



Australian Government
Land & Water Australia

PEOPLE, PRACTICE and POLICY

A review of social and institutional research



April 2006

Introduction



Bobbie Brazil



Tim Fisher

We are very pleased to welcome you to this edition of *People, Practice and Policy*.

This new publication provides you with a snapshot of some of Land & Water Australia's innovative social sciences research, which helps us to better understand and inform sustainable natural resource management (NRM) in Australia.

A series of short articles by the researchers highlights their key findings grouped around three integrating themes:

1. Institutions and governance arrangements
2. Policy instrument choice and mix
3. Landscapes, lifestyles and livelihoods

These themes are elaborated in our social and institutional research prospectus called *'Making the connections that build sustainability in natural resource management'*, which guides our investments in this area. Our objective is to integrate social and institutional considerations into biophysical and industries-based approaches to NRM, and thereby to inform policy and lift adoption of sustainable practice change by land managers.

We hope you enjoy reading about the research and find the insights useful. We encourage you to contact the researchers, order a publication, visit the Land & Water Australia website, and participate in our social and institutional research activities.

A handwritten signature in blue ink that reads "Bobbie Brazil".

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A handwritten signature in blue ink that reads "Tim Fisher".

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Disclaimer:

The information contained in this publication is intended for general use, to assist public knowledge and discussion and to help improve the sustainable management of land, water and vegetation. It includes general statements based on scientific research. Readers are advised and need to be aware that this information may be incomplete or unsuitable for use in specific situations. Before taking any action or decision based on the information in this publication, readers should seek expert professional, scientific and technical advice.

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Future directions for social and institutional research

Recognising the importance of social and institutional issues in natural resource management, the Board of Land & Water Australia approved funding in December 2004 for a second phase of the Social and Institutional Research Program (SIRP) from 2005–2010. This new program is described in the publication *Making the Connections that Build Sustainability in Natural Resource Management*.

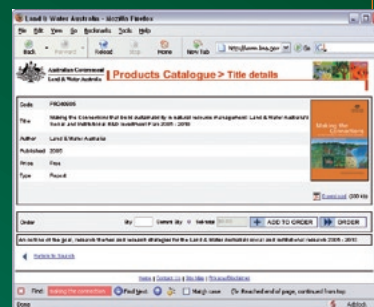
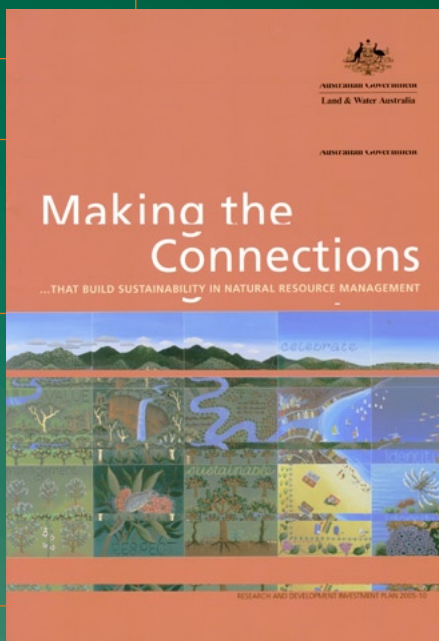
LWA will fund and manage integrated social sciences research, covering economic, legal, institutional and learning activities that contribute to the long-term sustainability of landscapes, lifestyles and livelihoods in rural Australia under three themes:

1. institutions and governance arrangements for sustainable NRM
2. policy instrument choice
3. landscapes, lifestyles and livelihoods.

The program has a total budget of \$4.55m over five years from 2005–2010. An amount of up to \$1.39m has been allocated for an initial R&D call focusing on the following priority areas:

- ▶ National Water Initiative social, market and institutional implementation
- ▶ native vegetation regulations, incentives and institutions
- ▶ market-based instruments mix, private sector leverage and institutions
- ▶ regional NRM groups, institutions and governance arrangements.

The first call for R&D proposals was advertised in October 2005. Subsequent calls are likely to be advertised annually in *The Australian*, through 'SIRP's UP' and on the Land & Water Australia website: <http://www.lwa.gov.au>



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FRAMING SCALES AND RESPONSIBILITIES

Steve Dovers

The research reported here and the theory and empirical evidence supporting it address the great challenge and experiment of our time: the achievement of an ecologically sustainable and humanly desirable pattern of development. Natural resources management (NRM) is a subset of the larger challenge of sustainability or ecologically sustainable development, and is sometimes thought about in a narrow, fragmented manner. However, when it is linked to the broader challenge of sustainability it takes on different and difficult dimensions. These are much harder and more urgent than the traditional view that it is 'resources' or 'the environment' that have to be managed, rather than ourselves and our institutions.

The challenge is to ensure that policy:

- works over the longer term
- incorporates environmental, social and economic concerns
- encourages wide participation
- handles uncertainty constructively
- knowingly experiments with new policy instruments and processes
- is embedded in suitable institutional settings that allocate responsibilities across geographic and administrative scales and encourage mutual understanding and ongoing learning.

We do not know how to do these things yet—it is a very different way of conducting our affairs. However, programs of rigorous, practically oriented R&D have been developed across the world and are increasing our abilities. The Social and Institutional Research Program of Land & Water Australia is an outstanding example of this, with an innovative approach to funding R&D and ensuring that it is interconnected rather than fragmented. This is especially useful when valuable projects can be brought together to allow insights into underlying challenges.



The six research projects described in the first section of this issue of *People, Practice and Policy* offer this larger potential, as well as being highly innovative and useful works in their own right.

Taken together, the research projects point to some underlying themes and tensions in NRM (and society more broadly), which are important, unresolved, and deserve further attention and integration of efforts and knowledge:

- ▶ the need for research, knowledge production and policy discourses that bring rigorous, often theoretical academic analyses together with real policy problems
- ▶ the issues of negotiating and coordinating geographical and administrative scales, and allocating responsibilities across those scales
- ▶ further exploration of the 'best' scales at which to manage resources, research and policy formulation, so that we can move from defining and establishing regional scales toward more confronting questions of democratic legitimacy, administrative and statutory competence, and finding the necessary financial, human, informational and other resources
- ▶ policy integration (social, environmental, economic), which is at the heart of several of the research projects featured here, and is the key to achieving sustainable NRM.

In a world where the public sector has reduced its direct, traditional activities in policy and other non-government actors have taken up or been passed additional responsibilities, there are both positive and negative prospects.

The positive prospect is greater flexibility, productive partnerships, and the coordinated placing of responsibilities on those best placed to fulfil them at the most optimal scale.

The negative prospect is abrogation of responsibilities, inadequately enabled arrangements at non-traditional scales of governance, and fragmentation and lack of communication.

As well as political will and openness and honesty by all players, resources are needed for institutional development. It is the institutional framework we operate within that enables us to explore the demands of the great experiment of sustainable NRM policy and practice.

Volunteerism, democracy, administration and the evolution of future landscapes

Geoff Syme and Catherine Johnston



Children participating in the volunteer Waterwatcher Program
Photo: Patricia Brock, Integrated Area Wide Management Group

The Australian Research Centre for Water in Society (ARCWIS) explores the volunteerism upon which so much natural resource management (NRM) depends, as well as exploring related issues of democracy and legitimacy. Valuably, they are connecting to the realm of public administration, which gives more explanatory power to the research and policy purchase to the findings. We are only learning to negotiate the balance between government and community roles and between formal and informal institutions. If we get that balance wrong too often, whether through deviousness or ineptitude, the resulting loss of trust will destroy the prospects for successful regional NRM.

Background

Currently, the NRM framework in Australia devolves planning and implementation to the regional level, away from direct control by state and federal government agencies. This places great emphasis on community and volunteer activity. It presents a variety of issues such as community capacity building and decision making; volunteer participation in light of social and demographic changes; and a modified relationship between government and community and between government agencies themselves.

Much attention is given to addressing these challenges, but there is also a strong need for a long-term vision of values and goals for NRM. The desired role of democracy in regional

NRM, the development of a common model of public administration (incorporating both public service and voluntary non-profit approaches), and the long-term role and viability of volunteerism in Australia are particular issues that need attention.

Funded by Land & Water Australia, ARCWIS within CSIRO Land and Water is leading a five-year research project: Volunteerism, Democracy, Administration and the Evolution of Future Landscapes. The key characteristic of the study is the adoption of a futures methodology in order to develop alternative futures with the aim of building a long-term resilient model for managing our natural landscape.

Specific project objectives are:

- to examine NRM in political, economic, public administration and community contexts in the light of current social change factors
- to evaluate NRM approaches from multiple stakeholder and futures perspectives to create alternative integrated models of democratic process, public administration and volunteerism for a more robust NRM system in 30 years time
- to promote widespread discussion on alternative futures for NRM administration through the conduct of an international congress and stakeholder workshop, and to develop a series of recommended

systems for NRM in the future. The resultant feedback will be passed to regional NRM groups and relevant state and federal stakeholders

- to create simple decision aids that encourage incorporation of longer-term social factors into planning for regional groups, government decision makers and industry.

Methodology

The research consists of four distinct phases. The first, the scoping stage of research (finalised in May 2005), involved discussions nationally with organisations and volunteers to explore trends and drivers in volunteerism, both in natural resource management and not-for-profit agencies in other spheres—for example, the Australian Red Cross. The focus of this research was on current democratic, administrative and volunteerism issues and trends, and those likely to arise over the next 30 years.



Workshop settings enable community participation in NRM
Photo: Catherine Johnston

Themes that emerged from the interviews included:

- concern about finding the balance between community empowerment and government support
- impact of demographic changes on volunteering – for example, the exodus of youth from rural areas
- the changing role of volunteers, including ‘professionalisation’
- potential replacement of paid workers by volunteers, or vice versa
- addressing a long-term problem within a short-term framework.

