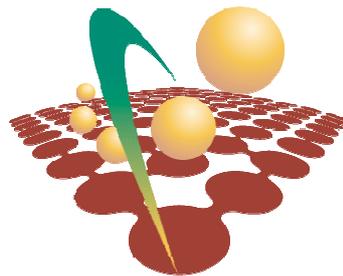


# ***Designing 'Eco-Civic' Regions for NRM***

**Final report on Land & Water Australia UNE 35:**

***Ecological and Social Functions Influencing  
Governance of Natural Resources***



INSTITUTE FOR **Rural Futures**



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'Eco-Civic'  
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July 2002

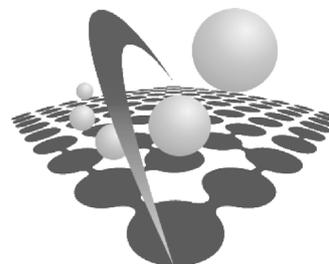
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*... learn from the past, try to understand the present, and feel inspired to help plan a better future for all  
Australians.*  
Herb Wharton, retired Aboriginal drover and author



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## Executive Summary

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*Although ecology may be treated as science, its greater and overriding wisdom is universal ... That wisdom can be approached mathematically, or it can be danced or told as a myth ... a deep sense of engagement with the landscape, with profound connections to surroundings and to natural processes central to life.* Paul Shepard (1969)

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The ecological sustainability of future landscapes and their capacity to support human communities and resource uses depends on a range of institutions. An important institution for regional resource management is civic engagement in local affairs, including resource and land use issues. Local civic engagement has traditionally been structured around local government. More recently, attempts have been made to extend this to decision-making bodies based on river catchments.

If citizens are to participate in regional resource management in ways that are meaningful to them, it is important that both the landscape units being discussed, and the jurisdictional boundaries also be meaningful. We have been developing a theoretical base and associated spatial mapping techniques to explore how boundaries for resource management regions might be identified. This work is guided by three considerations that are believed to be important if regional resource management is to be meaningful to the citizens involved. The first is that the character of the landscape units within the region possess a high degree of similarity, which should lead to greater coincidence of interest among the inhabitants of the region. The second consideration is that the choice of management region maximises the areal proportion of the region that is considered to be part of their 'community' by the inhabitants, which should lead to greater commitment to civic engagement in resource management. The third principle relates to the need to be able to scale up from local to broader regional contexts as appropriate for effective resource management and administration, while not compromising the first two principles.

As part of the methodological development, we delineated a series of nested 'eco-civic' resource management regions for the northern New South Wales. Such regions may serve in the future as a common framework for Federal and State

natural resource management programs, as well as State Government and local government service delivery.

A social survey with a range of question framings and maps was designed to elucidate, in a data form capable of mapping on a GIS, the areas of interest for a variety of reasons to residents and what area they considered as their 'community'. The survey and several maps and map scales were tested on a small number of country town and rural residents and then further refined. The sample was very large because of the need for. Overlapping areas of postcodes (providing the finest level of spatial mapping available from a random sample of electoral rolls) provided a spatially even as well as statistically significant sampling strategy. The requirement for spatial evenness however increased the required sample more than five-fold, resulting in the survey being mailed to some 10,500 residents of northern NSW.

Mapping and analysis of the social survey data as it came in quickly indicated high levels of overlap of community areas of interest in their natural resource base, civic engagement, and areas of interest for local government and regional development. When 'stacked' together, the high density of the areas of common community concern became a three-dimensional social landscape, showing peaks of community interest and valleys of lesser interest. Within a broad, high level, community catchment two sub-catchments could be delineated - providing overall a nested hierarchy of three levels of communities of common interest from local to regional.

Ecological landscapes were described hierarchically using GIS classification or regionalisation of multi-attribute data including soils, climate surfaces, elevation, topography and geology. For effective resource governance and NRM according to our principles, maximising civic engagement - the community catchment

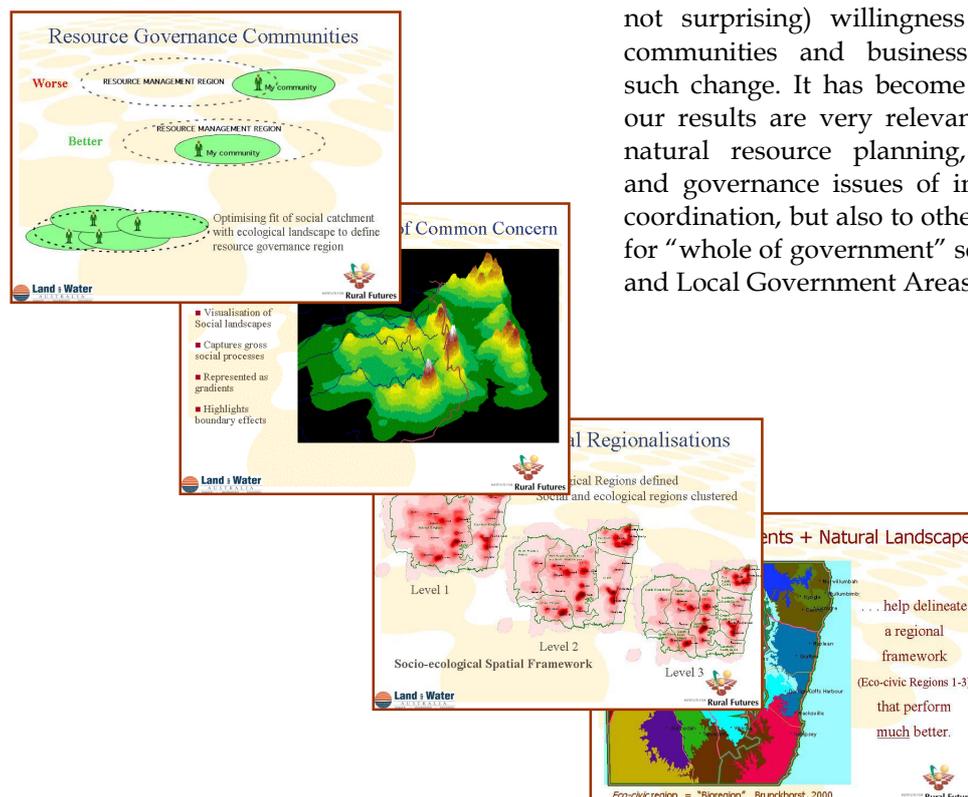
areas of residents' interest expressed in the mapping of the survey returns – with a similar ecological resource base requires developing a best fit to optimise citizen engagement in resource governance processes within relatively similar ecological resource landscape/s.

