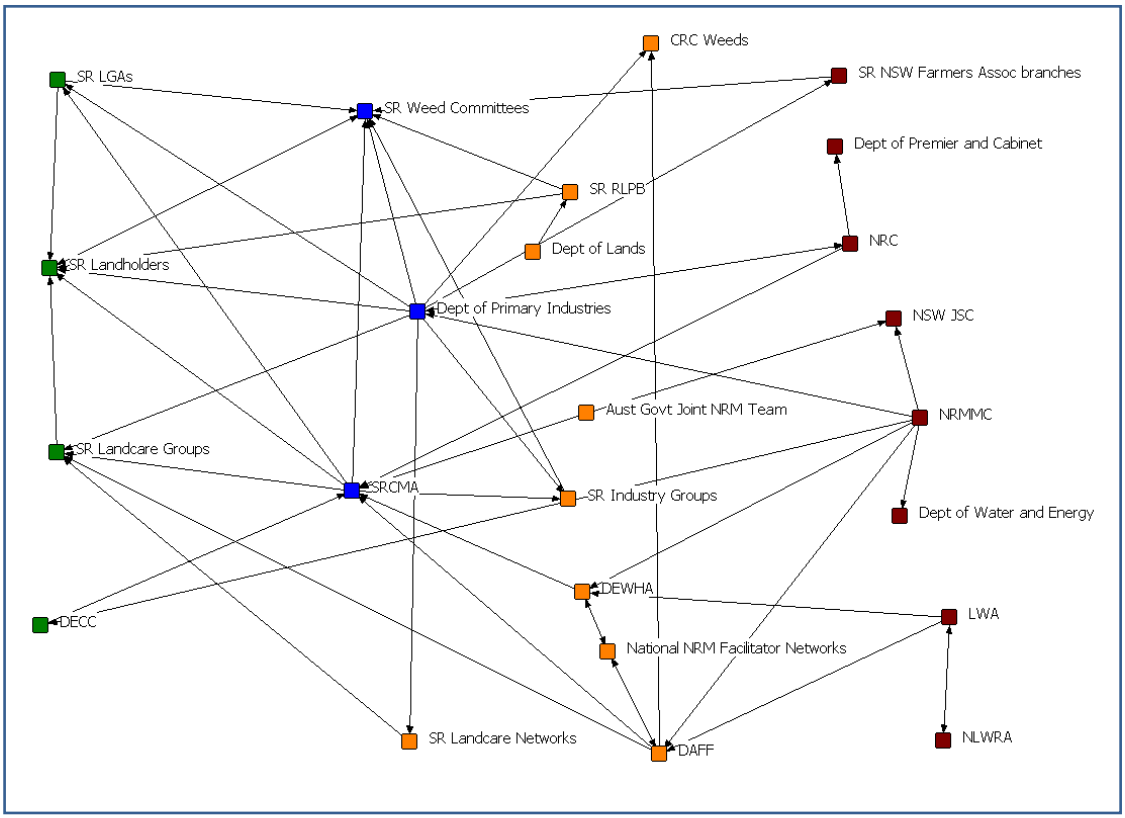

Figure 5D. Social entities and weed management: All social entities – strong ties

Examples of several quantitative indicators which may be defined for the social entities and social network is presented in Table 5 and 6[15].

Table 5 for instance shows the influence scores for social entities as derived from the scoring matrix shown in Appendix F. The influence scores are presented for each social entity and show the extent to which each social entity has an influence on other social entities at the local/regional, State and national levels. In addition, a total influence score across all social entities is also presented.

Table 5. Total influence scores for social entities

Social Entity	Local/Regional Influence	State Influence	National Influence	Total Influence
Department of Primary Industries	17	6	8	31
NRMMC	0	8	7	15
Southern Rivers CMA	13	0	0	13
NSW Joint Steering Committee (JSC)	1	5	7	13
Department of Lands	9	2	1	12
Department of Forestry and Fisheries (DAFF)	7	1	4	12
DEWHA	6	2	3	11
CRC Weeds	6	2	3	11
National NRM Facilitator Networks	6	0	5	11
NRC	2	7	2	11
DECC	6	3	1	10
Land and Water Australia	0	2	6	8
SR Weed Management Committees	7	0	0	7
Australian Government Joint NRM Team	5	2	0	7
SR environment groups	6	0	0	6
SR Local Government Authorities	6	0	0	6
SR Rural Lands Protection Boards	6	0	0	6
NRAC	4	2	0	6
National Land and Water Resources Audit	0	2	4	6
SR Landcare networks	4	0	0	4
SR Landcare groups	3	0	0	3
State conservation organisations	3	0	0	3
Department of Premier and Cabinet	0	2	1	3
SR landholders	2	0	0	2
SR industry groups	2	0	0	2
SR NSW Farmer Association branches	2	0	0	2
National conservation organisations	2	0	0	2
Department of Water and Energy	0	0	0	0
Department of Planning	0	0	0	0
Total	125	46	52	

Note: *The scores are the sum of the influence scores for a specific social entity in relation to all other social entities at the local/regional level; State and National levels*
The total influence score is the sum of the influence scores for a specific social entity in relation to all other social entities

Source: *EBC (2008).*

From Table 5 it is apparent that the social entities with the greatest influence in relation to weed management at the local and regional level are the NSW DPI and the Southern Rivers CMA.

[15] *Table 5 and 6 only presents examples of several indicators. There are numerous publications which report a wide range of other social network indicators which also could be used in describing the data. This includes the identification of 'isolate' social entities, cliques, subgroups, structural holes and other indicators of network density and centrality*

However unlike the Southern Rivers CMA, the Department of Primary Industries also has significant influence at the State and national levels. Table 5 also shows the influence of the NRM Ministerial Council, which although having little influence at the local and regional level, exerts significant influence at the State and national levels.

Although Table 5 only presents the findings of influence in relation to weed management, if these findings were maintained across all other continua as described in Table 4, it would have significant implications in relation to NRM program design and delivery. For example issue which may need to be addressed include:

- the National NRM Facilitator network does not appear to have any significant influence in relation to State level social entities;
- the Southern Rivers CMA while having a significant local and regional influence, appears to have no influence in relation to State and Australian Government agencies; and
- the Australian Government Joint NRM Team, while it has a strong regional and some State influence appears to have no influence in relation to other Australian Government agencies.

Table 6 provides examples of several of the network indicators discussed in Section 6.3. The first two indicators (indegree and outdegree) are measures of degree centrality. Indegree indicates the number of ties directed towards the social entity and outdegree indicates the number of ties the social entity directs towards others. A shown in Table 6, Landcare groups, Landcare networks, Local Government Authorities and landholders all have a relatively high number of ties directed towards them, however they direct few ties to others. In contrast, the NSW DPI, the NSW JSC, CRC Weeds and the Department of Lands are more likely to direct ties (and influence) to others in the network.

The closeness indicator shows those social entities which have the shortest paths (ties) to all others in the network. These social entities typically ‘know’ the network and are easily able to monitor changes in the network. Environment groups in the Southern Rivers region and the NSW DPI both have high closeness measures.

The betweenness indicator identifies those social entities that play a brokering role in the network. While these entities play a powerful role in the network they also represent a point of potential failure in the network in so far as they are often the only link amongst entities. Social entities with high betweenness scores include the NSW DPI, Southern Rivers environment groups and the Department of Lands.

Table 6. Examples of network indicators

Social Entity	Centrality Measure			
	Indegree	Outdegree	Closeness	Betweenness
Department of Primary Industries	8	13	97.0	45.1
Southern Rivers CMA	8	3	102.0	15.8
SR environment groups	12	6	95.0	51.8
DECC	8	8	99.0	25.8
SR Landcare groups	9	1	103.0	10.2
Department of Lands	4	10	99.0	44.2
DEWHA	4	7	107.0	4.6
SR Local Government Authorities	9	2	104.0	10.2
NSW Joint Steering Committee (JSC)	5	13	101.0	26.6
Department of Forestry and Fisheries (DAFF)	5	4	107.0	4.6
CRC Weeds	1	11	101.0	13.2
SR Landcare networks	8	2	104.0	5.6
SR landholders	5	0	113.0	0.6
SR industry groups	7	0	107.0	7.6
Australian Government Joint NRM Team	6	3	105.0	13.8
National NRM Facilitator Networks	1	7	107.0	4.6
SR Weed Management Committees	2	5	113.0	10.5
NRC	1	5	111.0	2.0
NRMMC	3	1	116.0	0.3
SR Rural Lands Protection Boards	4	1	111.0	2.4
NRAC	1	6	106.0	21.3
Land and Water Australia	3	2	113.0	0.1
National Land and Water Resources Audit	3	4	112.0	0.2
State conservation organisations	1	3	114.0	0.7
Department of Premier and Cabinet	1	3	117.0	0.0
SR NSW Farmer Association branches	2	0	125.0	0.5
National conservation organisations	0	2	120.0	0.0
Department of Water and Energy	0	0	841.0	0.0
Department of Planning	1	0	125.0	0.0

Note: *Indegree is the number of ties directed towards the social entity.*
Outdegree is the number of ties that the social entity directs to others.
Closeness is a measure of the shortest paths to all others in the network. Lower scores indicate they can are more likely to be able to access all other entities in the network.
Betweenness is a measure of the extent to which the entity as acting as a broker between other social entities in the network. Higher scores indicate they are more likely to act as brokers and control the information flow.