The second phase of the research explored ideas for alternative futures for NRM by conducting workshops in two case study NRM regions—the Corangamite Region in Victoria and the Northern Agricultural Region in Western Australia. A causal layered analysis methodology was used to critique current NRM perspectives and practices in order to open up ‘transformative spaces for the creation of alternative futures’ (Inayatullah 2004). This entailed examining NRM at multiple layers (litany/ everyday reality; systemic causes; worldview/discourse; myth/metaphor) to take thinking past ‘the obvious’, and then rethinking the implied future at each level. From these workshops a number of possible scenarios for NRM in the future were developed.

A wealth of information was obtained from the regional workshops. It reflects the project themes of democracy, administration



Community involvement in NRM is essential to its success
Photo: Catherine Johnston

and volunteering, with futures centred on governance, bureaucratic structures and workable volunteerism. Other emergent themes include collective responsibility and

of governance, administration and implementation for landscape management in Australia. The outcome of this third stage will be the development of responses that

Reference

Inayatullah, S (ed.) 2004, *The Causal Layered Analysis (CLA) Reader: Theory and Case Studies of an Integrative and Transformative Methodology*, Tamkung University Press, Taiwan.

create simple decision aids that encourage incorporation of longer term social factors

working together, building trust and confidence, celebrating success, integrating flexibility, and raising the national profile of NRM.

In the third phase of this research, a stakeholder workshop, preceded by a public colloquium, will be conducted in April 2006. International and national experts and representatives from regional catchment management and volunteer groups, all with unique specialist knowledge, will meet to consider alternate modes

can be taken now and in the long term to address the future emerging issues.

The final stage of research will entail evaluation of the research project itself and of the recommended systems for NRM in the future. A postal evaluation survey will be administered to a sample of half the interview and workshop samples. The purpose of the questionnaire survey will be to evaluate the impact of research outcomes and usefulness of a community-based future scenario exercise.



Project reference: CLW73

Project completion: 2008

Fact sheet: forthcoming

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Indigenous NRM research and development

Land & Water Australia currently funds a portfolio of Indigenous-focused research encompassing 11 projects. A forum was held in December 2004 in Darwin, bringing together researchers from across the projects to present their work and discuss options for better coordination of the research. A follow-up workshop was held in Darwin in December 2005 to help researchers develop communication strategies, skills and tools to enhance communication of research results and provide pathways to inform policy.

The projects currently funded by Land & Water Australia encompass a variety of disciplines cutting across a wide range of NRM issues locally, regionally and nationally. Much of the research is aimed at developing processes that acknowledge the value of both western and Indigenous knowledge frameworks while building better capacity of local people, researchers, government and NRM organisations to come up with innovative and collaborative solutions for better land management.

Institutional integration in complex environments—pursuing rural sustainability at the regional level in Australia and the United States

Tiffany Morrison

Tiffany Morrison focuses on regional scale institutional development—an Australian natural resource management (NRM) experiment in recent years that can be variously read as a brave advance, an abrogation of responsibilities by state and national governments, or yet another phase in the fits-and-starts approach that has characterised the history of regional policy. Given the quantity, and sometimes quality, of current regional scale ventures, we must engage with regional scale governance and integration and seek to improve it. Tiffany's framework is a strong advance, incorporating lessons of past experiences at home and abroad.

Background

Most people working in NRM will agree that the institutional landscape in rural environments is overwhelmingly complex (see Figure 1). Academics regard such institutional complexity as intractable or 'wicked'. Increasing concern about institutional complexity in rural areas, combined with the need to manage ecosystems at a bioregional scale, has resulted in a distinct trend in Australia toward 'regional institutional integration'.

Regional strategic planning, regional organisational amalgamation and regional administrative boundary reconfiguration is increasingly being proposed in order to achieve such regional institutional integration. Despite this increasing popularity, these approaches were not well thought out in 2000, when this research began. In particular, there had been little critical hypothesis development on institutions and regional integration

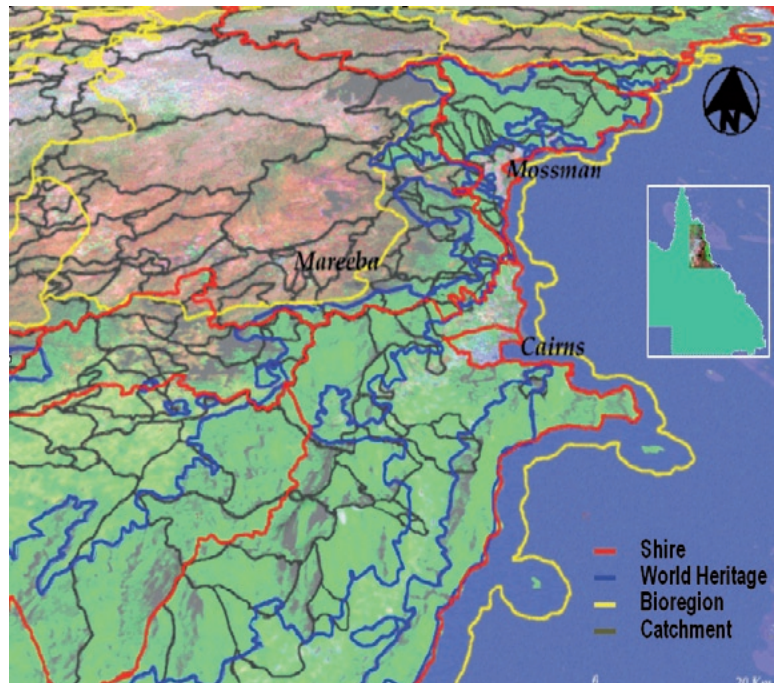


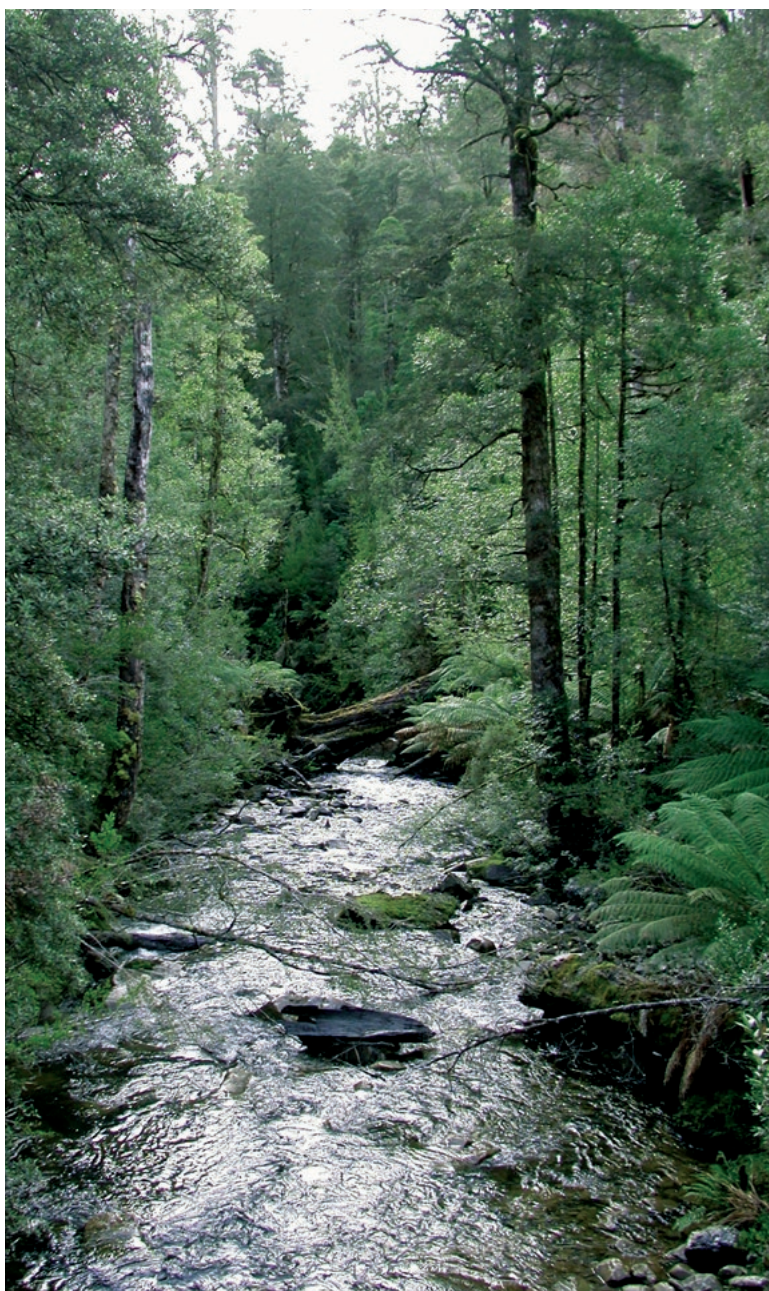
Figure 1: Jurisdictional fragmentation and overlap in the Wet Tropics

by which reforms towards achieving rural sustainability could be guided.

Methodology

This project examined how the complex institutional relationships that exist within and between governments, private and voluntary organisations and citizens in a region have positively affected efforts to secure rural sustainability.

The initial findings enabled the development of an 'integration diagnostic', according to which regional institutional integration could be enhanced in the Wet Tropics and the Fox-Wolf Basin. The diagnostic highlights the structural, functional, procedural, informational, facilitative and contextual dimensions of integration and can also be used to explore integration in other regions.



Wet Tropics rainforest, Queensland

Photo: Pete Davies

Key findings

In the Wet Tropics, Australia, and the Fox-Wolf Basin in the United States, regional integration occurred between a multitude of players and in a multitude of ways. Informal regional networks formed around issues of land use, industrial development, culture, environment, natural

resource management, intergovernmental relations and human services.

An intricate array of resources and opportunities provided the conditions for actors to intersect at nodes where specific integrative activities could occur.

Implications for policy

The diagnostic is of interest to NRM policy practitioners in Australia and internationally, as well as to those outside the environmental and rural arena who are interested in designing regional institutions and integrated policy (for example, practitioners in the areas of public health, community development and economic development).

The need for the diagnostic was based on the premise that if the integration agenda (for example, in environmental planning and management but also in other arenas) is to be achieved, there are a number of issues to be addressed.