The crucial part of the project lay in the design of the methods for data capture, analysis and the mapping and delineation of some sort of combined social-ecological “functional zones” that matched these three principles. Consultation and feedback from community stakeholders and government agencies occurred throughout the project. Feedback helped to simplify our overly technical principles down to the three described. These are much easier to explain and justify to a wide range of stakeholders, groups and government administrations. We then geographically defined the “functional zones”, “biocultural regions” or “bioregions” as nested resource governance regions identified via “eco-civic” optimisation – providing for the best geographical fit of communities of shared interest (social catchments) with ecological landscapes at 3 inter-related (nested) scales, while minimising loss of civic interest as indicated by social survey.

Through regular discussions with local government, resource management and other government agencies, and Premier's Dept. Co-ordination program in our applied case-study area, consultation continued iteratively and considerable interest and support for the rationale and approach was developed. We were then given access to the mapped data of government service delivery areas and regions.

We compared current NSW government agencies operational regions and LGAs with our derived “resource governance regions”. While agencies clearly understood that their operational areas were not optimal, the very poor performance of existing administrative frameworks compared to our nested ‘eco-civic’ local to regional framework created tremendous interest and discussion.

While adoption and application of this new method to re-defining regional NRM frameworks along with local government and other service delivery might be seen as a very big step to take, it is not impossible, because the ‘eco-civic’ areas maximise capture of the area of interest to most residents and communities it is likely to be politically palatable in terms of reform implementation. Feedback via media, radio talk back and other stakeholder networks have also indicated a tremendous (if not surprising) willingness by the local communities and businesses to pursue such change. It has become apparent that our results are very relevant, not only to natural resource planning, management and governance issues of integration and coordination, but also to other related areas for “whole of government” service delivery and Local Government Areas (LGAs).



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# Designing 'Eco-Civic' Regions for Natural Resources Management

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*The Landscape is a complex collective artwork, shaped by ecological, geographic, economic and cultural processes*

Lewis Mumford 1938

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## The Project

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Land &Water Australia reference: UNE 35

Project Title: *Ecological and Social Functions Influencing Governance of Natural Resources*

Working Title: *Designing Eco-Civic Regions for Natural Resources Management*

Date of report preparation: 10 July 2002

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## Project Objectives

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The L&WA UNE35 Project Schedule states:

The project aims to catalyse and facilitate participative innovation towards more reflexively competent institutions and ecologically sustainable resource governance. This will be achieved through examination of the combined influences of social functions and ecological functions operating broadly across regional landscapes.

Primary research and development objectives:

1. Development of new approaches and methodologies to spatial analysis of ecological influences across landscapes
2. Development of new methodologies for institutional mapping and spatial

analysis of social influences across landscapes

3. New techniques to elucidate and visualise potential regional management zones reflecting combined social ecological influences.
4. Explore and elucidate with key agencies and community groups 'operational' zones of management and organisational learning approaches to adapt to, potentially new or adapted institutional forms for resource governance

It is noteworthy here to indicate that through development of the methodology, its implementation and communications with stakeholders, agencies and L&WA staff much of the language of the original objectives, as stated above, has changed (noted in Milestone 3 report). In this report we will generally use different descriptors to those above.

## Background

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Future sustainability will require systems of resource governance<sup>1</sup> that mediate the relationship between society and the economy on one hand, and continuation of ecosystem functional processes on the other. Therefore, the human dimensions of landscapes must be integrated with policies, administrative frameworks and plans to repair and sustain ecological systems and functions.

Different community and political levels of participation in decision making and broadly inter-connected ecological systems and resource uses need a mutual geography that brings together shared natural resource issues and their stakeholders at appropriate scales of engagement (Figure 1). An important institution for regional resource management is civic interest and engagement in local affairs, including

resource and land use issues. Local civic engagement has traditionally been structured around local government. State and Federal government resource management agencies have various administrative regions. More recently, attempts have been made to extend this to decision-making bodies based on river catchments (eg, ICM). Generally, however, these frameworks for resource governance have not achieved effective engagement, integration or action. They often seem to produce plans that few are interested in implementation, that have been 'captured' by single interests (not representative; small proportion engaged or participating) or that split inter-related issues into multiple single-issue frameworks (eg, vegetation regions, catchment regions, forestry regions). Such approaches can dissolve into a seemingly endless recursive loop of problem (symptom) solving or commit communities to courses of action that turn out to be ineffective.

The results of a project funded by Land & Water Australia (UNE 35) are reported here. The project aims to contribute one approach towards catalysing more participative institutions for resource governance, planning and management. The project focused on development and trial of a methodology to map the extent of the strength of community interest in a geographic area and, combining these with biophysical areal units of similarity delineate 'functional' zones ('Eco-Civic' regions) for resource governance.

## Approach

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These current concerns and issues related to policy, planning and delivery frameworks for effective and efficient natural resource management and governance (NRMG) beg the questions (Figure 1):

- How do we identify a "basic" region that can represent true "wholes" for integration of both, community interests and ecological characteristics?
- How (and where) do we draw the boundaries? and

- What are the expectations of a 'good' region for NRM?

The laws that govern the processes of natural systems are fixed therefore opportunities to significantly improve resource management outcomes will rely on our ability to modify our social systems to better serve our long term interest in the natural world<sup>2</sup>. In practice however, social change seems to be incredibly difficult to achieve. Nevertheless, society<sup>3</sup> and its institutions<sup>4</sup> may need to become more capable of substantial transitions over shorter time scales to adapt to pressures of change including social ramifications of reduced resource capacity or alternative ecosystem uses and restoration. Such transformations might require novel approaches if humanity is to find realistic solutions to social and environmental sustainability issues providing long-term resilience because the community can adapt with matching civic skills and knowledge. More effective spatial representation of these features is likely to greatly improve community engagement and participation.

The foundation for this socially resilient civic engagement lies in the community networks of trust and reciprocity, termed social capital, which greatly enhances the mobilising of resources within a community. It also relates to the degree of investment a community (or residents are prepared to make) in a particular area. This 'sense of place' or 'place capital' includes the attachment by a community to the particular characteristics of a regional cultural and natural landscape. The creation of a resource governance institution that draws on these social resources and matches them to the local community territory provides both, a logical and a theoretically grounded, spatial arrangement - a nested (multi-scale) resource governance framework.<sup>5</sup>

Integration of ecological functions and influences of landscapes for NRMG suggests a regional framework should maximise the homogeneity of the landscape units within the region.