Source: *EBC (2008)*

8.2 Resource Exchange Network

In addition to assessing the influence network (Section 8.1) data was also collected from key informants in relation to the level of resource exchange amongst social entities (Appendix D).

A review of the data and information used in this analysis suggests that it is of secondary relevance when compared to the information found in the influence network (Section 8.1). This is primarily due to judgments made in relation to resource exchange being relatively general and non –specific. For example, while we know two social entities may have a high level of resource exchange, we do not know the type of resources exchanged - do the resources being exchanged include information, funds or local knowledge? It is therefore difficult to apply the findings in terms of policy and program development, design or implementation.

The analysis of the resource exchange network as shown in Appendix H is based on a similar analysis as undertaken in relation to the influence network. However, in this analysis the ties

between social entities are non-directional, meaning that the ties simply indicate the strength of the relationship amongst social entities and not the direction of the relationship.

Appendix H shows for each of the four levels of analysis the 'strong' resource exchange ties occurring amongst social entities. As is evident in Figure H4, the network becomes relatively complex in relation to the ties existing amongst entities. Given the complexity of the network, a full analysis of network indicators (as described in Section 8.2) would normally be used to assist in the description of this network.

An examination of the network presented in Figure H4 and the degree centrality of the social entities shows that in terms of the exchange of resources, those entities with the highest level of resource exchange include State and Australian entities including: (i) DPI; (ii) DAFF; (iii) DECC; (iv) The Southern Rivers CMA; (v) the NRC and (vi) DEWHA. An examination of the 'betweenness' indicators also shows that the NSW DPI and the Southern Rivers CMA again play a significant role in 'brokering' the exchange of information in the network.

As indicated previously only some network indicators and analyses have been demonstrated in this report and once data has been collected there are a range of additional indicators and analyses that may be explored. For example and in relation to the level of exchange amongst social entities, Appendix I shows how the network can be used to identify 'factions', which in this case are groups of entities within the network who have a high level of exchange amongst themselves. Appendix I clearly shows factional groupings based on (i) regional entities; (ii) Australian and State Government entities; (iii) conservation and environment groups; and (iv) research organisations.

Given the amount of information that has to be collected in relation to the social entities (Appendix D, E and F) it is suggested that information in relation to resource exchange not be collected in the future and that the focus be on collecting information in relation to influence. The network in relation to resource exchange is not as specific and useful as that related to influence and in many instances duplicates the findings in the influence data.

8.3 Implications for NRM Programs and Investment

Using the demonstration project as an illustration, the important question becomes what are the implications for such an analysis in relation to NRM program design, development implementation and targeted investment?

The following points provide some examples of the implications of the analysis in this context:

1. With the exception of the DECC and Local Government Authorities, Landcare groups appears to be the only organised group undertaking weed management in the Southern Rivers NRM region. On the basis of the demonstration project, there may be a need to develop programs and reinforce existing NRM programs to ensure the viability of Landcare within the region and that the appropriate support is provided to Landcare groups to address weed management issues.

2. If weed management on private lands is to be addressed, it is very clear that the majority of the on-ground work will be undertaken by landholders in the region and that NRM programs and investments need to be clearly designed and targeted at this group[16].

3. The SRCMA and the NSW DPI are the entities through which targeted NRM funding should occur in relation to weed management on private lands. Both organisations have significant influence in relation to weed management amongst Local Government Authorities, Landcare groups and landholders.

4. Future programs focussing on weed management directed at landholders need to involve the SRCMA, DPI, Landcare, Weed Management Committees and Rural Lands Protection Boards.

5. If targeted investment is required to address weed management on public lands, the focus for this investment should be the Department of Environment and Climate Change.

6. Policy, program and research information related to weeds management which is developed by many National and State agencies needs to better target the SRCMA and DPI. This information is often currently 'brokered' through industry groups in the Southern Rivers region, DEWHA and DAFF.

8.4 Implications for Monitoring and Evaluation

The type of analysis described in the demonstration project has several key implications in relation to monitoring and evaluation. Most importantly the demonstration project shows how data and information collected through this process may contribute to the overall process of NRM monitoring and evaluation. For instance:

- The methodology identifies the specific social entities to be examined for the purpose of monitoring and evaluation. For instance, the MERI framework (Australian Government, 2008b) identifies "NRM organisations and institutions" as an asset class for the purpose of indicator assessment, but does not specifically identify the NRM organisations and institutions themselves. The methodology and analysis as described in this paper permits the identification of NRM organisations in relation to specific NRM outcomes, which can then be used as a basis for indicator assessment within a monitoring and evaluation context.

- Previous monitoring and evaluation methods and frameworks have generally been developed in relation to specific social entities which have included for example land managers (Nelson, Webb and Byron, 2005), regional NRM bodies (Fenton & Rickert, 2008) and facilitators (Love and Carroll, 2008). The approach as described in the demonstration project is the first attempt to focus NRM monitoring and evaluation on a

[16] *It is interesting to note that research in the Southern Rivers NRM region amongst landholders, indicates that low capacity to address the threat of weeds is due to (i) the lack of time available to landholders; (ii) the lack of funds to address the issue; and (ii) that many landholders regard themselves as too old to undertake the activity.*

social systems framework rather than separate and independent investigations of specific social entities.

- The approach as described in the demonstration project integrates both quantitative and qualitative information and is sufficiently flexible so as to allow more specific monitoring and evaluation questions to be included in the analysis. For instance, while indicators of the number of partnerships (ties) and the 'reach' of social entities can be assessed through quantitative measures (Australian Government, 2008b) the framework could also be used as a platform for evaluating the "appropriateness, impact, effectiveness, efficiency and legacy of policies, programs or projects" (Australian Government, 2008a)

- Repeating the methodology as described in the demonstration project at specific time intervals, will allow the direct assessment of changes in the social asset system across time, including influence, relationships and attributes over time of social entities.

9. CONCLUSIONS AND FUTURE DIRECTIONS

A review of the use and application of the term social assets within the context of an assets based planning framework as developed and applied in Victoria; the National NRM MERI framework; and previous research which has addressed the concept of social assets, indicates the term 'social assets' should be used to describe:

1. Those characteristics of the social system which enable the longer term conservation, repair or replenishment of natural assets (NRM outcomes), and which
2. Comprise those characteristics of the social system which include:
    a. specific social entities, such as resource managers, NRM organisations and institutions (Australian Government, 2008b);
    b. the attributes or characteristics of social entities, which may also reflect their capacity to adopt sustainable management practices (Australian Government, 2008b); and
    c. the relationships and partnerships amongst social entities, including the capacity of social entities to influence others in the achievement of sustainable NRM outcomes.

In this context it is perhaps more appropriate to refer to a system of social assets, rather than attempting to identify a discrete social attribute as a social asset. Although social assets are not described as a system of social assets, the Australian Government (2008a; 2008b) MERI framework does allude to a systems approach in *defining* social assets. In the MERI framework social asset classes are identified, which include NRM organisations and institutions; attributes are defined in terms of the capacity of institutions and organisations to change and adopt sustainable practices; and the relationships or social capital amongst NRM organisations and institutions are also considered an important asset.

A methodology has been proposed for assessing and describing the social asset system and a demonstration project undertaken to illustrate how the data maybe collected, analysed and presented. The methodology that has been proposed is based on the analysis of the social asset system, which includes multiple social entities, their attributes and relationships. The approach is very different to many other previous social assessments in NRM, which have generally focused on one type or group of social entities (i.e., land mangers, regional NRM organisations, Landcare groups etc) in isolation from the broader social system in which they are embedded.

Furthermore, while a quantitative approach is used to describe the social network underpinning the social asset system, qualitative information is also used to describe the social entities, their attributes and relationships. Using an integrative quantitative and qualitative approach ensures that the outcomes of the analysis are more likely to have applied value in relation to program development, design and implementation; targeted NRM investment and monitoring and evaluation.

While a demonstration project has been used to illustrate the proposed methodology for assessing the social asset system, the next steps involved in further developing the project would include:

- jurisdictional workshops to further refine the methodology and gain jurisdictional agreement and participation in the development of the project methodology and outcomes; and
- pilot testing the proposed methodology using a minimum of four strata and undertaking an analysis of the pilot data to again illustrate its application and use.

On the basis of the jurisdictional review and pilot testing of the methodology the project could then be implemented at the national scale.

APPENDIX A: WEB BASED - IDENTIFICATION OF SOCIAL ASSETS

What are the important social assets? In identifying social assets remember…

1. That they include those social and economic attributes of the NRM system which 'enable' or 'inhibit' the achievement of NRM outcomes; and
2. For this project they should be identifiable at a national scale. That is, the social assets should be generally applicable across all NRM regions, States and Territories.

Using a name, label or short description try and identify up to 10 social assets that you think are important in achieving natural resources outcomes. Don't worry about their order of importance.