First, and perhaps most fundamentally, we need to clarify our notion of what integration might entail. We need to examine the institutional actors, and the structural relations between them. We also need to examine what integrating actors do, and how they do it. In addition, we need to examine the intra-regional and extra-regional conditions that assist these actors to integrate (or not) over time. Finally, we need to better understand the historical, cultural and political contexts that influence institutional interaction and levels of cooperation and coordination.

To illuminate institutional performance this tool therefore diagnoses these institutional (and other) relations in environmental

planning and management to identify the diverse and particular ways in which integration can be pursued in different settings.

The diagnostic has been successfully applied in several case studies including regional planning in the Wet Tropics region of northern Australia (Morrison 2004), a review of national water resource management (McDonald, Morrison & Lane 2003) and in a review of resource governance in the Northern Territory (McDonald & Wood 2004). In each case the diagnostic assisted the identification of duplications and gaps within and between programs.

References

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and the USA, unpublished PhD thesis, School of Geography, Planning and Architecture, University of Queensland, St Lucia.

Morrison, TH, McDonald, GT & Lane, MB 2004, 'Integrating natural resource management for better environmental outcomes', *Australian Geographer*, 35 (3), 243–58.

in each case the diagnostic assisted the identification of duplications and gaps within and between programs



Project reference: CSE4

Project completion: 2004

Fact sheet: forthcoming

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What scale should we use to manage resource and engage communities? A team led by David Brunckhorst at the Institute for Rural Futures used a range of variables to determine boundaries that incorporate the nature of environment and society rather than mere historical accident, to shed light on the difficulties in understanding how a 'region' for natural resource governance might be defined. Given political and other investments in current boundaries, it may be that no administrative boundaries will be redrawn to match these eco-civic regions. Even so, insights from the team's work provide powerful reasoning for the better design of policies, programs and management structures. And we have an objective antidote to hydro-determinism and the dominance of catchment management, which assumes that the environment, communities and economies think and act as whole catchments (they rarely do).

Background

The ecological sustainability of future landscapes depends on a range of institutions, as does their capacity to support human communities and resource uses. 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. Resource management agencies at state and federal levels have various administrative regions. More recent attempts at integration have been made to extend this to decision-making bodies based on river catchments (for example, integrated catchment management). If citizens are to participate in regional resource management in ways that



Figure 1: Eco-civic regionalisation for New South Wales (Levels 1–3)

are meaningful to them, both the landscape units being discussed and the jurisdictional boundaries that define regions need to be meaningful. The different levels of community and political participation in decision making and, more broadly, inter-connected ecological systems and resource use need a 'mutual

geography' that brings together shared natural resource issues and their stakeholders at appropriate scales of engagement (see Figure 1). This project has developed a theoretical base and associated spatial mapping techniques to explore how boundaries for resource management regions might be identified.

Methodology

This work was guided by three considerations that are believed to be important if regional resource management is to be meaningful to the citizens involved:

- ▶ 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 choice of management region maximises the real 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 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.

The project aimed to catalyse and facilitate participative innovation towards more reflexively competent institutions and ecologically sustainable resource governance, through examination



In the field workshop bringing stakeholders together to discuss NRM

Photo: James Morris

of the combined influences of social and ecological functions operating broadly across regional landscapes.

This required:

- ▶ development of new methodologies for institutional mapping and spatial analysis of social influences, the areas of greatest collective interest and interaction for governance by local communities, across landscapes
- ▶ development of new approaches and methodologies for spatial integration of ecological landscapes
- ▶ new techniques to delineate potential regional management zones reflecting combined social ecological influences
- ▶ exploration with key agencies and communities of 'operational' zones of management (regions) for potentially new or adapted institutional forms for resource governance.

As part of the methodological development, the research team delineated a series of nested 'eco-civic' resource management regions for 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 and local government service delivery.

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

geographically defined the functional zones 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 three inter-related (nested) scales, while minimising loss of civic interest as indicated by social survey.

need to be able to scale up from local to broader regional contexts

A social survey with a range of questions and maps was developed, in a data form capable of mapping on a GIS, to work out areas of interest to residents and find out 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. 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 increased the required sample more than five-fold, resulting in the survey being mailed to some 10,500 residents of northern New South Wales.

Key findings

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

of community interest and valleys of lesser interest. Within a broad, high level, a community catchment plus two sub-catchments could be delineated—providing 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. Effective resource governance and NRM, according to our principles, requires maximising the community catchment areas of residents' interest (expressed in the mapping of the survey returns) with a similar ecological resource base.

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. We then

Implications for policy

While adoption and application of this new method to redefining regional NRM frameworks (along with local government and other service delivery) might seem a very big step, it is not impossible. This is because 'eco-civic' areas maximise capture of the area of interest to most residents and communities and are therefore more likely to be politically palatable in terms of reform implementation.

Feedback via media, radio talkback and other stakeholder networks has also indicated a tremendous willingness by 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).

Where an NRM and governance region is located is very important. Overall, the LGAs in the study area captured less than 10 per cent of the landscape of interest to residents. This simply means LGAs are in

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,

possibly across the top of several catchments. Policies, programs and community action could be planned to 'nest' up towards the ultimate, whole catchment targets. Such regional frameworks may serve in the future as a common framework for federal and state NRM programs, as well as state and local government service delivery.

boundaries must change — they need to be in the right location

the wrong place. In fact, LGAs perform worse than a completely random allocation of boundaries (as governance regions) would. It is not surprising, either, that state government agency regions perform so poorly, because such administrative regions are usually larger groupings of LGAs.

Purely biophysical regions also rate quite poorly (for example, the Interim Biogeographic Regionalisation of Australia, catchments and catchment board areas). Catchment boundaries and local

boundaries must change— they need to be in the right location. The methodology developed here is applicable to any non-metropolitan area. It could be valuable in determining better regional arrangements for NRM policies and programs such as the Natural Heritage Trust.

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,



Project reference: UNE35

Project completion: 2002

Fact sheet: forthcoming

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Social and institutional implications of landscape and land use change

Jeanette Stanley



The expansion of pine plantation across the grazing landscape in Adjungbilly, NSW
Photo: Jeanette Stanley

Jeanette Stanley focuses on the local scale where people live, work and engage with the local environment. She examines the impacts on these communities, and the issues that arise when policy decisions made at regional, state or national scale result in changed landscapes, altered local and regional economies, and different

social dynamics. Past experience suggests we are not good at predicting such impacts, or at negotiating the introduction of change constructively and inclusively. Drawing on an array of literature and on fine-scale empirical work, Jeanette's research suggests that we can do better, and provides an operational framework for doing so.

Background

Land use change is occurring across rural Australia with significant implications for rural communities, socially, economically and environmentally. Some of this change is the result of explicit government policy—*policy-driven land use change*—that has the potential to change landscapes, alter local and regional economies, and change social dynamics. In some cases, the changes that take place cannot be absorbed by local communities, who may not have the resilience or 'stocks' of social capital to cope with and adapt to them. Hence, policy-driven land use change may threaten the social and economic sustainability of surrounding communities.

Alternatively, the change may be 'embraced' by the local community—offering economic and social opportunities for communities who may be under pressure from highly variable market and climatic conditions. This research suggests that to some extent the way in which a community receives a policy-driven land use change is dependent on the way it is introduced by the responsible government agency. It therefore proposes a *community land use policy framework* to guide government agencies through a series of steps designed to meet the broad social, economic and environmental needs and aspirations of both the agency and the community.

Landscapes are constantly changing and evolving through natural and human induced processes. One example of a human-induced landscape change is the changing of land uses. In the same way that humans have the capacity to create landscapes of social, economic and ecological value, we also have the capacity to create impoverished and degraded social and environmental landscapes. Human-induced land use changes may be cumulative,

market-driven, cultural or social, or policy-driven. This research project focuses specifically on the latter category of land use change—policy-driven land use change.

It is important to separate drivers of change over which Australian governments and communities have differing levels of control. In cases where little direct control exists, the scope for policy intervention is limited to prediction and mitigation. However, in cases where changes in rural landscapes are a result of explicit, purposeful policies, resource managers are able to manage the change and its impacts, from the conception of the change. They will have control over most aspects of the land use change, including the impacts on the rural community.

conflicting values and needs. Hence, this research addresses a current and increasing challenge by providing a clear framework to begin addressing the complex social, economic, and environmental systems into which policy-driven land use changes are introduced.

Methodology

By synthesising three bodies of literature—public participation, social impact assessment and social capital theory—and exploring two case studies, this piece of research explores the conditions under which policy-driven land use change can contribute to sustainable rural communities. People affected by the changes in the case study areas and people responsible for implementing the changes were interviewed, and a wide

government-sponsored replacement of agricultural land uses with softwood plantations. The way in which the land use change was introduced by Forests NSW and the subsequent impacts are explored.

The second case study examines a rural community within the Bourke district of western New South Wales. Since 1996 the NSW National Parks and Wildlife Service has purchased three former grazing properties to create Gundabooka National Park, totalling over 60,000 hectares. The land use change in this region is far less visually obvious than that of Adjungbilly, but still represents a significant change in management philosophies, goals and priorities, from that of economic production to that of ecological conservation. In contrast to the Adjungbilly case study, the Bourke community has responded positively to the land use change. It is therefore possible to learn from this to better inform the management decisions and philosophies that influence future land use change decisions.

Key findings

To introduce policy-driven land use change in a way that contributes to a community's long-term sustainability, and offers economic and social opportunities for the community, this thesis has proposed, through the

it is important to separate drivers of change

While there may be clear imperatives motivating policy-driven land use change, governments are essentially intervening in complex social, economic and environmental systems. It is therefore a responsibility of governments when introducing land use change to ensure that the land use 'fits' the community—environmentally, socially and economically. However, governments lack a simple process for how to manage

range of secondary data sources were examined. The primary and secondary data were compared and contrasted to develop policy recommendations for governments introducing land use change.