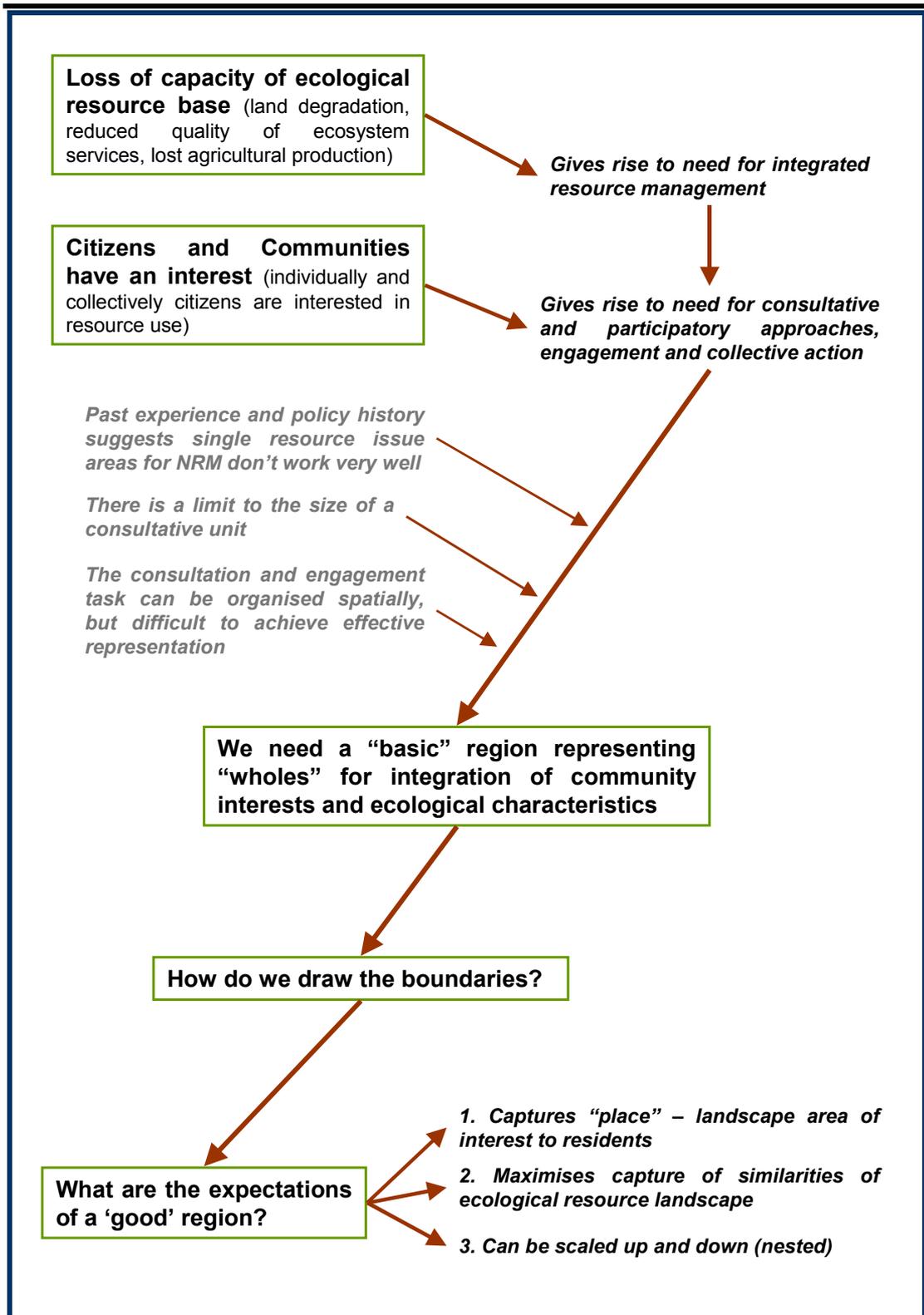


Figure 1. Simplified logical argument for methodological design. In recognising the need for a basic 'holistic' region to integrate community interests with ecological characteristics, this project focused on developing a method to identify boundaries that met the three primary expectations of such regional frameworks for more effective resource governance.

In other words, the natural landscape context for resource management is made up of fairly similar biophysical characteristics – these are the. There are two significant elements arising here. Firstly the association by the local (human) communities to their natural landscape characterised by particular ecosystems and vegetation. This includes attachment to the visual elements of the landscape and to the resource utilisation by these communities including land use issues – further embedding communities into their landscape through the creation of a cultural (agricultural, urban) landscape. There are other benefits arising from the management of a relatively homogenous landscape. For example, efficiencies arise in the construction and maintenance of infrastructure, requirements for specific equipment and expertise or experience, and knowledge of the behaviour of the local soils, vegetation in times of flood, fire and drought.

Both ecological systems and social systems are interconnected at broader scales. While biophysical structure provides ecological function and services important to communities and land uses at one level, they interrelate to other landscape systems, land uses and communities at broader scales (eg, whole catchments or adjacent catchments and political systems such as LGAs; Figures 4 & 5). Therefore regional frameworks for NRMG must be able to scale up from local to broader regional contexts as appropriate for effective resource management and administration, while maximising capture of communities’ areas of interest and similar natural landscapes.<sup>6</sup>

## Methodology and Results

The above discussion is summarised in Figure 1 and, leads us to the methodology for delineating the boundaries of NRMG regions. The methodology is to provide for three important conditions that are expected of the regional frameworks (Figure 1).

The framework is required to:

1. Maximise capture of “sense of place”; the landscape area of interest to residents and in which they are willing to engage in decisions for the future (Figure 2);
2. Maximise capture of similarities of the ecological resource base (homogeneity of the biophysical landscape; Figure 3); and,
3. Be capable of being scaled up from a local level to broader regional contexts (nesting) while not compromising the first two principles (Figures 4 & 5).<sup>7,8</sup>

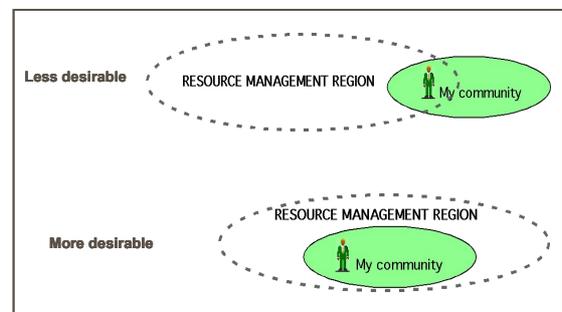


Figure 2. The first condition requires that the governance region contain as greater proportion as possible of the areas that residents regard as their ‘community’.

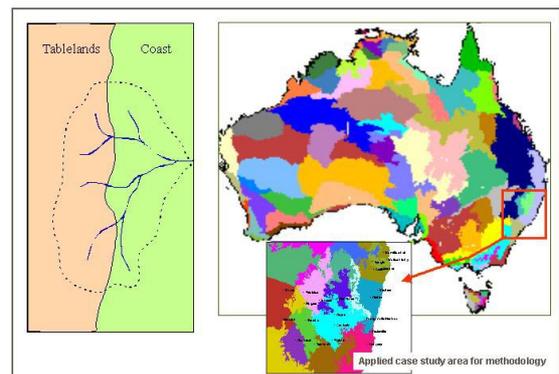


Figure 3. The second condition is that the resource governance region has a reasonable degree of spatial correspondence with the ‘natural’ landscape. Examples shown here include a tablelands and coastal plains landscapes intersected by a catchment, and the Interim Biogeographic Regionalisation of Australia (IBRA) with our finer scale biophysical landscapes of the study area.