Social Assets	Entities	Attributes	Relationships
• Institutional relationships (e.g., Landcare and landowners)	X		X
• The community as a social contract (peer relationships, peer pressure, the roles of influence amongst neighbours)	X	X	X
• Terms of trade (could be purely economic but also has a cultural influence role in the way years of declining terms of trade can lead to pessimism about the future)		X	X
• Bureaucracy of assistance (my survey respondents often cite red tape as a disincentive to applying for assistance)		X	X
• The balance of benefits for greater good/private gain (doing something for the greater good has feel-good factor built in, but doing something for you is directly beneficial - make it both and you have a winner)		X	
• Understanding of the big picture (my survey respondents often seem terribly insular in their outlook and a bit paranoid about the govt forcing them to change)	X	X	X
• Communication in plain English			X
• Regional body capacity: Stakeholder knowledge - skills in stakeholder analysis and engagement	X	X	X
• Landholder attitudes - especially towards on-farm biodiversity conservation	X	X	
• Landholder skills and (sustainable) farm practices	X	X	
• Accessibility and availability of NRM best practice knowledge		X	
• Industry engagement and support for NRM best practice		X	X
• Regional body capacity: Knowledge and use of a range of incentives for NRM on-farm practice change	X	X	
• Strong community and landholder NRM networks	X		X
• Urban and rural NRM volunteers	X		
• Regional body capacity - corporate and financial governance	X	X	
• Landcare/NRM Group capacity - skills in accessing and managing knowledge, finances, and developing resilient networks	X	X	X
• Viable regional community to be able to engage and deliver in NRM	X	X	X
• Level of reciprocity			X
• Social capital - links to reciprocity		X	X
• Social equity		X	X
• Community capacity for capacity building	X	X	
• Community resilience	X	X	
• Project management skills by NRM organisations	X	X	
• High level of trust developed in NRM partnerships			X
• Strong networks between NRM organisations	X		X
• NRM organisations link strongly into wider social networks	X		X
• Broad community awareness of NRM issues	X	X	
• Empowered NRM community organisations through decision power and appropriate support	X	X	
• Efficient information transfer between government agencies and NRM community	X		X

Social Assets *(continued)*	Entities	Attributes	Relationships
• Corporate social responsibility recognised by both large and small businesses	X	X	
• Funded activities aim for capacity improvement or social networking outcomes as well as environmental outcomes		X	X
• Skilled facilitators/coordinators/extension workers		X	
• Indigenous community	X		
• Work life balance		X	
• Volunteer efficiency	X	X	
• New social communication technology (i.e. blog talk radio)			X
• Incentives to act- financial (eg cost share) and social (e.g. recreational facilities, protecting heritage,etc...)		X	
• Community (Individuals and Groups) - awareness, involvement and knowledge		X	
• Ability to change - program, policy, community and agency flexibility to meet long term and short term needs		X	
• Partnerships and stakeholder engagement (with other agencies, industry, community members and groups, etc...)			X
• Education and skill development- not restricted by age groups, social groups, location, etc....		X	
• Communication - clear, concise, to the point and with minimal jargon or acronyms in a variety of formats		X	X
• Internal staff - properly trained, briefed, committed and open		X	
• Relevance		X	
• Heritage - knowledge, culture, traditions, etc....		X	
• Huge network of community environmental groups, (of volunteers) undertaking NRM activities in a certain locations/catchments	X		
• Individuals who volunteer for NRM activities, as part of a group or committee, Natural Resource Centre or for a particular NRM event		X	
• Landcare/Catchment Care officers, Rangers, and various other (paid) staff who support the volunteers in achieving NRM outcomes	X		
• Funding bodies, whether using NRM levies, Australian government, or other partnership funding	X		
• Private organisations and businesses who contribute to achieving NRM outcomes	X		
• Non-government organisations such as Trees for Life, Conservation Volunteers Australia, Conservation Council	X		
• Private landholders who contribute time and money to sustainable land management	X		
• Providers of technical and research information, training and professional development (Universities, Government, Research corporations etc)	X		
• NRM Boards (in South Australia) and their network of NRM Groups, Advisory Committees etc	X		
• Efficient and effective networks, information sharing and communication in the broadest sense			X
• Community education on natural resources and the importance of protecting them		X	
• Education for politicians, local government and council members and workers on the importance of protecting natural resources		X	
• Political support for the protection of natural resources		X	
• Financial support for on-ground action groups		X	
• Close network between on-ground action groups with the ability to strategise together			X
• food production		X	
• limits to water supply		X	
• recreation		X	
• employment opportunities		X	

• success of businesses		X	
• climate change air quality		X	
• soil fertility and erosion control		X	
• coastal water quality and shoreline stability		X	
• population pressures		X	
• landowners - undertaking action on their own property, in it for the long term,	X	X	
• regional organisations/CMAs - that provide strategic, integrated leadership, promote collaboration, information source	X	X	X
• partnerships - collaborations between stakeholders to achieve joint NRM goals, protect shared assets			X
• care groups - groups of people caring for a particular site or asset	X		
• staff of NRM organisations - looking after them provides continuity of service, retains corporate knowledge, enables continual improvement	X		
• local government - plays a pivotal role working with the community, providing community services and planning landscape, often under resourced	X		
• industry - using natural resources wisely, monitoring environmental condition	X		
• educational and environmental organisations - voicing community concerns, raising awareness, providing tools and information	X		
• state government - (should be) providing policy, resources and expertise	X		
• research and consulting groups - providing science and expert advice	X		
• Indigenous Assets Values into NRM		X	
• Indigenous Asset Values for Water		X	
• Indigenous Asset for Coastal & Marine Indigenous Asset for Biodiversity		X	
• Indigenous Asset for Land & Sustainability		X	
• Indigenous Asset for Social Economics		X	
• Long-term political commitment to lead NRM outcomes		X	
• Permanent institutional arrangements establishing responsibility, eg, NRM regional bodies		X	
• Continuous improvement processes used, eg plan, do, review Community development approach - make information and decision making tools available		X	
• The diversity of individuals in communities - there is strength in diversity		X	
• Maintaining and improving profitable enterprises through better environmental practices		X	
• Established trials and demonstrations of better techniques and practices		X	
• Improved education levels		X	
• Local Government planning processes consistent with good environmental outcomes		X	

APPENDIX B: WEB BASED - CRITERIA FOR IDENTIFYING SOCIAL ASSETS

What criteria did you use in identifying the social assets?

When you identified each of the social assets, what criteria did you use to identify the asset? In the spaces below identify what you think are the important criteria for identifying social assets.

For example, one criteria you should have used was that they enable the achievement of natural resource management outcomes.

Criteria

- The social asset should be instrumental in the decision process of adopting a practice to achieve the NRM outcome.
- Practically, the asset should be measurable.

- The use of plain English allows people from diverse cultures and backgrounds, at all levels of social structures to be included in managing natural resources.

- The social asset relates to some aspect of human capital, skills, knowledge, and attitudes relating to NRM
- The social asset includes organisational and individual capacity for NRM
- The social asset is integral to one or more links in a program logic (theory of change) cause and effect for NRM program delivery
- The social asset can be defined in a way that is amenable to target setting (or some form of goal specification) for NRM program delivery
- The social asset can be defined in a measurable sense (same as 4 really)
- The social asset can be both a means and an end.

- Based much of my thinking around communities as a whole, in that there are a wide range of requirements of a community as a functioning body that have to be maintained or developed before the assumption of whether an asset should enable the achievement of NRM outcomes can even be applied.

- Social assets should reinforce achievement of NRM through empowered community organisations
- Social assets should streamline information availability and knowledge acquisition that enhances NRM action.
- Social assets should encourage synergetic efforts by a range of community organisations to achieve multiple community goals (including but not exclusively NRM)
- Social assets should generate ethical change that moves Australian businesses towards commitment to triple bottom line actions.

- Diverse and practical viewpoints on NRM are available through Indigenous involvement
- Work life balance is a social asset which achieves effective NRM workers and can be enhanced through training and application of new habits in the NRM workforce
- Volunteers contribute extensively to NRM in Australia however volunteer burnout reduces the potential contribution that could be made. training and application of new habits in volunteers similar to the work life balance asset is needed to increase the value of the volunteer asset
- Communication in real time between informed persons in their field will be able to rapidly expand, enhance and cross-fertilise project planning and management to gain best outcomes by learning from each other at the cutting edge of action.

- Often Natural Resources do not follow human boundaries. Eg., State boundaries, shire boundaries, etc.... enable transboundary management.
- Natural Resource development, protection and management is not restricted as set period in time. E.g. a single decade, political administration or funding cycle.
- At the macro level, the management of natural resources is entrusted to agencies that change overtime, but the communities surrounding these assets tend to remain stable over long periods of time; sometimes entire generations. These communities will often have a greater ownership of the natural resource than the agency.
- Ability to communicate in a timely and effective manner allows for the sharing of information and knowledge. The more knowledge collected the better able we are to make informed decisions about management.
- Ability to support all stakeholders in Natural Resource Management and foster committed ownership and minimise exclusion.
- Develop consistent quality of management.

- Enabling and assisting the achievement of NRM outcomes
- Working together to achieve common goals in NRM
- Recognising that everyone can make a difference (to achieving NRM outcomes) no matter how small or large, one-off or continuous etc Ensuring commitment from funding bodies, all tiers of government and the community

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- The importance of networks and good communication - tailored to suit the message and participants
- The enormous contribution of volunteers in our NRM world

- Will foster community support for NRM programs
- Will gear politicians towards policies that protect NR
- Will allow higher levels of funding to be directed towards
- NRM Will allow on-ground works to actually be achieved
- Will prevent overlaps in on-ground works and foster a community of education

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- that human populations should be able to survive in our environment
- that there should still be jobs and successful businesses to support them
- that there should be fertile soils to enable food production for our population
- that there should be sufficient water for food production and human needs
- that there should be limits on population growth so that environmental resources are not exceeded
- that there should be limits on environmental pollution of air, soil, fresh water & sea water, so that animal and plant life can continue on the Earth

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- social asset has an interest in natural resources
- social asset has a clear role to play in NRM activity

- Financial incentives - a society that pays its way for the outcomes it wants
- The social asset should be cost neutral or profitable for the landholder
- The social asset should empower the landholder
- It should be a continuous process It should appeal to bettering landholders own interests
- It should be long-term with an agreed vision for the future
- The social asset should enable or assist in the achievement of NRM outcomes!!!!!!