The first case study examines the Adjungbilly community near Gundagai and Tumut in New South Wales. Predominantly a grazing community, the major change in the region is the active,





The former Belah homestead on Gundabooka National Park, Bourke, NSW
Photo: Jeanette Stanley

examination of theoretical, empirical and case study evidence, a community land use policy approach, combining social impact assessment, public participation, and social capital-enhancing strategies into a practical policy framework. This framework is encapsulated within five management philosophies:

- ▶ place-based management philosophies as opposed to the application of generic agency policy
- ▶ managing land use change at a local and regional level
- ▶ adopting a triple-bottom-line approach
- ▶ adopting a participatory approach
- ▶ whole-of-government decision making.

These management philosophies should lay the foundations for all decision making surrounding

land use change. By planning for change, and introducing it in a sensitive manner, communities and governments can influence the social outcomes and the ongoing sustainability of communities.

The project examines the two case studies of policy-driven land use change to compare and contrast the diverse management approaches adopted during their introduction. The first case study used few components of the community land use policy approach, while the second unintentionally followed large parts of the approach. The outcomes for the respective communities were vastly different, with the first community actively opposing the change, and the latter community embracing the change, demonstrating how such an approach can improve outcomes for the community, and hence also the agency.

Implications for policy

At present, government agencies do not adequately consider social and economic needs of communities when introducing land use change. This is not because they do not care, or that they have little regard for the value of rural communities; rather, it is because they do not know how to incorporate social and economic needs into land use decision-making. The complexity of social and economic systems and their relationship with natural systems acts as a barrier to the effective integration of social and economic considerations into land use decisions.

The value of this thesis is that it offers decision makers a way forward by providing a framework to guide decision making surrounding land use changes with consideration of social, economic and environmental needs of both the community and the government agency.




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Fact sheet: website

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Resilience — enhancing local government capacity in natural resource management

Su Wild River



Dieback and weeds—Tasmania
Photo: Su Wild River

Su Wild River engages with part of the institutional landscape highly familiar to Australians, which has statutory competence and democratic legitimacy, but is startlingly overlooked in natural resource management (NRM) literature and policy—local government. Not simply highlighting the importance of local government, Su advances on two crucial fronts: why it is overlooked, which we must know before we can decide what to do, and what can best be done to better connect local government to other scales of information, policy and management.

Background

Local governments and their environmental contributions are poorly understood by other levels of government and research communities. This is partly because of the extreme diversity among Australia's 700 or so local governments. It is also because of differing perspectives on the roles of local government. Local governments are constituted under state government legislation, and derive their statutory capacity from the states. As a consequence, state government officials legitimately think of local governments as creatures and servants of the state. But local government perspectives contradict this, focusing on the democratic election of councils by local communities, and a resulting primary commitment to those communities. Local government officials rightly think of themselves as creatures and servants of the local community (Wild River 2002).

'outside-in' research to find better ways of communicating broad environmental knowledge to local government

The differing state and local government perspectives on local government roles frequently undermine environmental initiatives involving local governments, and are the analytical basis of the *Resilience* project. *Resilience*

sets out to improve the understanding that local governments have for other spheres' priorities, and that other spheres have for local government. Its two main strategies are 'outside-in' research to find better ways of communicating broad environmental knowledge to local government, and 'inside-out' research to learn local government priorities and communicate them to the other spheres.

Resilience is working with 28 local governments across Australia—four from each state and the Northern Territory. Regional agencies are also involved. All of the participating local governments face serious, multiple NRM challenges, and part of the research approach is to identify and work with neighbouring pairs, where neighbours share many of the same NRM challenges, but have differing levels of engagement in NRM programs.

Methodology

Resilience drew on the results of the National Land & Water Resources Audit to identify local governments facing serious, multiple NRM problems. It selected a subset of 18 of the Audit maps for this work, based on a set of NRM indicators that local government had identified as important to them, and that are also recognised as important by the Australia/New Zealand Environment Council.

The maps show the extent of water, soil, biodiversity, climate and human settlements problems. These maps were overlaid on local government boundaries. A rating was applied indicating which of the NRM problems was more or less significant in each of Australia's local government areas (excluding compact-urban local governments). The resulting map indicates which local governments face multiple, serious NRM problems. Local government associations helped to identify the degree of engagement among those local governments facing NRM problems (Figure 1).

Resilience produced NRM information kits tailored to each of the participating local governments and the regional NRM agencies they work with. The kits included the NRM challenges map, together with a set of one-page fact sheets highlighting each of the individual Audit maps and presenting summary

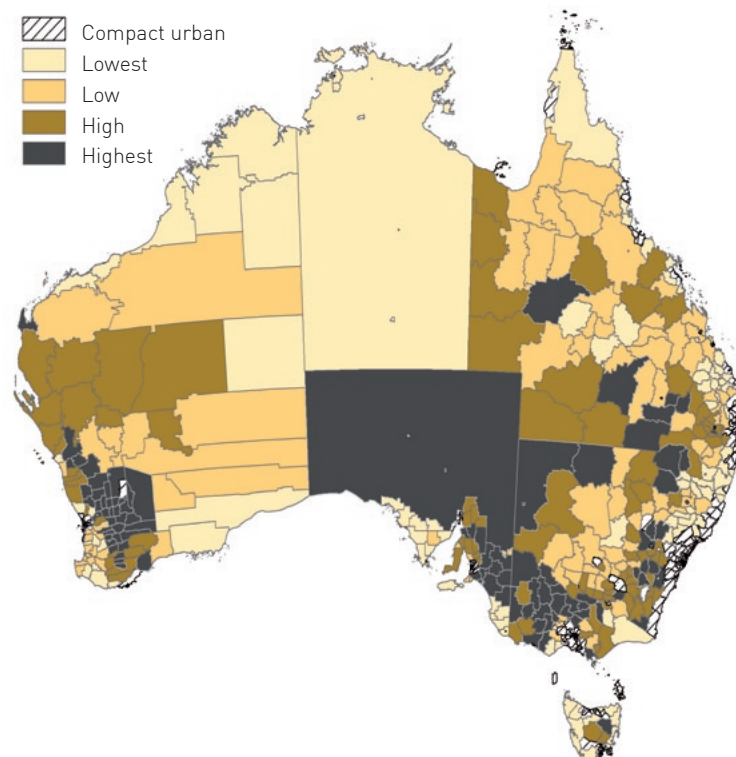


Figure 1

Compiled by Su Wild River as part of a Land & Water Australia project. The NRM issues classification is a composite indicator from separate indicators related to inland waters, soil, biodiversity, climate and human settlements, all weighted equally. NRM information is from the National Land & Water Resources Audit 2001–02. Local government boundaries are from Australian Bureau of Statistics 2001.

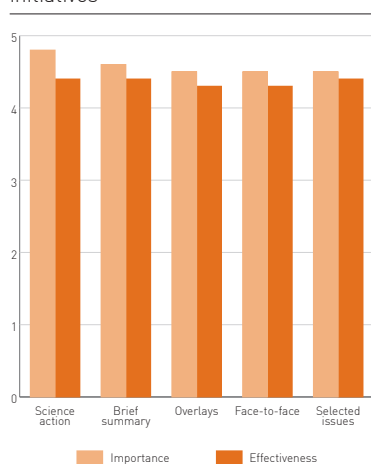
information about each key NRM indicator–issue. Also contained in the kits was published information on the key NRM issues that were identified on Audit maps as being important in that local area. The kits included many Land & Water Australia publications. In-depth interviews were held with officials from each participating local government, including chief executive officers, councillors, managers and officers with an interest in NRM issues. Relevant staff from regional NRM agencies were also interviewed. Most of the questions were

qualitative, but a gap-analysis survey quantified participants' responses to the kits. This technique explores the gap between the importance and effectiveness of an initiative, using a 1–5 scale for each.

Key findings

Answers to gap analysis questions about the kits are shown in Figure 2. Results were extremely positive, with all features identified as both important and effective by nearly all respondents. There is clearly a place for tailored and targeted NRM information that provides detailed scientific information

Figure 2
Importance and effectiveness of NRM initiatives



to local governments and communities on issues that are important to them. Respondents liked the scientific strength and action-oriented nature of the published NRM information that was included. Important aspects of the brief summary sheets included their colourful, visual messages with internet links to further detailed information. These features made them suitable to include in council submissions that highlight the need for action on specific NRM problems.

locate their own area on the maps. Face-to-face delivery of this NRM information was well received, but not considered essential. Local government participants objected to getting large volumes of brochures from other spheres of government, when the issues were too generic to really grab the attention of local people.

The selected subset of all NRM issues that received attention in the kits was welcomed, although ideally this would be a first step in an ongoing information exchange between the spheres. Processes that enquire about what local governments are interested in, then provide that information, while also suggesting issues that are known from outside to be important, would work well. Information does not need to be simple to appeal to local people. It is more important for it to target the issues that matter most to them, and some of the more technical reports contained in the CDs

The *Resilience* 'inside-out' analysis research will provide a qualitative analysis of all interview results. Some of the key issues being investigated are:

- ▶ local government perceptions of key NRM issues, and how they learn about them
- ▶ natural roles for local government in NRM, including water and weed management
- ▶ the importance and effectiveness of coordination and consistency between spheres of government on NRM initiatives
- ▶ local government views on the strengths and weaknesses of NRM initiatives led by other spheres
- ▶ what factors are important in helping and stopping local government engagement in NRM initiatives
- ▶ what factors contribute most to resilience in local areas facing significant NRM challenges.

Implications for policy

The information gathered from this part of the research project will provide further insights into how we can build capacity in both local governments and the organisations that wish to interact with them to improve NRM outcomes.

areas with the most serious, multiple NRM problems rarely look degraded

The overlays referred to in the interviews were simple overhead transparencies showing the local government boundaries that can be overlaid on the NRM maps included in the kit, as it was important for local governments to be able to

that were provided were of great interest to local practitioners. Participants were impressed by the large range of readily accessible information available through Land & Water Australia's online ordering system.