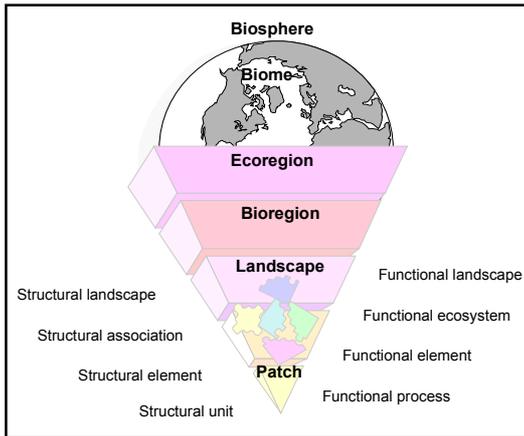


Figure 4. Nesting of structural and functional components of ecological units (after Rollings and Brunckhorst 1999, Brunckhorst 2000, 2001). Human interaction with the environment occurs mainly at landscape scales, but across relatively short time periods.

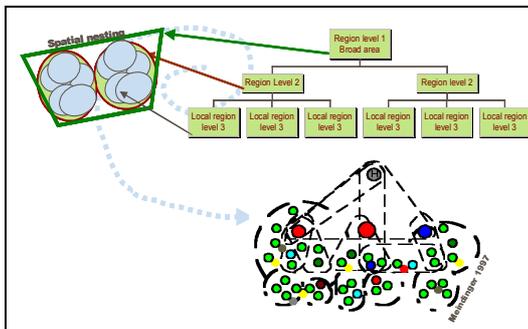


Figure 5. The principle of nesting also facilitates a loosely networked hierarchy that captures communities of common interest and similar natural landscapes, balancing representative participatory processes with administrative control (after Meindinger 1997, 1998, Shannon 1998).

A social survey with a range of question framings and maps was designed to elucidate, in a data form compatible with GIS mapping, the areas of interest to residents and what area they considered as their 'community'. The survey and several maps and map scales were tested on a small number of country town and rural residents and then further refined (a copy of the survey is enclosed).

The method developed needed to be compatible & integrated for:

- Random survey sample with spatial evenness.
- Appropriate mapping scale (1:1 million when scaled up from postcode areas).

- Overlap mapping to avoid artificial boundaries.
- Data sources ABS Census, Postcode, Federal Electoral Areas.
- Spatial unit of Postcode Area.
- Large sample size (10,500); return response ~> 23% .
- Spatial database design (requiring very large capacity for several hundred thousand records as well as capability to link to GIS data tables).

The sample was very large because of the need for a sampling strategy that would provide significant data across the entire study area (spatial evenness). Overlapping areas of postcodes (the finest spatial mapping unit available from electoral rolls) provided a spatially even as well as statistically significant sampling strategy. The requirement for spatial evenness however increased the required sample more than five-fold, resulting in the survey being mailed to some 10,500 residents of northern NSW. The response rate was just under 23%, providing appropriate confidence limits at postcode spatial evenness scales – however, the data has been scaled up for mapping, which provides increased (statistical) levels of confidence.<sup>9</sup>

Mapping and analysis of the social survey data as it came in, quickly indicated high levels of overlap of community areas of interest in their natural resource base, civic engagement, and areas of interest for local government and regional development (Figure 6).

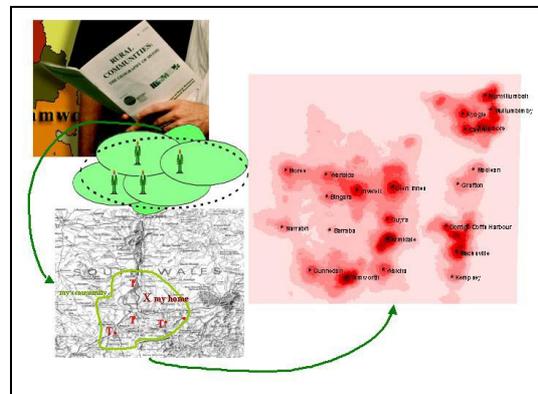


Figure 6. From social survey responses on various question framings to GIS mapping of a community surface – the social landscape.

When the respondents' community polygons were 'stacked' together, like pancakes, the height and slope of the mutual areas of community concern became a three-dimensional social landscape, showing peaks of community interest and valleys of lesser interest. The community polygons were aggregated to form the community surface and 3D visualisation of social landscapes. The social landscape captures gross social processes represented as gradients, which highlights boundary effects (Figure 7).

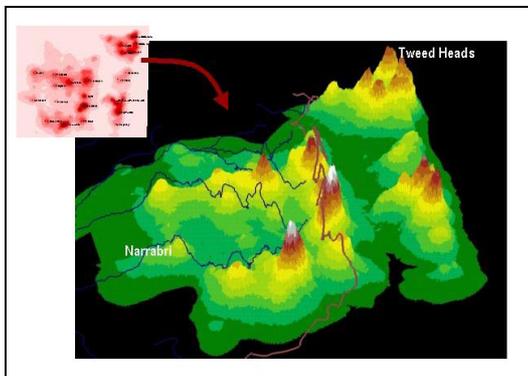


Figure 7. The geographically attributed community surface as a 3D social landscape – the topography represents low points (valleys) in community's area of interest.

A GIS hydrological analytical tool delineated community catchments from the social landscape. The 'valleys' define breakpoints between social groups of communities of common interest (Figure 8). It provides a socially optimal solution in accordance with our first condition. It also identifies the 'order' of nested hierarchical arrangements (third principle)

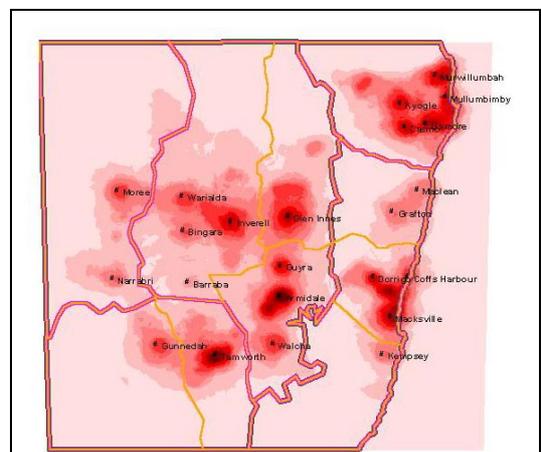
The hydrological model identifies the local level "headwater" communities, which come together at the next community "sub-catchment level and finally a broad regional level (eg, northern NSW coast). In other words, within a broad, high level, community catchment two sub-catchments could be delineated – providing overall a nested hierarchy of

three levels of communities of common interest from local to regional.