APPENDIX C: DEMONSTRATION PROJECT – TASK INSTRUCTIONS

IDENTIFYING AND CHARACTERISING SOCIAL ASSETS WITHIN THE NATURAL RESOURCE MANAGEMENT (NRM) SYSTEM

Project Demonstration

INTRODUCTION

This project is being managed by Land and Water Australia (SIRP program). The project seeks to identify and characterise the social assets within the NRM system.

Achieving natural resource management (NRM) outcomes, such as for example reducing salinity, improving water quality and protecting native vegetation; requires the involvement of individuals, groups and organisations. However, while NRM funding, policies and programs are often directed at individuals, groups and organisations within the NRM system their roles and interrelationships are not always clearly identifiable or understood.

Establishing a methodology which identifies and improves our understanding of the social attributes of the NRM system has important implications in better targeting NRM funding and NRM policy and program development and implementation. Those social attributes which influence the achievement of NRM outcomes are referred in this project as social assets and include those social and economic attributes of the NRM system which 'enable' or 'inhibit' the achievement of NRM outcomes.

The project brief includes the following core objectives:

1. Develop an outline of how the NRM social assets will be identified and assessed. The outline should include a set of criteria with related rationale, the recommended scale of analysis and information on how outputs can be used by NRM decision makers;
2. Collate information related to current NRM social assets, including their role, capacity, focus and area of influence, key relationships and potential future changes to these;
3. Identify areas where specific social assets could be targeted or strengthened to achieve specific natural resource management outcomes; and
4. Provide advice on the critical social assets of the NRM system to measure over time and the methodology that could be used.

The project outcomes aims to inform policy makers and monitoring and evaluation of natural resource management programs.

I have attached a draft issues paper which provides a broad introduction to some of the issues associated with identifying and describing social assets. (See attached)

METHODOLOGY

While the issues paper (attached) provides a discussion of some of the issues associated with identifying social assets, what is also needed is a demonstration of the methodology that may be

used in identifying and describing social assets and an example of what the research outcomes may look like.

In order to achieve this, a methodology has been developed to provide a demonstration of the research outcomes. This methodology is described more fully in the attachment on pages 20 – 24.

Social assets and the relationships amongst social assets are described at:

(i) the local/regional level;
(ii) the State level; and
(iii) the National level.

For the purpose of the demonstration project this includes (i) Southern Rivers CMA; (iii) NSW state and (iii) the national level.

For the purpose of the demonstration methodology we are using three expert informants (you are being asked to be one of our informants) to describe your knowledge of the social assets and their interrelationships within and across the three levels. An expert informant has been selected at the local/regional level; State level and National level.

In order to provide some additional focus to the demonstration methodology, social assets are to be identified which

(i) provide core NRM functions; and
(ii) provide for the development, implementation or provision of policies, programs, investments or on-ground activities associated with the management of weeds.

TASKS

There are two tasks that we would like you to complete. The first task should take you about 10 minutes, while the second task may take about an hour of your time. I will send you more information before you complete the second task.

Task 1: Identification of organisations and groups

On the next page (Table A) you will see a list of entities (organisations and groups). Three groups of entities have been identified which have different levels of influence. They include those entities which have

(i) a local and regional influence;
(ii) a State influence; and
(iii) a National influence.

Two criteria have been used to identify all entities. The criteria are that the entity:

1. Provides a core function in relation to NRM at the local/regional; State or National level; and
2. Provides for the development, implementation or provision of policies, programs, investments or on-ground activities associated with the management of weeds.

I have made an initial attempt to identify these entities (which have been in existence for the last 12 months) which satisfy both criteria.

Could you please examine the list provided in Table A and add or remove entities which you think are needed in addressing the two core criteria and return the amended list to me (mark@ebc.net.au).

Task 2: Scoring Relations and Influence

I will provide you with a revised list of entities. I will also provide you with more detailed instructions on this task at the time.

I will provide you with two matrices and will ask you to score using a 3 point scale (low, moderate, high):

1. the level of resources (funds, knowledge, skills, materials, etc) that are exchanged between all pairs of entities; and
2. the level of influence between entities in the achievement of improved on-ground weed management in the Southern Rivers.

I will provide you with more details on this second task once we have identified the appropriate organisations and groups (Task 1).

Thanks for your help with this.

Any questions please call me on 0412098514.

LOCAL AND REGIONAL INFLUENCE

Bullet points against each entity are used to provide examples and illustrate specific points

1. **SRCMA Environment & conservation groups** (multiple)
    - Shoalhaven Riverwatch; Gerroa Environmental Protection Society; Friends of the Mongarlowe River; South East Coast Conservation Alliance; Turross Lakes Preservation Group; Bega Environmental Network
2. **SRCMA Industry & development groups** (multiple)
    - Bega Cheese; NSW Dairy Industry Development Company; South Coast Highlands Dairy Industry Group; Sapphire Coast Producers Association; Natural Sequence Farming Assoc; Small Farms Network
3. **SRCMA Landcare groups** (multiple)
    - Includes the 100 local Landcare groups throughout the region
4. **SRCMA Landcare networks** (multiple)
    - Far South Coast Landcare Assoc; Eurobodalla Landcare Management Committee; Snowy Interstate Landcare Committee; South East Landcare; Shoalhaven Landcare; Illawarra Landcare; Upper Snowy Landcare; Upper Shoalhaven Landcare Council
5. **SRCMA Landholders** (multiple)
    - Includes all farmers, hobby farmers and lifestyle landholders in the region
6. **SRCMA Local Governments** (multiple)
    - Kiama Council; Wollongong City Council; Eurobodalla Council; Shellharbour Council; Snowy River Council; Goulburn-Mulwaree Council; Bega Shire Council; Cooma-Monaro Shire; Bombala Shire Council
    - Southern Council's group - 7 Local Government Authorities including Bega; Eurobodalla; Kiama; Shellharbour; Shoalhaven, Wingecarribee and Wollongong.
    - Illawarra District Noxious Weeds Authority - (IDNWA) is the Local Government body that controls noxious weeds in the three Council areas of Wollongong City; Shellharbour City and Kiama Municipal
7. **SRCMA NSW Farmers Association branches** (multiple)
    - Regional and district offices of the NSW Farmers Association
8. **Rural Lands Protection Board** (multiple)
    - Offices at Cooma; Braidwood; Ulladulla
9. **Southern Rivers CMA**
    - The CMA for the region
10. **Regional and Local Weeds Committees**
    - 14 Regional and local weeds committees including:
    - Southern Tablelands Noxious Plants Committee (inc. local councils, DPI, CMA's); South Coast Bitou Bush Taskforce –(inc. local council, SRCMA and DPI); Monaro Regional Weeds Committee (inc. local councils, SRCMA and DPI) ; Bega Valley Fireweed Committee – a committee to address fireweed problems in the Bega Valley Shire, see http://thebegavalley.org.au/fireweed.html.

STATE INFLUENCE

11. **State Conservation organisations** (Non-Government)
    - Nature Conservation Council of NSW; Total Environment Centre
12. **Department of Environment and Climate Change** (NSW)
    - Parks and Wildlife Group; Environmental Protection and Regulation Group; Climate Change, Policy and Programs Group; Scientific Services Division
13. **Department of Lands**
14. **Department of Premiers and Cabinet**
15. **Department of Water and Energy**
16. **Natural Resources Advisory Council (NRAC)**
17. **Natural Resources Commission (NRC)**
18. **NSW Department of Planning**
19. **NSW Department of Primary Industries**
    - State Forests; Agriculture, NSW Fisheries, Mineral Resources
20. **NSW Joint Steering Committee (JSC)**

NATIONAL INFLUENCE

21. **National Conservation organisations** (Non-Government)
    - Bush Heritage Australia; Australian Wildlife Conservancy; The Nature Conservancy; Trust for Nature: Conservation Volunteers Australia; Greening Australia; Australian Conservation Foundation
22. **CRC Weed Management**
23. **Australian Government Natural Resources Management Team**
    - NSW State Team; Other activity teams (inc. Capacity building, Indigenous Engagement Team; M&E)
24. **Department of the Environment, Water, Heritage and the Arts** (DEWHA)
    - Parks Australia; Marine and Biodiversity Division; Approvals and Wildlife Division
25. **Department of Agriculture Forestry and Fisheries** (DAFF)
    - Rural Policy and Innovation Division; Food and Agriculture Division; Natural Resource Management Division; Bureau of Rural Sciences; ABARE.
26. **National NRM Facilitator Networks**
    - Australian Government Facilitators, Sustainable Farming Practices Facilitator; Indigenous Land Management Facilitators; National Weeds Facilitator
27. **Land and Water Australia** (LWA)
28. **National Land and Water Resources Audit** (NLWRA)
29. **Natural Resource Management Ministerial Council** (NRMMC)
    - Natural Resource Management Standing Committee (NRMSC)
    - Natural Resources Policies and Programs Committee (NRPPC)
    - Several NRPPC Sub-groups inc. Australian Weeds Committee; Market Based Instruments Task Group;

APPENDIX D: DEMONSTRATION PROJECT – TASK 1 INSTRUCTIONS (ASSESSING EXCHANGE)

TASK 1: ASSESSING EXCHANGE

Resources may include information, funds, people, ideas or material objects.