Productive crop but degraded stream
Photo: Su Wild River



Erosion and turbidity—NSW
Photo: Su Wild River



Aquatic weeds—North Queensland
Photo: Su Wild River

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Making the connection between water and sustaining Indigenous cultural life

Jessica Weir

Jessica Weir explores an issue unforgivably ignored in water policy and management until recently: Indigenous understanding and use of, and rights to, water. The research goes beyond describing a gap in understanding and moves on to implications and models for moving forward. The recognition of Indigenous water issues in the National Water Initiative is an advance, but the lack of capacity to progress this recognition in water planning and allocation remains a challenge. Jessica points to ways in which this can be done.



MLDRIN delegates and observers at a MLDRIN meeting, Wamba Wamba/Barapa Barapa shared country, Deniliquin (NSW), July 2004. Photo: Jessica Weir

Background

Negotiating Indigenous rights to water in the Murray-Darling Basin must be one of the hardest negotiation spaces in natural resource management (NRM) for Indigenous peoples in Australia. The water is of enormous economic value, particularly for agricultural production, and access to water as an economic resource has become more

competitive since extraction rates have ensured that the water supply is finite in the short term. The water is also severely degraded, carrying massive salt and sediment loads, and over-consumption of the water has changed and reduced the flooding regimes critical for the ecological life adapted to the variable water flows.

The degradation of the rivers places increasing pressure on water allocations, as government policy prescribes that more water be allocated for the environment to protect the health of the rivers. Water issues are now a national priority, as evidenced by the development of the National Water Initiative. Despite Indigenous water concerns making an entrance in government thinking in the National Water Initiative, the context of competing claims to a finite resource makes scarce allowance for the rights arguments of Indigenous peoples. Indigenous peoples in southern Australia are further marginalised in water debates by authenticity formulas such as native title which contest the legitimacy of their identity as traditional owners.

This research project has only been possible because of a research agreement that was successfully negotiated between myself and the alliance of traditional owners: the Murray Lower Darling Rivers Indigenous Nations (MLDRIN). MLDRIN was formed in 1999 to establish a governance structure for the traditional owners to increase their involvement in the water debates held in broader forums, and to strengthen the capacity of traditional owner groups themselves to engage with water law and policy. MLDRIN is an alliance of ten Nation groups from along the Murray River and its tributaries, currently: the Wiradjuri, Yorta Yorta, Taungurung, Wamba Wamba, Barapa Barapa, Mutti Mutti, Wadi Wadi, Latji Latji, Weragaia, and Ngarrindjeri Nations.

The traditional owners navigate complex arguments about rights and identity in their negotiations with state and federal governments, and the multi-jurisdictional

with Indigenous peoples, and an essential part of ethical research practice. The research agreement has informed the methodology of this project, which is

profound importance. For the traditional owners, country is where they practise and pass on, revive and reclaim, their heritage, their identity, and their spirituality. The massive ecological changes that have occurred along the Murray, the Darling, and their tributaries, have directly impacted on the identities of the traditional owners. For example, going fishing, collecting bush foods and medicines and collecting grasses for basket weaving are all activities that are difficult to do if the fish, bush foods, medicines, and grasses are no longer present. The Elders in particular have seen dramatic changes over their lifetime, because the largest water storages were only built in the last 70 years.

Now, without the life of country that was sustained by the rivers' flow, the Elders are unable to pass on to their children and grandchildren what they

examines how the traditional owners communicate a holistic philosophy about water

Murray-Darling Basin Commission and Ministerial Council (see Morgan et al. 2004). The research looks at how the traditional owners handle these negotiations, and the sorts of arguments they make about why they should have greater involvement in water policy and planning. It also examines how the traditional owners communicate a holistic philosophy about water within a management and policy context that would otherwise separate nature and culture. The intercultural setting within which the traditional owners negotiate has fostered the creation of new concepts in NRM, including the concept of 'cultural flows'. This concept is a communicative device which could be implemented into policy and planning to recognise the culturally different relationship that the traditional owners have with the water.

Methodology

Establishing and maintaining a research agreement is a critical part of working

essentially a multi-sited ethnographic study of the alliance, within the discipline of human geography.

Key findings

The central structure and principles of MLDRIN, concerning the responsibilities the traditional owners have with their country, is formed from the resilience of the traditional governance structures held prior to colonisation. While much has changed for the traditional owners since colonisation, connections to country continue to hold a



Yorta Yorta children, Barmah Forest, Yorta Yorta country, north east of Echuca, Victoria. Photo: Jessica Weir



Tidal fish trap made from stones, the Coorong, Ngarrindjeri country (SA)

Photo: Jessica Weir

learnt from experience when they were young. This makes the traditional owners feel that their cultural practice is threatened. This is experienced as a present-day loss of cultural heritage.

Within this context, the traditional owners seek to

make about contemporary water management, and their vision of the cultural flow, throws into relief the models of NRM that currently dominate the rivers, and reveals the exploitative aspects of these models. The traditional owners are

Implications for policy

MLDRIN is a grassroots example of how traditional owners have developed a form of representation that can engage with NRM bureaucracies at a broader scale, beyond the Nation group. In the era following the abolition of the Aboriginal and Torres Strait Islander Commission, examples of Indigenous governance arrangements such as this one provide a valuable model for other Indigenous peoples and governments to consider as a way of overcoming the inherently complex process of engagement between Indigenous and state governance structures.

If natural resource managers are interested in the longer-term sustainability of their agreements with traditional owners, then those agreements need to be accountable to the governance structures and processes that the traditional owners respect. Yet piecemeal representation of

piecemeal representation of Indigenous peoples... is played out again and again

protect what has not been destroyed from further damage, and to try to return water to important areas in country. Rather than denying the loss that has occurred, or succumbing to grief over lost connections, the traditional owners acknowledge the loss and are doing something about it. The formation of MLDRIN is a political response by the traditional owners to their desire to care for the river country. The criticisms the MLDRIN delegates

speaking of a much more connected appreciation of the rivers, embedded within networks of relationships, and this conception is also where ecologists are already headed in their theorising. By listening to the MLDRIN delegates, we can learn about an alternative relationship with the rivers which respects the life-sustaining flow of water.

Indigenous peoples on NRM boards is played out again and again in the creation of new NRM structures, as was the case, for example, with the local water management committees in New South Wales, which had two positions allocated for Indigenous representation (Behrendt & Thompson 2003, pp. 52–6).

Initiatives such as MLDRIN seek to avoid the problems of this limited form of engagement by providing an organised and effective representation which can operate at a broader scale, and is still responsible to the governance structures of the Nation groups. This research project will record their innovative approach to engaging with government on water issues, and reveal how the traditional owners are challenged to articulate their culturally different relationship with the rivers at the complex, competitive, intercultural negotiation table. Importantly, it will also show how an Indigenous perspective is enhancing Australia's water conscience.



MLDRIN delegates on a 'visit to country'. This visit was to axe grinding grooves by the Macquarie River in Dubbo (NSW), October 2004. Photo: Jessica Weir

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Catchment and water planning in New South Wales and South Australia

Carla Mooney

The law is fundamental to modern governance, yet is disturbingly absent in much natural resource management (NRM) research and policy. Carla Mooney is one of the few researchers who bring understanding of the importance, pervasiveness and limits of the law into engagement with NRM policy, practice and thinking. She emphasises the inevitable importance of regulation and especially its implementation, the crucial need to coordinate NRM with land use planning, the value of comparative work on the concurrent policy experiments that run in federal systems, and the problem of poorly constructed statutory instructions to decision makers.

Background

Catchment and water planning has become commonplace across Australia, with almost all the states either amending existing legislation, or introducing new legislation to provide a framework for planning and implementation. It has been widely argued that this type of planning will contribute to improving the sustainability of land use across catchments. Unlike land use planning, which has a focus on new land uses, catchment and water planning is concerned with existing land uses. It embraces



Regulation is one way of protecting waterways like this one, but is it effective?
Photo: Alex Meehan

a very different approach to planning in that it is generally required to identify the parameters of sustainable use and engage a community process to define a framework for decision making about access to natural resources and priorities for government investment in landscape repair. It is also said to contribute to the integration of NRM.

Methodology

The context for this research was a detailed examination of the environmental, social and economic bottom line of agriculture; the influence of the attitudes of individuals on the environment; the historical role of governments in the development of agriculture; the contemporary role of the Australian Government in NRM; and a critique of the broad pattern of natural resource, environmental and land use planning law at the state level. A 'case study' method was used, with the following theoretical challenges examined:

- ▶ to identify the elements of a legal approach to catchment and water planning which would operationalise the principles of sustainability

- ▶ to develop an analytical framework through which to explore the potential of catchment and water planning for the development of an effective regulatory strategy.

We examined the relevant literature to extract what the key elements of a planning framework should be. These were defined as: priority to the environment, inter- and intra-generational equity, precaution, integration, adaptation and participation.

In addition, we analysed and explored the legal and administrative arrangements for catchment and water planning in South Australia and New South Wales

Key findings

Both New South Wales and South Australia have introduced significant reform to the decision-making framework and adopted a procedural approach for planning that incorporates (to a greater or lesser extent) the elements of ecologically sustainable development (ESD). There has clearly been an evolution in the approach to decision making about natural resources. Access to resources is no longer determined on the basis of a simple assessment of availability. Now a decision-making process, which looks at a range of environmental attributes and engages a spectrum of values, forms the basis for this determination.

The conclusion drawn from the literature survey on regulatory (re)design was that the context and manner in which regulation is designed can be critical to its effectiveness. Rather than designing solutions themselves, regulators need a process to generate solutions, build a consensus for

change, recognise the multiplicity of interests and values and design multi-instrument responses that feature flexibility and recognise variety.

A strong statutory environmental priority can be

rather than designing solutions themselves, regulators need a process to generate solutions

undermined by a contest between uncertain science and more certain information on social and economic impacts, particularly when there are inadequate tools to facilitate change. Decision making in these circumstances is better located at one remove from resource users who are directly affected, and should represent non-consumptive interests effectively.