Figure 8. Application of a hydrological model delineated community catchments from the social landscape. The 'valleys' define breakpoints between social groups of communities of common interest at different catchment or 'community interest capture' levels.

The broadest level (Level 1) divides the northern NSW coastal communities from the New England and North West along the top of the escarpment (Figure 9).<sup>10</sup> The Level 2 (pink line, Figure 9) and Level 3 community catchments (yellow lines, Figure 9) can be clearly defined also. A finer scale division might be possible, however we felt the confidence limits of the survey data and mapped community polygons did not allow further division.<sup>11</sup>





federal levels in the whole range of NRM departments and agencies, including Planning, Local Government, Transport and Regional Services and other whole of government co-ordination (eg, Premiers Dept.).

Clearly we need comparable measure of performance to be able to assess different governance frameworks. One of conditions described earlier is an important criteria – that a meaningful and effective resource governance framework for NRM must encompass as greater proportion as possible of the areas that the inhabitants regard as their ‘community’.<sup>12</sup>

The performance measure or rating to assess how well this condition has been met and for comparison against other regional frameworks (see Figure 11). The rating or Community Capture Index (CCI) is the number of residents (survey respondents) whose entire area of interest is contained within the boundary of the region or administrative area (eg, LGA, EPA region, our Levels 1-3; see Figure 11).

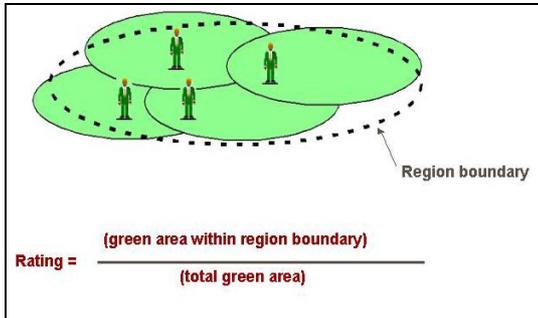


Figure 11. The Community Capture Index (CCI) provides a rating of the proportion of residents (survey respondents) whose area of interest lies entirely within the boundary of the region.

Local governments are important natural resource managers as well as playing a role in environmental planning, water and waste management and development controls. Our case-study area contained thirty-six Local Government Areas (LGAs). The study shows very clearly that the areas that people today think of as their community are often cut through by local government boundaries. All

respondents indicated a civic concern for districts larger than those within the current local government boundaries.

A Community Capture Index value was calculated for each LGA in the study area. An interesting bimodal distribution resulted when CCI was graphed against the percentage of respondents for each of the 36 LGAs (Figure 12). Most respondents considered only around 10% of the LGA coincided with their area of interest – even though residents were interested in a larger area!

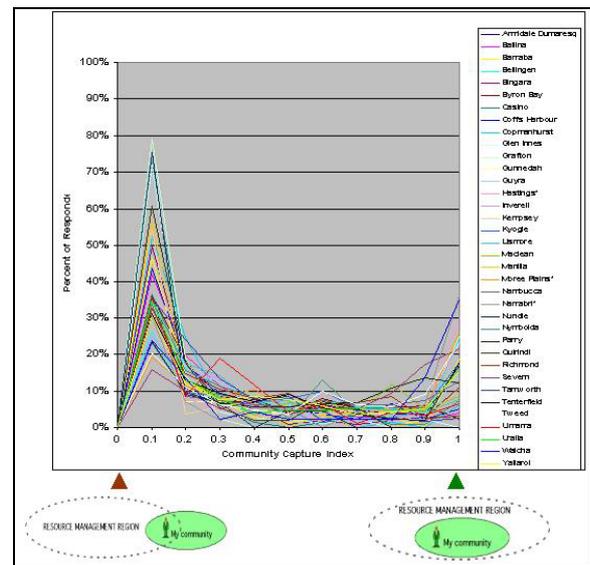


Figure 12. The bimodal distribution of percentage of respondents’ area of interest ‘captured’ (CCI) by LGAs. Most respondents area of interest fell outside their LGA.

When governance frameworks cut through relatively high zones of community interest, as shown in figure 13, they end up ‘capturing’ more areas that are in between - where fewer people have an interest or in a ‘transition’ zone between areas of higher community interest. Overall, the Local Government Areas in the study area captured less than 10% of the landscape of interest to residents. In fact LGAs perform worse than a completely random allocation of boundaries (as governance regions) would (Figure 14). This simply means LGAs are in the wrong place – they tend to straddle several “no-mans land” areas (social landscape valleys).

Amalgamating LGAs into larger areas does not improve performance beyond random. It is not surprising that State government agency regions perform so poorly as well, because such administrative regions are usually larger groupings of LGAs. Purely biophysical regions also rate quite deplorably (eg, IBRA; Catchments and Catchment Board areas; Figure 13). Catchment boundaries and local government boundaries divide the very communities that have an interest in the future of their local region and, indeed must work together towards a sustainable future. To improve performance, boundaries must change – they need to be in the right location.

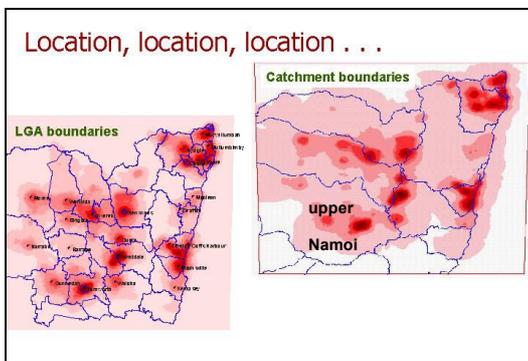


Figure 13. Existing LGAs and Catchment management boundaries overlaid on the social landscape. Catchment and LGA boundaries clearly split the very communities that need to work together for a sustainable future.

This gives us some additional confidence in our results that attempt to identify boundaries for contexts that maximise potential civic engagement together with similar ecological resource and, be able to move up and down scale. The community catchments guide us to the right location; the ecological landscapes, though blending and interacting, provide resource management context.

In the study area, one zone of interest is the catchment of the upper Namoi River which is reasonably coincident with a similar area of high interest of residents of local communities. This sub-catchment region is also close to our Level 2 ‘Eco-civic’ region in that area. It also performs

much better in the CCI, sitting beside the Level 2 rating in Figure 14.