Think about the exchange of resources between each row and column entity in the last 12 months.

Score the level of resource exchange between the two entities
0 = None/very little
1 = Minor
2 = Moderate
3 = Large

Sometimes the exchange between A and B may not be the same as between B and A. In these cases just try and find an average.

	SRCMA Enironment & conservation groups	SRCMA industry and development groups	SRCMA Landcare groups	SRCMA Landcare networks	SRCMA Landholders	SRCMA Local Governments	NSW Farmers Association (branches)	Rural Lands Protection Board	Southern Rivers CMA	Regional and Local Weeds Committees	State conservation organisations	DECC	Department of Lands	Department of Premier and Cabinet	Department of Water and Energy	Natural Resources Advisory Council	Natural Resources Commission	Department of Planning	Department of Primary Industries	NSW Joint Steering Committee (JSC)	National conservation organisations (non-Govt)	CRC Weed Management	Australian Government NRM Team	DEWHA	DAFF	National NRM Facilitator Networks	Land and Water Australia	National Land and Water Resources Audit	Natural Resouce Management Ministerial Council
SRCMA Environment & conservation groups																													
SRCMA Industry and development groups	0																												
SRCMA Landcare groups	1	1																											
SRCMA Landcare networks	1	1	3																										
SRCMA Landholders	1	2	2	2																									
SRCMA Local Governments	2	2	2	2	2																								
SRCMA NSW Farmers Association (branches)	0	2	1	1	2	1																							
SRCMA Rural Lands Protection Board	0	2	1	1	3	1	1																						
Southern Rivers CMA	1	2	3	3	3	3	1	2																					
Regional and Local Weeds Committees	1	2	1	0	2	2	2	2	2																				
State conservation organisations	2	0	1	0	0	0	0	0	1	0																			
DECC	1	1	1	1	1	1	0	2	3	1	2																		
Department of Lands	0	0	0	0	0	1	0	2	2	0	1	2																	
Department of Premier and Cabinet	0	0	0	0	0	0	0	0	1	0	0	3	3																
Department of Water and Energy	0	0	0	0	0	0	0	1	1	0	0	3	2	3															
Natural Resources Advisory Council	0	0	0	0	0	0	0	0	2	0	3	3	2	2	2														
Natural Resources Commission	0	0	0	0	0	0	0	0	2	0	1	3	2	3	3	2													
Department of Planning	0	0	0	0	0	2	0	0	1	0	0	2	2	3	2	1	2												
Department of Primary Industries	1	2	1	1	2	2	2	3	2	1	1	2	2	3	2	1	2	2											
NSW Joint Steering Committee (JSC)	0	0	0	0	0	1	0	0	1	0	0	3	2	2	2	1	3	0	2										
National conservation organisations (Non-Govt)	1	1	0	1	0	0	0	0	1	0	2	1	0	1	1	0	1	0	1	0									
CRC Weed Management	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	1	0	3	0	1								
Australian Government NRM Team	0	1	0	0	0	1	0	0	3	0	1	3	1	2	1	0	2	0	2	3	2	0							
DEWHA	0	1	0	0	0	1	0	0	1	0	1	3	1	2	3	0	2	1	2	3	2	2	3						
DAFF	0	2	2	1	0	1	0	0	2	0	1	2	2	2	2	0	2	1	3	3	2	2	3	3					
National NRM Facilitator Networks	1	0	2	1	1	1	0	0	1	0	1	1	0	0	0	0	0	0	1	1	2	1	3	3	3				
Land and Water Australia	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	1	0	1	0	1	1	2	3	2	1			
National Land and Water Resources Audit	0	0	0	0	0	0	0	0	1	0	0	2	2	1	2	1	2	0	2	2	1	1	2	2	2	1	3		
Natural Resouce Management Ministerial Council	0	0	0	0	0	0	0	0	0	0	0	3	0	2	3	0	1	1	3	3	0	0	1	1	1	0	0	0	

APPENDIX E: DEMONSTRATION PROJECT – TASK 2 INSTRUCTIONS (ASSESSING ON GROUND ACTIVITIES)

In the management of weeds in the SRCMA region, some of the entities in the table below are involved in on-ground works. Other entities for example *influence* on ground works through the development of policies and programs and providing funds, information and other resources for weed management.

Consider weed management in the SRCMA in the last 12 months. Would you say the entity has....

1 = No influence on on-ground works
2 = Limited influence on on-ground works
3 = Some influence on on-ground works
4 = Undertakes on ground works

On-ground works includes the direct prevention, eradication, containment and/or control of weeds

	Score
SRCMA environment & conservation groups	2
SRCMA Industry and development groups	2
SRCMA Landcare groups	4
SRCMA Landcare networks	2
SRCMA Landholders	4
SRCMA Local Governments	4
SRCMA NSW Farmers Association (branches)	1
SRCMA Rural Lands Protection Board	2
Southern Rivers CMA	3
Regional and Local Weeds Committees	3
State conservation organisations	1
DECC	4
Department of Lands	2
Department of Premiers and Cabinet	1
Department of Water and Energy	1
Natural Resources Advisory Council	1
Natural Resources Commission	1
Department of Planning	1
Department of Primary Industries	3
NSW Joint Steering Committee (JSC)	1
National conservation organisations (Non-Government)	1
CRC Weed Management	2
Australian Government NRM Team	2
DEWHA	2
DAFF	2
National NRM Facilitator Networks	2
Land and Water Australia	1
National Land and Water Resources Audit	1
Natural Resouce Management Ministerial Council	1

APPENDIX F: DEMONSTRATION PROJECT – TASK 3 INSTRUCTIONS (ASSESSING INFLUENCE)

TASK 3: ASSESSING INFLUENCE

Think about the management of weeds in the SRCMA region. In relation to weed management in the SRCMA, what influence does the entity in the column have on the entity in the row?

In terms of weed management in the SRCMA region would you say the infleunce is...
0 = None/very little
1 = Minor
2 = Moderate
3 = Large

Influence means affecting, or changing the way individuals, groups and organisations behave, act and think; including the actions they undertake, the decisons they make and the way they do things.

	SRCMA Enironment & conservation groups	SRCMA Industry and development groups	SRMCA Landcare groups	SRCMA Landcare networks	SRCMA Landholders	SCRMA Local Governments	NSW Farmers Association (branches)	Rural Lands Protection Board	Southern Rivers CMA	Regional and Local Weeds Committees	State conservation organisations	DECC	Department of Lands	Department of Premier and Cabinet	Department of Water and Energy	Natural Resources Advisory Council	Natural Resources Commission	Department of Planning	Department of Primary Industries	NSW Joint Steering Committee (JSC)	National conservation organisations (Non-Govt)	CRC Weed Management	Australian Government NRM Team	DEWHA	DAFF	National NRM Facilitator Networks	Land and Water Australia	National Land and Water Resources Audit	Natural Resouce Management Ministerial Council
SRCMA environment & conservation groups		0	0	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0	1	0	1	1	1	1	1	1	0	0	0
SRCMA Industry and development groups	1		0	0	0	0	0	0	2	0	0	0	1	0	0	1	0	0	2	0	1	1	0	1	1	0	0	0	0
SRCMA Landcare groups	1	0		2	0	1	0	1	2	1	0	1	1	0	0	0	0	0	2	0	0	0	1	1	2	1	0	0	0
SRCMA Landcare networks	1	0	0		0	1	0	0	1	0	0	0	1	0	0	0	0	0	2	0	0	1	1	0	1	1	0	0	0
SRCMA Landholders	1	0	2	1	0	2	0	3	2	2	0	1	0	0	0	0	0	0	2	0	0	1	0	0	0	1	0	0	0
SRCMA Local Government	1	0	0	1	0		0	0	2	1	1	1	1	0	0	0	0	0	2	0	0	1	0	1	0	1	0	0	0
SRCMA NSW Farmers Association (branches)	0	0	0	0	0	0		0	0	1	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0
SRCMA Rural Lands Protection Board	0	0	0	0	0	0	0		1	1	0	0	2	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Southern Rivers CMA	1	0	0	0	0	0	0	0		1	1	2	1	0	0	0	2	0	1	1	0	1	2	2	2	1	0	0	0
Regional and Local Weeds Committees	0	2	1	0	2	2	2	2	2		0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
State conservation organisations (Non-Govt)	0	0	0	0	0	0	0	0	0	0		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
DECC	0	0	0	0	0	0	0	0	0	0	0		0	0	0	1	1	0	1	1	0	1	0	1	0	0	1	1	2
Department of Lands	0	0	0	0	0	0	0	0	0	0	0	1		0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0
Department of Premier and Cabinet	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	2	0	0	1	0	0	0	0	0	0	0	0	0
Department of Water and Energy	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	2
Natural Resources Advisory Council	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	1	0	0	0	0	0	0	0	0	0	0
Natural Resources Commission	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	2	1	0	0	0	0	0	0	0	0	0
Department of Planning	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Department of Primary Industries	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	2	0		1	0	1	0	1	0	0	1	1	2
NSW Joint Steering Committee (JSC)	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1		0	0	2	0	1	0	0	0	2
National conservation organisations (Non-Govt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
CRC Weed Management	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0		0	0	2	0	0	0	0
Australian Government NRM Team	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0		0	0	1	0	0	1
DEWHA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0		0	2	2	1	3
DAFF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1		2	2	1	3
National NRM Facilitator Networks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	2		0	0	0
Land and Water Australia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0		2	0
National Land and Water Resources Audit	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2		0
Natural Resouce Management Ministerial Council	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	