The nature and extent of environmental problems in Australia generally, and in these two catchments specifically, makes it evident that more is required than constraining resource use to the current level. In many instances environmental repair and restoration is necessary in order to maintain the long-term integrity of ecosystems. For this to occur, both vision and, in many cases, long time frames will be necessary. Neither state has planning frameworks that include these elements.

Legislative arrangements for catchment and water planning in both states have the essential procedures necessary for adaptive management in place—the establishment of management goals and targets, and requirements for performance monitoring and review. The case studies show, however, that there is insufficient information on which to base a review of performance and thus to adapt management. Goals are too broadly defined, targets are poorly specified and indicators of performance too general in nature.

Community participation takes both direct and indirect forms. In South Australia, catchment water management boards are made up of 'expert' community members. In New South Wales, catchment boards and water management committees are made up of departmental representatives and representatives of identified stakeholders. In both cases there is public consultation about plans, although the provisions are more formalised and expansive in the SA legislation.

The main potential benefit of the 'expert' approach employed in South Australia is that it separates the representation of values from particular vested interests. In contrast, New South Wales has adopted the potentially more politicised approach of 'stakeholder' representation. Putting stakeholders together with government representatives on committees allows for a dynamic exchange of information and value change. It does mean, however, that the vested interests are represented at the table and the equitable representation of the range of values requires careful stewardship. The range of interests represented in New South Wales is more expansive than is the case in South Australia.

Local councils have key responsibilities in the area of land use planning and environmental regulation, including aspects of water quality. Yet there is no clear relationship between catchment management and planning and local council environmental regulation or land use planning.

The case studies also produced two different messages about land use planning. In New South Wales there is, effectively, no strategic planning by state government for rural areas. The relationship between land use planning and catchment and water planning barely exists. By contrast, in South Australia there is substantial effort put into strategic land use planning. However, apparently these plans are drawn with almost no reference to the planning occurring at the catchment level. In both states there would appear to be an uneasy relationship between land use and natural resource planning.

The relationship between land use planning and water planning needs to be carefully developed to ensure the effective delivery of NRM outcomes. In both states there was inconsistency



Coordinating NRM and land use planning is critical to protecting areas such as this one
Photo: Alex Meehan

between the prescriptions of the water and the land use plans. While land use plans provided for further development, water plans concluded that the resource was already overdeveloped.

The case studies also showed that there is generally a separation between plans that manage and plans that regulate. We need to both lever and drive change, provide incentives and disincentives, induce and enforce. Linkages between the two approaches are essential. For effective change both management and regulation need to aim at achieving the same outcomes and reinforce each other.

The plan-making process in South Australia and New South Wales involves a relational shift that brings together a range of parties to explore problems and develop solutions. This would improve understanding of problems and possibilities and educate all parties about their responsibilities and constraints, and so build a consensus for change. Such a shift could play a crucial role in empowering the regulated community to devise solutions to environmental problems rather than having them imposed from above. Importantly, it could improve decision making by drawing diverse information together and exposing it to expert and community scrutiny.

There is broad agreement about the direction of NRM between levels of government. But the duplication between Australian Government programs (such as Natural Heritage Trust 2 and the National Action Plan) and state catchment planning programs can result in different priorities emerging. This could well dilute the effectiveness of the respective planning and management initiatives.

The key idea that emerged from the review of regulatory (re)design literature was that regulation could be improved if legal processes were designed to facilitate learning and value change. The approach would incorporate procedures that, starting with the 'problem',

is not sufficient to deliver the inter-sectoral approach that is required.

The administrative arrangements in South Australia have been shown to be relatively effective in delivering outcomes on the ground through direct investment, partnership arrangements, targeting education programs and so on. They do, however, constitute in effect another layer of government. While arguably more responsive to the community, their existence nonetheless generates its own coordination problems. In this regard the unclear relationship between catchment water management boards and local councils and the complexity of the issues around the regulation of water-affecting activities is a case in point. Further the potential for duplication of programs between the boards and government agencies was drawn out in the case study, particularly in relation to water quality management in the Mount Lofty Ranges.

the relationship between land use planning and catchment and water planning barely exists

Implications for policy

The relationship between democratically elected local councils and catchment and water management bodies appointed by a state government is a critical issue. There are compelling arguments for the integration of the plans produced by both bodies. However, the legitimacy of the respective approaches to participation, and the impact this has on relationship between plans, needs to be considered. The representativeness and legitimacy of appointed regional NRM groups warrants closer examination.

would allow the levers and drivers of change to be identified and approaches that target a mix of instruments to be designed. The broad engagement of the community through a planning process in designing policy instruments would offer incentives to change and broaden extrinsic capacity based on existing social institutions.

The case studies highlight the need for effective administrative arrangements for plan implementation. It would seem that 'coordinated administration', which the NSW approach exemplifies,



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THIS GOES WITH THAT...IN THE APPROPRIATE SETTINGS

Michael Lester

In response to policy-maker and management needs for practical applications of research findings, more and more new and innovative policy instruments are being developed within the natural resource management (NRM) toolkit, which in itself is becoming more complex to use. Of particular note has been the emergence of new market-based approaches and instruments, which are often seen as efficient alternatives to more traditional, regulatory command and control approaches. At the same time, community attitudes have been highlighting the importance of weighting and integrating non-market, often qualitative, values alongside more quantitative, monetised values.

The practical challenge now is for policy makers and land managers to know which tool or combination of tools to use, at which scale, with what supporting structures, for what problems, as perceived by which stakeholders, and with what impacts, efficiencies or unintended consequences.

The seven research projects brought together in this section provide practical insights and innovative approaches to the contemporary policy instrument design and implementation challenges facing NRM management. They sketch the frontiers of our current knowledge and point the way forward for further development and refinement of our tools and techniques.

Decision points for land and water futures

Michael Dunlop

Michael Dunlop explores long-term agricultural sector restructuring that may occur over the next 50 to 100 years. He uses a planning approach that identifies key environmental uncertainties and drivers of change drawing on historical data from the last 140 years and a series of future scenarios. He argues for a response that seeks to achieve, over several decades, the structural changes necessary to reverse past environmental damage while at the same time providing new opportunities for struggling farmers and reducing the burden of structural adjustment. This approach can inform decision-making at strategic points in future management.



A key consideration in scenario planning is how environmental values and protecting ecosystems are factored into future NRM. Photo: Angus Emmott

Background

Australia is at a crossroads in relation to the sustainable development and management of its natural resources. Past land and water management practices and policies have been dominated by short- to medium-term agricultural production and social imperatives. These decisions have been well intentioned but poorly informed about longer-term environmental and production implications.

A continuous (but unsustainable) expansion in the use of land and water resources as well as improvements in technology have masked the significant declines in landscape functionality that are now evident and are of concern to a wide community of interests.

Governments and industry have made substantial investment in research and development and data collection to improve the management and use of Australia's land and water resources. However, in the absence of a framework to understand the drivers of change and the trade-offs involved, consideration of these issues risks being increasingly polarised, narrowly focused and divisive.

The project addresses these problems by providing a national-scale analysis of current and past land and water uses as well as the forces likely to influence future production and resource-use decisions based on 140 years of qualitative and quantitative data. It explores the key environmental uncertainties and drivers of change as well as the opportunities and challenges that Australia faces in the longer term.

Methodology

The project developed an analytical framework that combines traditional scenario planning and CSIRO's national physical economy simulation. This is intended to assist managers and governments in exploring possible futures for Australian landscapes and the implications of alternative policy options.

The Australian Stocks and Flows Framework (ASFF)

completely new calibration to develop a complete and consistent 140-year historical database of agricultural land, irrigation, crop and animal production and land degradation.

Using the revised ASFF module, three alternative land and water scenarios were developed, each testing aspects of the scenario planning approach. A large number of drivers of future

Key findings

The following scenarios are an exploration of possible futures, not a set of alternative choices. A thorough examination of the consequences of each scenario will shed light on how we might increase the positive aspects and reduce the negative aspects of each, thus contributing to long-term strategic planning in an uncertain world. The



Salinity, an NRM issue that is motivating regional communities to consider alternative agricultural practices. Photo: Angus Emmott

is a system for conducting integrated analyses of the Australian physical economy and has been designed specifically for exploring long-term (over 50–100 years), economy-wide and national-scale issues. This project included a comprehensive revision of the ASFF agriculture module, guided by expert workshops on Australian agriculture and landscape function, and experience gained developing an initial set of prototypes. The revision included a

land and water use were reviewed and assessed. This large set of drivers was distilled into three scenarios. Each scenario resulted from a different set of reactions to the drivers; they represented a wide range of values and outcomes for Australian agriculture, the environment and society. The agricultural aspects of the scenarios were then quantified and explored using the ASFF, and implications drawn both from the scenarios themselves and from the process of developing them.

scenarios are markedly different from each other and from the present, but the changes are spread over 50 years, with most rates of change no faster than those that have been experienced at some time in the past.

'Water, water everywhere' is a scenario that recognises that rainfall is a vast and largely wasted resource for dryland agriculture and that more natural flow regimes are required to restore river and wetland health. The scenario sees retirement of

11 million hectares (Mha) of low productivity croplands and sown pastures in southern Australia, and 9 Mha expansion of cropping and intensive pasture production across northern Australia. Better use of soil water and increased inputs lead to substantial increases in yields and crop production. A reduction of 40 per cent in the area irrigated, and moderate increases in water use efficiency, lead to increases in environmental flows of more than 6600 gegalitres (GL). Dryland salinity and river salt loads continue to increase, but increases in environmental flows reduce salt concentrations and greatly increase river health in most stressed river systems.