As indicted above, a larger area might ‘capture’ more communities simply because it is larger. The line in Figure 14 shows that completely random allocation of areas as regional governance contexts has an increasing CCI with increasing size of the region. Performance is very poor for a given size region however, because of dislocation of communities of interest, straddling many “no man’s land” social valleys. For example, our Level 2 region’s community capture performance (CCI) is around 68% for an area of 25,000 sq km; the region following the random line will not achieve the same CCI until it is approximately 200,000 sq km in size. This is further illustrated in Figure 14 by several government agencies (Dept. Agriculture, Planning, EPA and Premiers Dept), which like most State government departments are large administrative regions based on groupings of adjacent LGAs – these administrative units can not perform better than the random region curve, where LGAs also sit (Figure 14) – they are still in the wrong place.

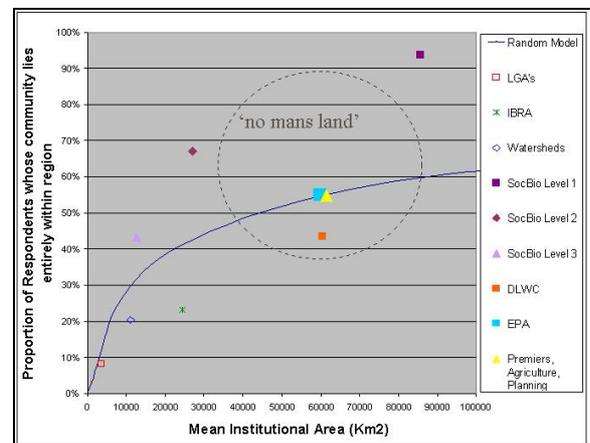


Figure 14. Community capture plotted against mean institutional governance area. All 3 levels of ‘Eco-civic’ regions perform much better than existing administrative regions of similar size.

Where a governance region is located is very important. The area of the graph in Figure 14 is labelled ‘no-man’s land’ as a reminder that this area is not available as a governance region – where the ‘place’ of

community lies is not on a continuum. Scaling is therefore important, but it is not a sliding scale. The next 'best' governance region up or down scale will be either, nesting 'community sub-catchments' up to the next Level (ie, Level 3s grouped to the Level 2 they are part of), or moving from a broad scale region (eg, Level 1 to 2 to 3) to its component finer level communities. The principle of nesting therefore is not only valuable for dealing with multi-scale issues, it is also important for retaining location context.

All 3 levels of 'Eco-civic' regions perform much better than existing administrative regions of similar size (Figure 14). These community derived boundaries, more accurately represent the areas of residents' interest and therefore would provide a more suitable framework for resource governance, in ecologically sustainable regional development, natural resources management, and the delivery of State and local government services.

## Eco-Civic Regions for Resource Governance

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The results of this project are immediately relevant. On one hand they show why purely biophysical or purely political / administrative regions are often an impediment to participation, engagement and action by communities. The results also show that political jurisdictions like local government are not representative of their residents and communities. If you want people to work together with a local council to build a bright sustainable future in rural Australia, it will be a lot easier, and a better result, if that council covers the area people think of as their community. The NSW government has been considering council amalgamations for some time and encouraging voluntary amalgamations of LGAs with out boundary changes. Our results show that unless boundaries are changed, community representation and engagement in local regional issues will not improve. This argument is relevant to other government service delivery as well. We have undertaken seminars and

meetings with several government departments at regional and Head office, and political levels to promote these findings and suggest adoption of this methodology for describing new regional LGAs and nested regional NRM administrative units.

Many of the State government departments we have consulted with and involved in various stages of the project have repeatedly said these eco-civic regional frameworks would be much better for them also in co-ordination and integration of their administrative tasks and service delivery. For example, manager of a regional EPA office indicated it makes good sense for his officers in dealing with environment protection issues from chemicals, pollution and water to related community health issues to be able to deal with a similar landscape ecological context that the majority of residents or local communities have a strong interest in.

The methodology developed here is applicable to any non-metropolitan area. It could be valuable in determining better regional arrangements for NHT, MDBC and other federal NRM policies and programs. There are lessons for catchment management too - perhaps Integrated catchment management might be re-interpreted to include the understanding of community identity with different parts of catchments, possibly across the top of several catchments. Policies, programs and community action could be planned to 'nest' up towards the ultimate, whole catchment targets.

While adoption and application of this new method to re-defining regional NRM frameworks along with local government and other service delivery might be seen as a very big step to take, it is not impossible, because the 'eco-civic' areas maximise capture of the area of interest to most residents and communities it is likely to be politically palatable in terms of reform implementation. Feedback via media, radio talk back and other stakeholder networks have also indicated a tremendous (if not surprising) willingness by the local communities and businesses to pursue such change. It has

become apparent that our results are very relevant, not only to natural resource planning, management and governance issues of integration and coordination, but also to other related areas for “whole of government” service delivery and Local Government Areas (LGAs).

Such regional frameworks may serve in the future as a common framework for Federal and State natural resource management programs, as well as State Government and local government service delivery.

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## Communication

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*Different living is not living in different places, but creating in the mind a map*

Stephen Spender, 1981

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### Communication Activities Summary

Considerable time and effort has gone into consultation and communications. The primary audience for communication and transfer are policy makers, planners and program managers at all levels of government, and across portfolios and administrative areas, but with a particular focus on natural resource management related areas.

Communications have also targeted different administrative levels of potential adoption, from government Ministers and senior policy makers, advisors and bureaucrats to other officers and managers and 'regional' staff at all levels of government (including local government). We have also accessed various community interest groups, quasi-government agencies, government co-ordination mechanisms. Meetings with government ministers (including the NSW Premier, Local Government Minister, Land & Water Minister, Planning Minister in NSW; and Federal Ministers Truss and Anderson).

The regional Premiers Department supports this project and has generously provided a suitable forum for discussions' involving government departments, agencies and NGO's. Premiers department appear to be keen to use the information in developing new strategies for coordinated regional service delivery by government. As discussed above, agency managers and employees have also shown considerable interest for the project through the acknowledged need for an integrated approach to resource management that 'makes sense' in terms of biogeographic boundaries and the underlying natural resource base, while incorporating the communities "sense of place" and "area/sphere of interest".

One originally unforeseen area of potential application, also relevant to NRM, has been local government. The mapped social survey data, with an explanation of the project and NRM context, have been extensively used in local government amalgamation commissions of inquiry.

Results of the project have been used in supporting one amalgamation (Armidale-Dumaresq) while demonstrating it did not go far enough in terms of boundaries and other local communities. Mapped social landscapes have also been applied to successfully demonstrate (with community support) why another proposed amalgamation (Nundle-Quirindi) should not proceed (see attached collection of media cuttings). An amalgamation of Nundle-Parry Shires might now proceed - a move supported by or data on communities of interest and the resource base (in this case the upper Namoi).