APPENDIX G: WEAK INFLUENCE TIES AMONGST SOCIAL ENTITIES

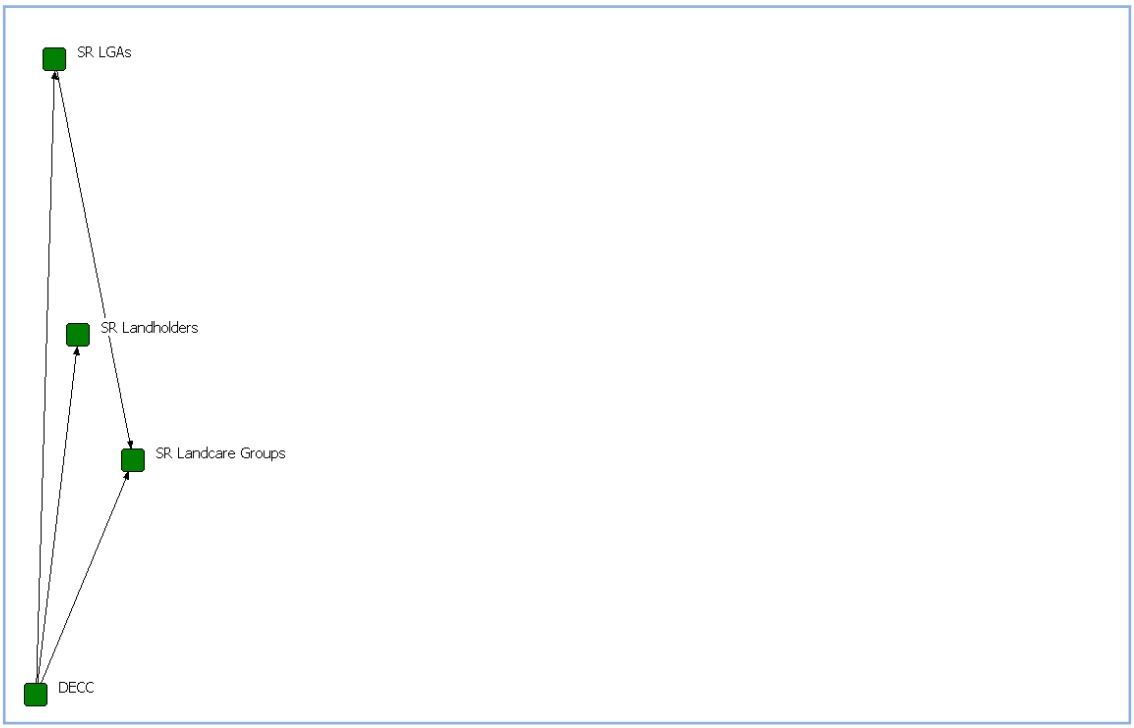


Figure G1. Social entities and weed management: On-ground influence - weak ties

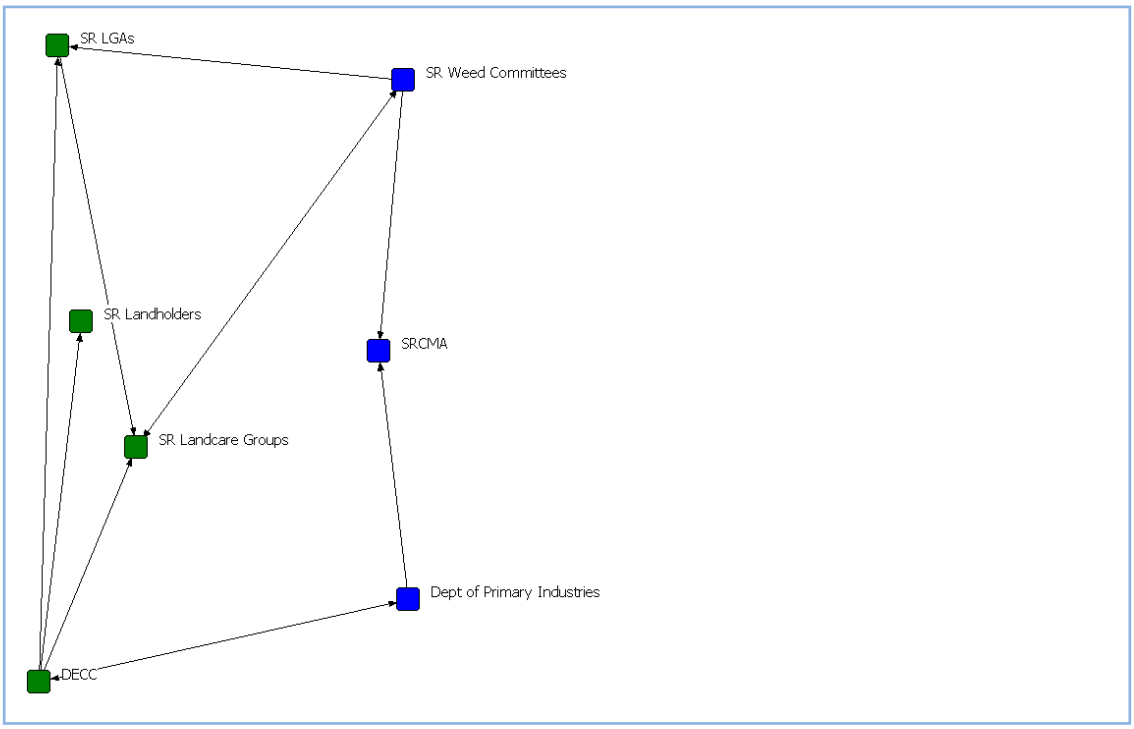


Figure G2. Social entities and weed management: Some on-ground influence - weak ties

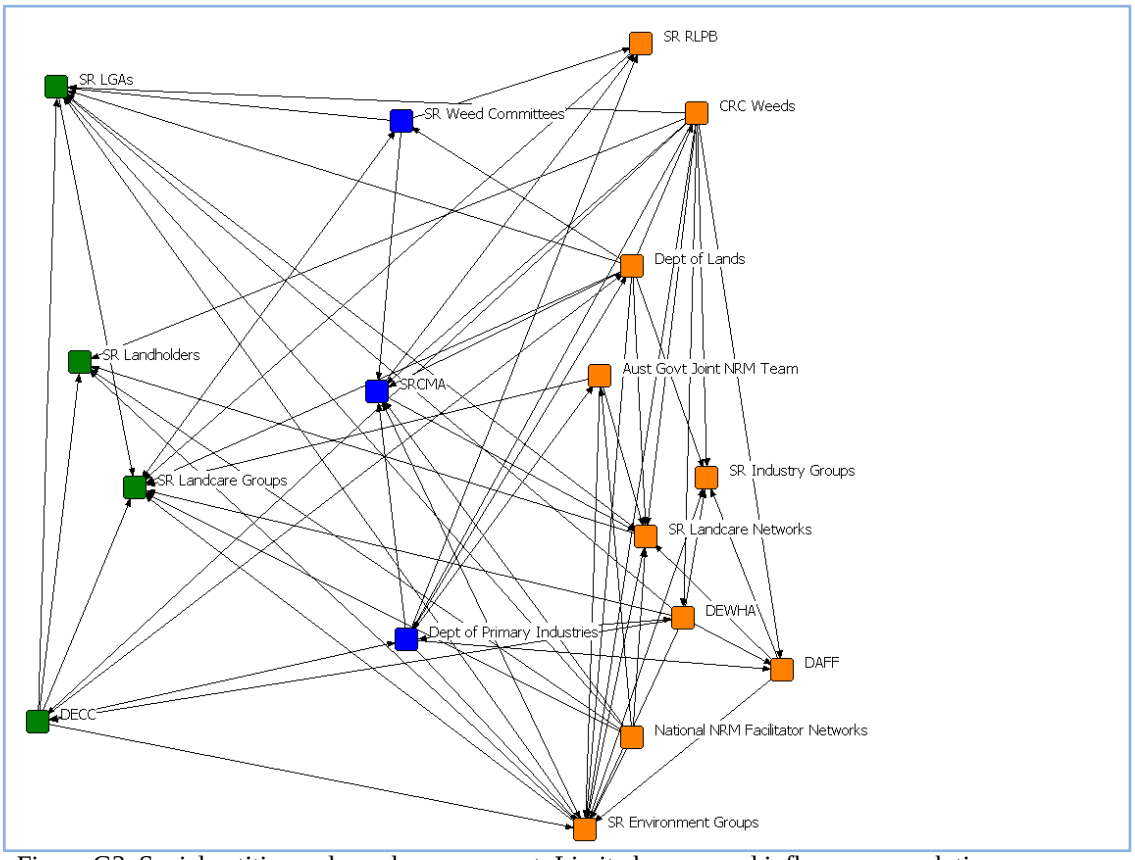


Figure G3. Social entities and weed management: Limited on-ground influence - weak ties