'Give and take' is a scenario that sees substantial value in continuing to shift the emphasis of agricultural production from low-value,



Landscapes like these prompt people into thinking about different management scenarios that better manage our NRM resources for future sustainability
Photo: Kylie Nicholls

Australia. Water extraction in northern Australia remains well within estimated sustainable yields. In southern Australia increases in water use efficiency from restructuring of irrigation systems and renewal of aging infrastructure provide sufficient savings to supply the increases in

values people see in our landscapes, and seeks to take regional Australia beyond its dependence on European-style agriculture. Under this scenario, the area of rainfed crops and sown pastures falls by 48 per cent (to about 30 Mha) with 19 Mha revegetated for forestry and conservation, while the area of irrigated land falls by 60 per cent, providing 8700 GL for additional environmental flows. Farming systems on the remaining cropland are gradually redesigned to better suit Australia's poor soils and variable climate, leading to substantial decreases in land degradation and continuing increases in yields. Despite substantial reductions in the area of most crops, production continues to exceed domestic demand by a factor of two or more for all commodities.

In this scenario, farmers increasingly make their livelihood from both managed and native ecosystems through value-adding, new products (possibly including energy, industrial and pharmaceutical products) and services (including carbon sequestration, clean water, biodiversity conservation and tourism). Regional economic growth is also enhanced through the 'tree change' phenomenon and by expansion of new non-rural businesses attracted by increased amenity, low-cost work environments and information technology.

scenario modelling capability to assist governments to develop and test alternative future policy options

highly variable dryland production to high-value irrigation. About 23 Mha of dryland crops and sown pastures are retired, with 15 Mha used for forestry or converted to native vegetation. The area under irrigation increases by about 2 Mha with just over half of this increase spread across northern

irrigation and about 800 GL of additional environmental flows. The scenario sees substantial reductions in land degradation rates, but river health remains an issue in many catchments in southern Australia.

'Brave new regions' is a scenario that recognises and capitalises on the diverse

Implications for policy

The historical period and the scenarios highlight the fact that change has been, and is likely to continue to be, a significant feature of Australian landscapes. There are substantial benefits to be gained by recognising this and developing strategic policies that seek to maximise the long-term opportunities provided by change rather

of landscape function. This has masked the effects of sustained losses of landscape function in older lands. When new land stops being added at this rate, the proportion of degraded land will increase dramatically unless future rates of loss of landscape function are reduced substantially. Continued intensification of cropping (for example, less pasture) could

The main legacy of the project is to integrate a vast array of national land and water data into a comprehensive and coherent analytical framework that provides a 100-year future scenario modelling capability. In looking to the future, the project has developed an analytical framework/ scenario modelling capability to assist governments to develop and test alternative future policy options and to comprehend the environmental, economic and social implications (trade-offs) that may be associated with each option. This information can assist governments in determining how to most effectively support and guide stakeholders towards achieving the best long-term outcomes as well as how to anticipate and manage any resultant short- to medium-term socio-economic disruption and impacts on rural and regional communities.

change has been, and will continue to be, a significant feature of Australian landscapes

than resisting change to eliminate short-term costs. For example, over the coming 50 years the continuing cost-price squeeze will inevitably lead to structural changes in agriculture. While this could be seen simply as a problem to be mitigated, a strategic view might see substantial opportunity for achieving, over several decades, the structural changes necessary to reverse losses in landscape function and river health. Furthermore, addressing these environmental issues could provide better opportunities for struggling farm businesses, thereby reducing the burden of structural adjustment.

Due to ever-increasing rates of addition of new agricultural land over the last 140 years, about half of Australia's cropland and sown pasture has always been less than 35 years old and relatively unaffected by loss

exacerbate this threat.

Despite the fact water resources in many catchments in southern Australia are over allocated, there is huge scope for growth in the value of the irrigation sector, return of significant volumes of water to the environment, and resolution of many urban water supply issues. In essence, southern Australia has a massive water allocation problem, not a water scarcity problem.

The scenarios suggest that achieving long-term benefits would require high-level coordination to ensure that the benefits and costs of change are spread evenly across the community, and that developments in different sectors work together to increase the possibility of gaining maximum environmental and economic benefit from the opportunities that change may present.



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Arrangements to enhance the effective use of incentive mechanisms in natural resource management

Sarah Simpson and Peter Chudleigh

Sarah Simpson and Peter Chudleigh look at how incentive mechanisms can be effectively applied at the regional or local scale to effect changes in land management practices. This requires using a suite of incentives together rather than as individual instruments, tailored to improve local-level understanding and landholder take-up. The authors develop key principles that turn around understanding and working with community aspirations, community capacity and constraints to adoption.

Background

This project explored potential arrangements for enhancing the coordination of policy, planning, incentives and on-ground action that lead to sustainable natural resource management (NRM) outcomes at the regional level. It aimed to develop a set of principles to guide arrangements for the effective use of incentives in NRM. It was carried out in mid-2003, when an increasing effort was being made by Australian governments to encourage the establishment of improved land management systems that resulted in sustainable natural resource management outcomes.

At the time, it was recognised by government that the role of incentives to elicit changes in management was likely to increase in the future. Knowing how to tailor a suite of incentives to improve relevance at the local level was an issue the project sought to address.

The way incentives are chosen, packaged and/or delivered, differs according to the context of the problem and location. The social, economic and cultural aspects of take-up of incentives are often not adequately considered before an incentive is released, yet we know that local and individual abilities to access and apply incentives are governed by these

social, economic and cultural aspects of take-up of incentives are often not adequately considered

factors. The project team considered that these factors would affect the capacity of land managers to understand, access or adopt the incentives on offer and that this may explain why past incentive programs had not delivered the full range of benefits available.

Methodology

By using a participatory research model, designers and developers of incentive packages were brought together with potential end-users to examine the range of factors that impacted on the use of incentives in NRM. The group also considered the impediments that hindered uptake of incentives and put forward recommendations about how they could be overcome. This information was then placed within the context of past and current policies, as well as the institutional structures associated with NRM. A review of the economic instruments currently in use or being considered by government was also undertaken. Finally, the delivery of incentives in the human services sector was reviewed so that comparisons could be made with approaches in NRM.

Key findings

By drawing this information together, nine principles were identified that should contribute to more effective use of incentives in NRM. The principles take account of community aspirations, the social and economic capacity of communities to apply them, and the constraints that militate against adoption of incentives.

- ▶ **1:** Institutional arrangements for delivering incentives must recognise the diversity among land managers and their particular needs and preferences.
- ▶ **2:** Where appropriate, and opportunities arise, 'brokering' group activities and encouraging collective responsibility approaches will assist in working towards landscape-scale change.
- ▶ **3:** Institutional arrangements for delivery of incentives should ensure that information on incentives and their applicability to particular situations is available to land managers.
- ▶ **4:** Community engagement and feedback mechanisms are essential elements in modifying the delivery of incentives and associated institutional arrangements. Early detection of negative community reaction to incentives allows for incentives to be adapted so they are locally relevant.
- ▶ **5:** Community engagement in incentive programs is more likely to be effective if the local community trusts the agency and personnel.
- ▶ **6:** Institutional arrangements for delivering incentives should encompass strategies and resources for capacity-building, including management and technical skills of land managers, to ensure that local actions contribute to regional NRM targets.
- ▶ **7:** To ensure committed staff and a sense of security in the community, institutional arrangements for incentives must include adequately paid professionals with employment security and professional development opportunities.
- ▶ **8:** Effective coordination between government agencies and amongst regional groups is essential to ensure land managers receive accessible and accurate information.
- ▶ **9:** Adequately resourced, rigorous monitoring and evaluation of incentives and their impact is essential to ensure incentives are having the intended outcomes in relation to regional NRM targets.



Workshops have been effective in the identification of incentives relevant to local communities
Photo: Desert Uplands Committee

In addition to these nine principles, the following key lessons were identified from a review of available economic incentives:

- ▶ Not all economic instruments can be used to address all NRM problems.
- ▶ Although there is usually abundant information on the technical design of economic instruments, some basic aspects of the use of an instrument have often not been addressed or adequately documented.
- ▶ Each instrument needs to be tailored to the individual NRM situation it will be used in. Regional and local knowledge is likely to be helpful in this process.
- ▶ Some economic instruments require a substantial amount of information for their successful use. This may make their design and implementation more difficult, especially if input from highly trained specialists is required.
- ▶ The risks involved with each instrument are often not explicitly identified or considered. The body implementing the instrument should be aware of the risks they will bear.
- ▶ Sometimes any level of government or even non-government organisations can develop and/or administer an economic instrument. However, there are also instruments that are best suited to particular management bodies.

Implications for policy

The project provided significant insight to regional bodies and others in considering institutional issues when developing and implementing

their incentive programs. The Queensland Government, which co-funded the project, has gone on to use the findings. All 15 regional NRM bodies in Queensland are now running NRM incentive programs. The project partially led to the development of a number of specific guidelines on incentive mechanisms and the creation of an incentives database in Queensland. (See http://www.regionalnrm.qld.gov.au/planning/state_wide/nap/se05.html)

The key findings from the report have also had an influence on the design and delivery of a number of different incentive programs in Queensland, in particular the use of third party delivery mechanisms when most appropriate (for example, in the Queensland Government's Vegetation Incentives Program, being delivered by Greening Australia), and the involvement of potential participants in mechanism design (an approach being used by a number of regional NRM bodies).



Maps are a useful way to start discussions about NRM
Photo: Desert Uplands Committee




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Related sites http://www.regionalnrm.qld.gov.au/planning/state_wide/nap/se05.html

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If you build them, will they pay?

Incentives for private sector nature conservation

Stuart Whitten

Stuart Whitten observes that in the United States and Europe involvement of the non-government and private sector in conservation is much greater than in Australia. This is due to the use of a wider range of policy instruments within their property rights, regulatory structures, contracting and organisational structures and common law. While Australia provides tax deductions and uses conservation covenants through the creation of statutory trust bodies, Whitten explores policy options that can mobilise the market-based potential to achieve innovative and cost-efficient outcomes, which has not always been fully tapped.

Background

Although three-quarters of Australia's land is privately managed via ownership or long-term lease, natural resource management (NRM) and nature conservation have been dominated by the government sector. It is only in the last 15 years that governments have given serious consideration to mobilising the potential contribution of the non-government sector to conservation. This has reduced the opportunities for private sector capital and expertise to be motivated and involved in natural resource management in Australia. The involvement of the non-government sector in natural resource management in some other countries, such as the United States, is much larger.