Clearly however, our data is clearly pointing to the need to revise boundaries at the same time local government reforms are undertaken. The politics of such a situation might also be assisted by our results in that they reflect "bottom-up" community identity with an area in terms of the landscapes they wish to have a say in the management and future of (therefore commanding a higher degree of public acceptance). Discussions with the Minister for Local Government, Regional Development and Rural Affairs, his Deputy Director General and the Deputy Director General of Planning NSW, and also Premiers department senior staff (including Director General), have revealed the potential interest of this research in institutional reform of local government and state government service delivery.

We have spoken at several public forums on local government, local environment

planning, amalgamations and to closed meetings of Councils/Shires and Regional Planning and Development Groups of Shires (including North Coast, Hawksbury, and Central West). Data / maps from the project have been very useful in making contributions to discussions on water reforms, vegetation management strategies and Catchment Board strategies in NSW.

Several discussions have been held with community and health services advocates, as well as regional groups of health professionals (eg, New England Group of General practitioners), who have all considered the method and results to date, could greatly improve co-ordination in planning, deliver and management in those sectors as well as related NRM issues.

Most recently, information from the project has made a valuable contribution to the *PlanFirst* "White Paper", which is examining options for more strategic, nested, local-regional planning in NSW.

The vast majority of the State government departments we have consulted with and involved in various stages of the project have repeatedly said these eco-civic regional frameworks would be much better for them also in co-ordination and integration of their administrative tasks and service delivery. For example, manager of a regional EPA office indicated it makes good sense for his officers in dealing with environment protection issues from chemicals, pollution and water to related community health issues to be able to deal with a

similar landscape ecological context that the majority of residents or local communities have a strong interest in.

The methodology developed here is applicable to any non-metropolitan area. It could be valuable in determining better regional arrangements for NHT and other federal NRM policies and programs. There are lessons for catchment management too - perhaps Integrated Catchment Management (ICM) of the future might be re-interpreted to include the understanding of community identity with different parts of catchments, possibly across the top of several catchments. Policies, programs and community action could be planned to 'nest' up towards the ultimate, whole catchment targets. We have discussed the meaning and use of the results with the MDBC as input to their considerations for more appropriate local-regional contexts for program delivery in the future.

In addition, communication and consultation with the general public has developed/continued via several for a - through the survey and results of the survey, as well as through community groups, workshops / community meetings, public hearings (Council/Shire amalgamations), various media (including radio news, talkback).

A collection of examples of media and related communications over the life of the project is attached separately.

**Sustainable Communities & Landscapes**

People, their place and the natural resource base they depend on operate across landscapes at various scales.

This project is concerned with how people and communities understand the area they have a shared future and interest in.

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**Land & Water**  
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**CERNM** Centre for Environmental Research in Natural Resource Management  
David Brunchhorst, Phil Coop & Ian Reeve

**Rural Futures**

The flyer features a photograph of a rural landscape with rolling green hills, a small town, and a large tree in the foreground. The background has a yellow and white pattern of circles.

## Summary Abstract

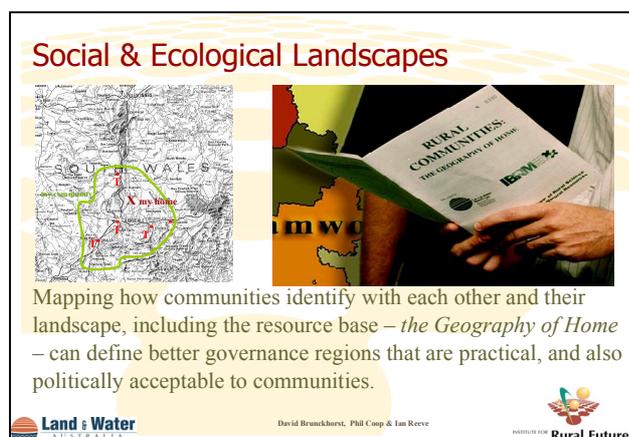
A 300 word summary abstract of the project follows

The ecological sustainability of future landscapes and their capacity to support human communities and resource uses depends on a range of institutions. An important institution for regional resource management is civic engagement in local affairs, including resource and land use issues. Local civic engagement is traditionally structured around local government. This has extended to decision-making bodies based on whole river catchments. For citizens to participate in regional resource management in ways that are meaningful to them, it is important that both the landscape units being discussed, and the jurisdictional boundaries are also meaningful.

A theoretical base and associated spatial mapping techniques to explore how boundaries for resource management regions might be identified was developed. This work is guided by two considerations that are believed to be important if regional resource management is to be meaningful to the citizens involved.

The first is that the biophysical character of the landscape units within the region possess are fairly similar. This will lead to a greater coincidence of interest among the inhabitants of the region. The second consideration is that the choice of management region maximises the areal proportion of the region that is considered to be part of their 'community' by the inhabitants, which should lead to greater commitment to civic engagement in resource management. A third principle relates to the capability to scale up for some resource management, administration, policy and planning issues. Nesting of combined social-ecological ('eco-civic', 'biocultural' or 'bioregional') frameworks from local to broader regions, inclusive of areas of collective interest (community catchments), can provide for multi-scaling.

As a practical application of these concepts, we applied the new method to delineate a series of nested 'eco-civic' resource management regions for northern NSW. Such regional frameworks may serve in the future as a common framework for Federal and State natural resource management programs, as well as State Government and local government service delivery. [313 words]



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\* denotes a publication output of, or related to, this project; a complete bibliography and literature review is provided in the technical report.<sup>13</sup>

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## Endnotes

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<sup>1</sup> "Governance is the capacity of self-organizing systems to govern themselves, and includes not only formal government authorities and agencies, but also an array of private sector and non-governmental organizations as well as communities. Stewardship is the expression of this capacity in the form of "responsible custody" of human ecosystems, and therefore requires competence, vigilance, and ethics of responsibility and accountability for the sustainability of human ecosystems" (Francis and Shannon, 1999 [www.ublaw.buffalo.edu/org/governance](http://www.ublaw.buffalo.edu/org/governance)) [from Shannon 2000]

<sup>2</sup> An increasing number of authors are turning their attention to ecological sustainability issues related to community and administrative arrangements – land use, urban infrastructure and services, local planning, and regional development. This timely shift might be seen as consideration of 'biocultural appropriateness' for institutional, urban and rural capacity building for natural resources management (see for example, Gunderson et al 1995, Forman 1995, Hanna et al 1996, Holling & Meffe 1996, Omernik & Bailey 1997, Reeve 1998, Knight & Landres 1998, Berkes & Folke 1998, Brunckhorst 1998, 2000, Brunckhorst & Mouat 2000).

<sup>3</sup> A social system refers to any group of people who interact long enough to create a shared set of understandings, norms, or routines to integrate action and established patterns of dominance and resource allocation.