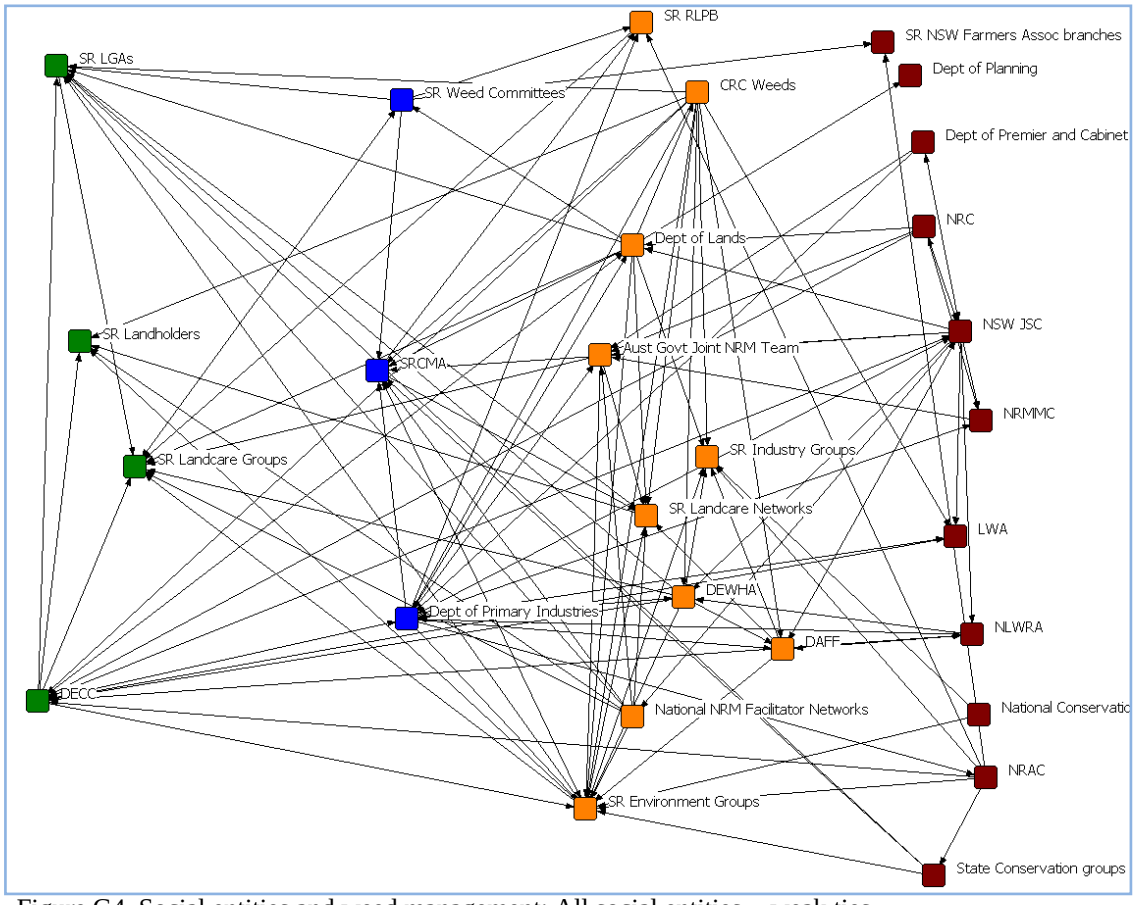


Figure G4. Social entities and weed management: All social entities - weak ties

APPENDIX H: RESOURCE EXCHANGE (STRONG TIES)

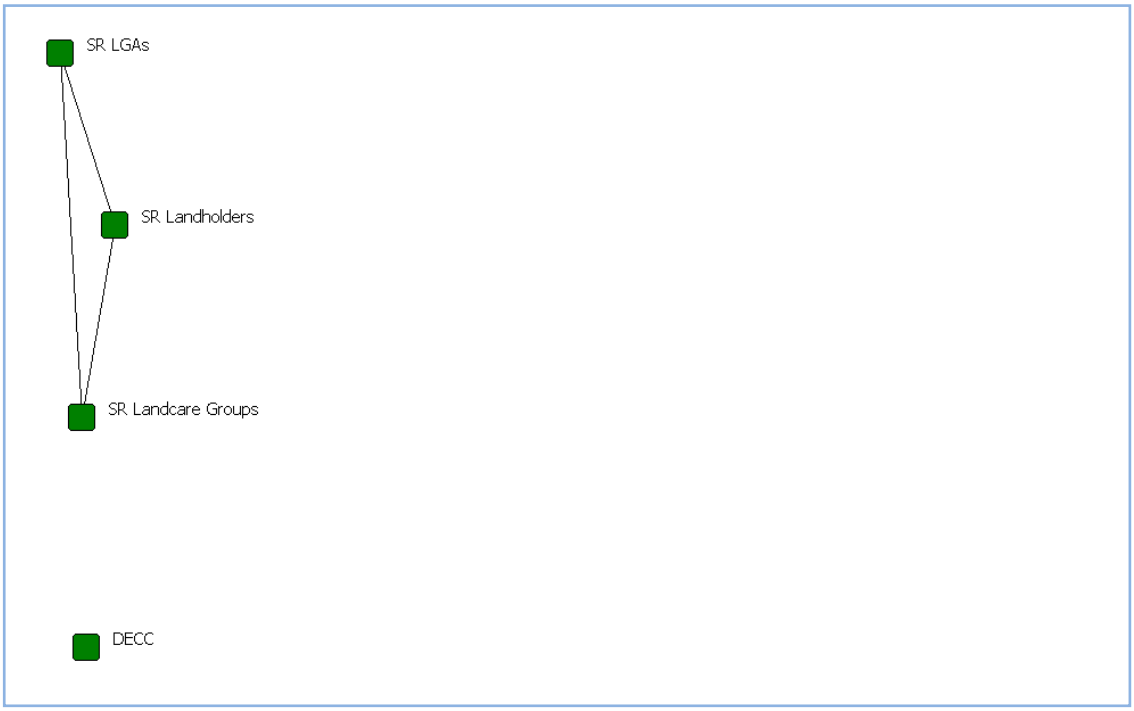


Figure H1. Social entities and weed management: On-ground exchange - strong ties

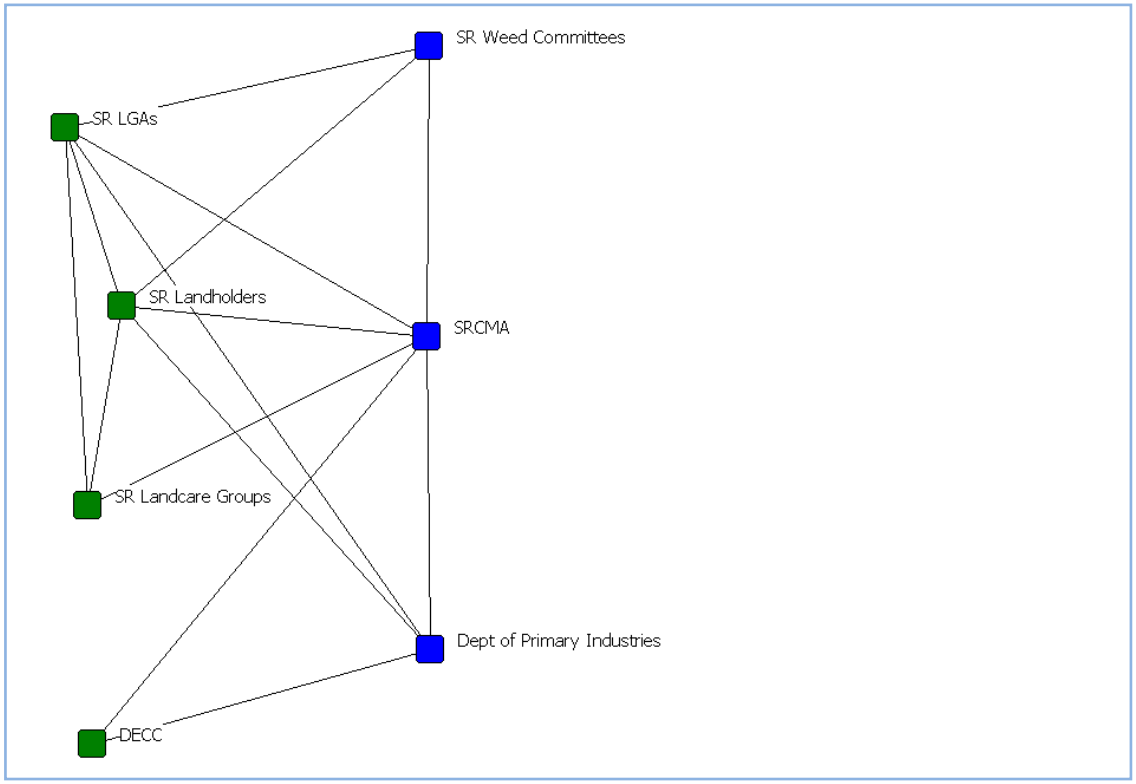


Figure H2. Social entities and weed management: Some on-ground exchange - strong ties

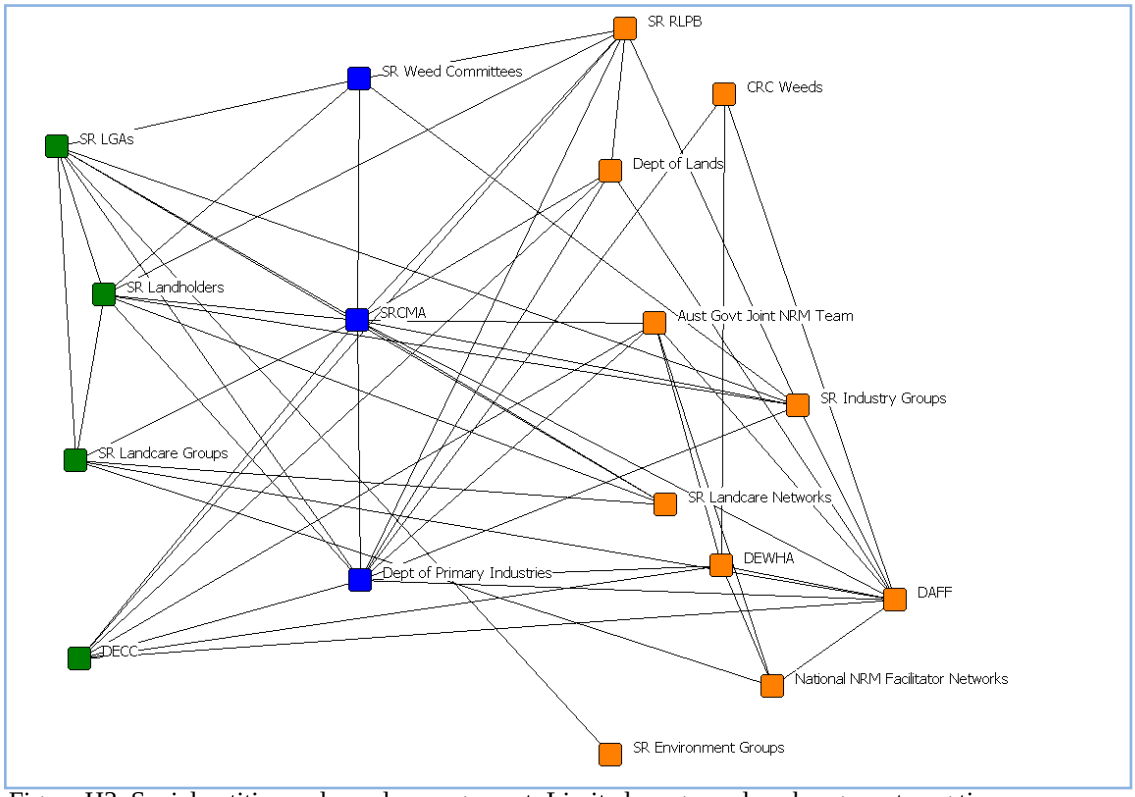


Figure H3. Social entities and weed management: Limited on-ground exchange - strong ties

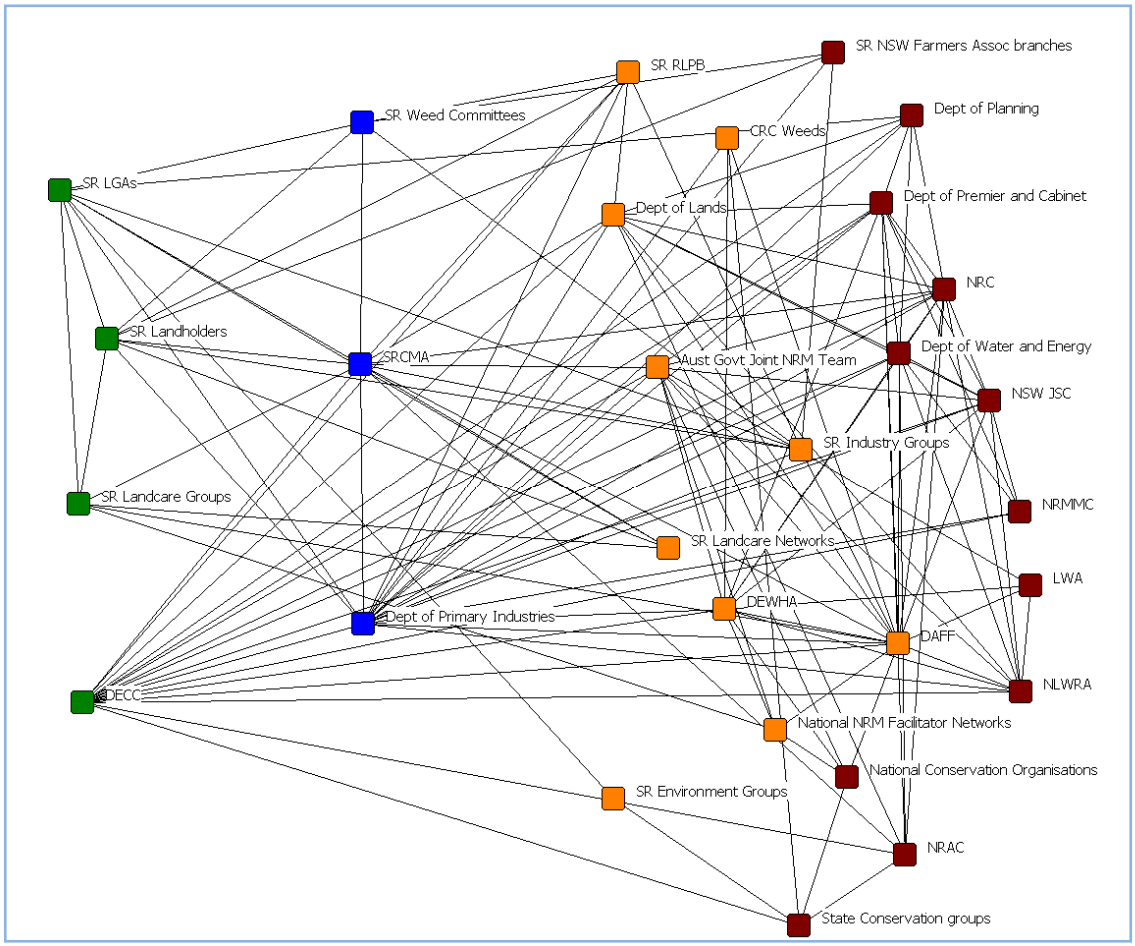
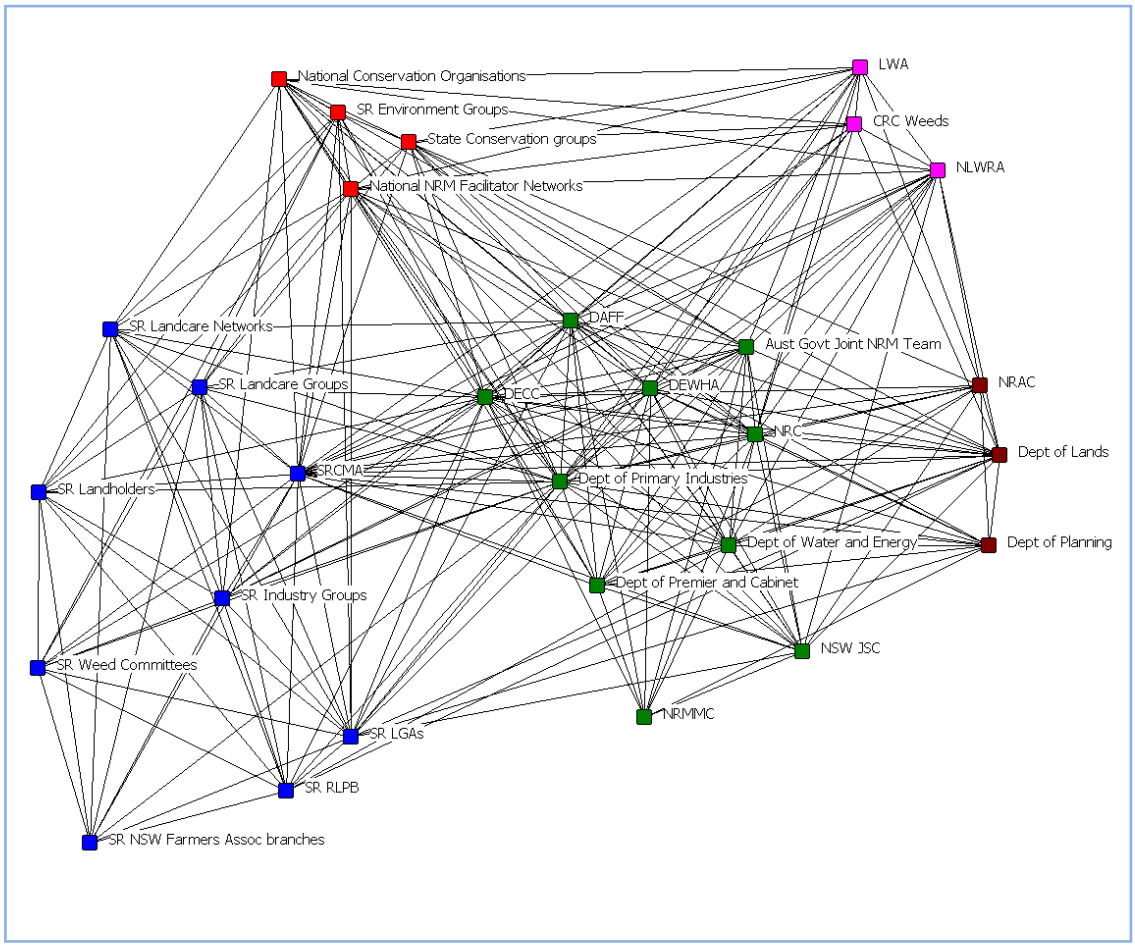


Figure H4. Social entities and weed management: All social entities - strong ties

APPENDIX I:
THE IDENTIFICATION OF FACTIONS IN NETWORK EXCHANGE DATA



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