<sup>4</sup> The term 'institutions' refers to sets of formal and informal rules and norms that shape interactions of humans with others, and with nature.

<sup>5</sup> These approaches also have the potential to create uniquely robust governance institutions that possess the essential dynamic qualities to enable improved adaptive capacities to the emergent processes that constantly challenge (non-metropolitan) communities (see for example, Shannon 1992, 1998, Gunderson et al 1995, Johnson et al 1999, Brunckhorst 2002). Transformation to a more effective resource governance framework will also draw on the notions of a bioregional framework (*sensu* Brunckhorst 2000) and an effective nested arrangement that better represent a community's actual interests in a particular regional landscape while retaining the capacity to address resource governance issues at appropriate ecological scales, creating in effect an institutional interface that bridges social and ecological processes while providing workable administrative arrangements (eg, for NRM agencies, LGAs and other government services; see Omernik & Bailey 1997, Berkes & Folke 1998).

<sup>6</sup> A loosely networked hierarchy that captures communities of common interest and similar natural landscapes might also balance bottom-up citizen participation and engagement with administrative control while allowing for variable task organization, knowledge sharing, efficient resource use, coordination and integration (see Slocombe 1983, Meindinger 1997, 1998, Rollings & Brunckhorst 1999, Shannon 1998, 2000, Brunckhorst 2000, Marshall 2001, Reeve et al 2002).

<sup>7</sup> Nested hierarchies of interconnected systems – "Understanding how systems of functional elements are linked at a variety of scales is referred to as hierarchy theory (Pattee 1973, O'Neill et al. 1986, Urban et al. 1987, Forman 1995, Bailey 1996). The objective of a nested hierarchy is the development of a systematic framework for classifying and mapping areas of the Earth based on the associations of ecological units at various geographic scales. A hierarchy, however, has connotations of a top-down, "through the ranks" approach. . . . a horizontal and vertical (up and down) integration providing a nesting of similar or jointly operating features, but not in any way cutting them off from other elements or influences. A nested hierarchy of ecological units such as ecoregions, bioregions and landscapes can be a powerful tool for planning integrated terrestrial and coastal-marine management. It provides a framework for ecologically sustainable development that should be assessed in its regional, not site or local, context. Nested spatial contexts can further provide for more meaningful environmental impact assessment and more strategic planning of restoration efforts, water quality and monitoring needs, integrated catchment management, research, biodiversity assessment and integrated conservation planning. Nested spatial hierarchies can provide much-needed context to implement, manage and assess actions appropriately. For example, a patch of cyanobacterial bloom in a reservoir floats amidst patches of water with no visible cyanobacteria. If we scale up, to a bird's eye view, we will see what proportion of the water body is effected. Scaling up further might provide insights into points where nutrient rich water flows into the reservoir. At a broader, landscape to regional, scale we might be able

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to discern patterns of land use and vegetation in the catchment, structural and functional elements, which influence water quality in the reservoir. It is often at this regional landscape level that assessment of the integration of social and ecological elements can be achieved. So a nested hierarchy of environments is useful for human planning. This is not to say however that systems operate this way – they operate within, across from bottom up, down horizontally, cycle within and across scales, and so on. Nevertheless, such a framework can be extremely useful in assessment and management of human activity and natural resources, all of which operate across and within several levels – allowing us to scale up and down, while managing across horizontally for integration and coordination.” [from Brunckhorst 2000: 20-21]

<sup>8</sup> Integration is possible within nested hierarchies – “Bioregional planning creates place-based policy integration that links local actions with a framework of global goals and principles related to sustainability. As a result, bioregional planning creates governance and stewardship capacity – the institutions, organizations, and relationships necessary to achieve socially desirable goals. ... However, this means that governance and stewardship are processes of social action, and thus is it necessary to consider what social action is (Westley 1995). Anthony Giddens argues that for social action to occur there must be three aspects of social structure which reinforce one another – structures of signification, structures of legitimation, and structures of domination (Giddens 1984). “Structures of signification” are interpretive schemes that give meaning to our activities and our lives; like myths, paradigms, ideologies, and visions of the future. “Structures of legitimation” are the norms and rules that organize our activities and govern the routines of life. “Structures of domination” are the allocation of resources and decision-making power that governs our ability to take effective action. Planning processes combine these three elements. Planning, in all its forms, creates meaning; it is a process of “sense-making” within a community of interest (Westley 1995: 396). As a meaning creation process (structures of signification), bioregional planning facilitates the defining of issues and problems as well as the working out of new ideas and solutions using a collaborative and deliberative approach (Brunckhorst 2000). It is useful to think of planning as the intervening variable between knowledge and action in large, complex systems (Westley 1995: 396).” [from Shannon 2000]

<sup>9</sup> Details of the methodology, statistical sampling and mapping are provided in the technical report for this project.

<sup>10</sup> The (biophysical) Interim Biogeographic Regionalisation of Australia (IBRA) divides this very large area along the midpoint of the escarpment gradient in some places and at the top of the escarpment (along the gorge country) in other places (see Hansen & di Castri 1992, Belbin 1993, Bailey 1996, Brunckhorst 2000).

<sup>11</sup> At least not without finer scale data which may or may not support a fourth level – we believe it probably would not support further division – our survey data (question responses) and community polygons suggest a wider community network and ‘sense of place’ and interactions operate at this local level (= Level 3). This is also borne out by some of our results. For example, Moree residents and Inverell residents have less affinities than might be expected – Inverell nests with the “slopes and Tablelands” Level 2; Walcha rural communities though closer to Tamworth (which is a larger center with more services than Armidale) have greater interest and affinities with the southern New England tablelands communities (Uralla, Armidale, Guyra) and landuses (this was also supported by respondents answers to other questions such as where they go for various services, as well as sporting and social events)

<sup>12</sup> The methodology developed here is a considerable advance beyond traditional social geography approaches, such as central place theory and gravity modelling, which are both based on the expectation that population centers capture adjacent residents and communities (having been developed for market and business trade evaluation; and more recently in large shopping center development). Our approach, while reflecting elements of central place theory, is also a marked departure from it and provides a method for acquiring and analysing real data. Professor Graeme Hugo with Colin Macgregor and co-authors (Hugo et al 2001) recently evaluated these approaches for the Bureau of Rural Sciences and Dept. Transport and Regional Services, rating this new methodology very highly. A comprehensive discussion of all relevant, literature, related theories and methods is contained in the full technical report.

<sup>13</sup> In addition, more than 30 workshop, meeting, seminar and conference presentations on the project have also been given as part of the communication strategy.

#### Attachments and Inclusions to this Report

1. Copy of social survey – The Geography of Home
2. Examples of media and communication activities
3. CD with
  - Copy of this report
  - Narrated MS Powerpoint presentation on project
  - Summary MS Powerpoint presentation on project