Methodology

This project investigated the opportunities and pathways to facilitating non-government investment in nature conservation. It compared the range of conservation tools available to non-government natural resource managers in Australia, the United States and England. Organisations in the United States and England whose work affects, or is predominantly undertaken on, privately owned land were selected to demonstrate the scale and scope of the non-government sector in these countries. One or more representatives were interviewed from each organisation and additional information was collected and supported by secondary material such as annual reports, magazines or newsletters for members and



Inundated micro-channels at Cooper Creek, Queensland. Will the private sector pay to preserve areas like these? Photo: Pete Davies

program information.

In order to develop a framework to analyse incentives for private sector NRM, the study investigated ways in which the private sector was directly contributing to nature conservation. This included cases where those who benefit were reinvesting in improved management, including direct and indirect recipients within the wider community (such as hunters and conservation-minded citizens) and those who directly owned and managed areas for their own benefit (such as wildlife ranching).

Key findings

Organisations active in the US and English conservation sectors use a range of tools to achieve their goals, including property rights,

regulatory structures, contracting and organisational structures and common law. A number of tools are available in the United States or England that are not available in Australia. These tools are generated by the differing institutional structures in the United States and England. The case studies undertaken in these countries as part of the project indicated that, given appropriate institutions, the community will pay towards nature conservation.

Examination of the tools and institutional structures led to a number of findings that could inform the Australian policy context. The policy implications from the study are divided into two groups. The first comprises those that can create competitive equality between private sector not-for-profit organisations, government and other private sector firms. The second group comprises additional policy implications for boosting the level of private sector nature conservation beyond the level playing field.

Group 1 reforms

These reforms aim to create competitive equality between private sector not-for-profit organisations, government and other private sector firms.

Property rights

- ▶ Continue reform of water property rights.
- ▶ Identify institutional constraints to improving conservation management. For example, minimise or remove development application procedures for rehabilitative management.
- ▶ Investigate and facilitate expanded use of not-for-profit conservation covenants for land and water.
- ▶ Allow managers to directly benefit from improved conservation outcomes where possible, for example via wildlife ranching.

Incentives

- ▶ Treat perpetual and temporary covenants equally under not-for-profit organisation laws.
- ▶ Ensure not-for-profit organisations can operate effectively as businesses. For example, ensure reinvestment rules do not inhibit strategic realignments to achieve improved conservation outcomes.
- ▶ Ensure that there is an adequate period over which donations can be deducted from tax.
- ▶ Ensure that agricultural programs do not have perverse impacts on the costs of private sector conservation. For example, if irrigation water is below full costs of supply, over-extraction will result.
- ▶ Increase use of private–public management partnerships.
- ▶ Investigate broader application of alternative management entities such as trusts, unit trusts or communal ownership of conservation sites and other structures.
- ▶ Develop mechanisms to establish and mentor not-for-profit organisations.



Hopkins River, protected within a commercial farming operation Photo: Mike Wagg

Legal measures

- ▶ Investigate common law disincentives for natural resource restoration. For example, wetland restoration causing liability for flooding in neighbouring properties.
- ▶ Investigate the degree to which non-government organisations have legal standing to act on behalf of the community.

Regulation

- ▶ Investigate use of bonds and insurance against environmental damage from development.
- ▶ Facilitate conservation group ownership of covenants or resources.
- ▶ Avoid creating perverse incentives in environmental protection legislation.
- ▶ Encourage effective and efficient conservation solutions, for example, ensure adequate management rather than simply focusing on the amount of land protected.
- ▶ Encourage innovation and learning-by-doing approaches in conservation management.

Group 2 reforms

Options to further enhance the competitive ability of not-for-profit organisations and private sector investors through the taxation system.

- ▶ Ensure donations of water rights/licences are tax deductible.
- ▶ Treat conservation and business inputs equally under income tax laws.
- ▶ Treat perpetual and temporary covenants equally under tax laws.
- ▶ Allow 'discount' land sales for conservation purposes to be tax deductible.
- ▶ Increase state and local tax concessions for conservation.
- ▶ Remove capital gains tax from sales and donations to conservation groups.
- ▶ Remove tax deductibility from business inputs that result in natural resource destruction.
- ▶ Consider treating donations to conservation groups as tax credits rather than deductions.
- ▶ Consider allowing deductions at greater than 100 per cent for donations to conservation groups.

Implications for policy

This research added to the growing momentum for increased incentives for private sector nature conservation. Tax deduction provisions covering donations to nature conservation organisations have been progressively enlarged throughout the late 1990s and early 2000s. Some other measures have been adopted with increased implementation of conservation covenants at arm's length from government through the creation of statutory bodies in several states.

private sector nature conservation has exploded across Australia

existing within the private sector. For example, conservation covenants can still only be held by one statutory authority in each state (plus directly by government agencies) rather than by incorporated not-for-profit organisations as is the case with easements within the United States.

However, there has been little concentrated effort dedicated towards reforms that will release the potential dynamism and innovation

There has also been little action to identify the administrative costs faced by the private sector in managing land for

and allow little innovation in management, and have often been won by the same government agencies that previously performed the

Heritage and the Australian Wildlife Conservancy. At the same time the development of market-based instruments is emphasising the importance of the private sector discipline and, especially, the value of innovation and cost-effective management in achieving conservation outcomes.

little concentrated effort dedicated towards reforms that will release the potential dynamism and innovation existing within the private sector

conservation, such as preparation of extensive development approval applications for rehabilitation works. While there have been encouraging developments in third party service provision in the environmental sector, with numerous management contracts let by regional NRM bodies, many of these contracts are restrictive

work in-house due to their restrictive structures. Perhaps the most encouraging responses in recent times have been those of the broader public. Private sector nature conservation has exploded across Australia in recent times with the significant expansion of the conservation holdings of organisations such as Bush



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For further information and the latest reports, initiatives and events from the Social and Institutional Research Program (SIRP) visit our website at: <http://www.sirp.gov.au> or visit the Land & Water Australia website: <http://www.lwa.gov.au> and follow the links.



Assessing natural resources management

Stefan Hajkovicz and Mike Young

Mike Young and Stefan Hajkovicz evaluate the strengths and weaknesses of an increasing range of techniques and practical tools that support resource management decision making in applying numerous datasets and research studies. They conclude that more effort is required—not only to develop more practical and useable tools, in the sense of improved algorithms, but also to better understand how real people make policy choices and decisions so that appropriate tools will be more widely adopted. The authors believe that we cannot create a ‘grand index’ decision tool to embrace all environmental and social goods. While political and social decisions from the policy framework processes set the broad agenda, the analytical tools can address economic efficiency and the benefit–cost implications of policy, project or location selection.



Decision support tools enable individuals and groups to explore a range of different issues and to test scenarios before implementing them on the ground. Photo: Alice Renton

Background

Problems of land degradation, pollution and resource scarcity are confronting communities, individuals, companies and governments with difficult decisions. These decisions can have far-reaching effects and are exceedingly complex, given both the quantity and quality of the information base on which they have to be made.

An increasing number of support techniques have been used to help in decision making. Many decision makers, however, are unsure

of which technique to use, how to apply it and whether it might bias the results. This project investigated the strengths and weaknesses of decision support techniques in the area of natural resource management (NRM).

Methodology

Our project conducted literature searches and used personal experience to develop the discussion of the range of decision support tools. The major types of problems in NRM decision making were categorised and used to describe the strengths and weaknesses of each decision tool. The decision tools analysed were benefit–cost analysis, multiple criteria analysis and other techniques including energy analysis, ultimate environmental threshold analysis, planning balance sheets and the environmental evaluation system. In each case the following questions were addressed:

we may even need to understand how real people make choices

- ▶ What are the major stages involved in applying the technique?
- ▶ How does the technique work?
- ▶ How does the technique influence an NRM decision?
- ▶ How can the technique bias an NRM decision?
- ▶ What are the technique's major strengths and weaknesses?
- ▶ What is the frontier of research for the technique?

Following this discussion and analysis, the policy frameworks operating in Australia within which NRM decisions were assessed, in particular environmental

impact assessments, social impact assessments, urban and regional planning, risk assessment, life cycle assessment and citizens' juries. Issues relating to how such assessments affect NRM decisions and how these processes relate to analytical decisions support techniques were also examined.

Key findings

We found that many institutions operating at many different levels—including the private sector, all levels of government and community groups—make NRM decisions. They often face uncertainty, the potential for irreversible outcomes,

multiple objectives, multiple stakeholders and intangible outcomes. Our research showed that no single decision-making technique will provide the best analysis of a particular NRM decision, but that combinations of techniques will assist decision makers.

In general terms, we suggest that analytical techniques will support political and social decisions by evaluating the economic implications of decisions. Thus, the range of policy framework processes will assist in setting the broad agenda and efficiency and benefit-cost issues can be addressed through analytical decision support techniques.

Implications for policy

This project reviewed numerous methods for



Workshop exploring a range of NRM issues and informing participants of available decision support tools
Photo: Stuart Pearson

helping decision makers in the selection of policies, projects or locations. Some of the approaches are concerned with valuation and attempt to measure the net worth of an environmental good to society. Valuation results are a key input to evaluation techniques such as benefit–cost analysis (BCA), cost effectiveness analysis (CEA) and multiple criteria analysis (MCA).

A key conclusion of our work was that decision models

important. For example, the Natural Heritage Trust and National Action Plan represent an extremely large expenditure on environmental goods in Australia. Soon (in 2007) these programs will come to a close and, more likely than not, will be replaced with other large programs. Can we reach desired levels of efficiency in future expenditure?

The scientific and research community has produced numerous datasets and

will be a need for testing, selection and refinement of the most appropriate tools. But algorithms alone will not be enough. Effective implementation will require a much deeper understanding of the policy process within which the decision support tools are applied.

And we may even need to understand how real people make choices, so we can build the appropriate tools. These will be some of the research challenges of the next decade.

delivering practical and robust decision support tools to Australia's natural resource managers is increasingly important

seldom provide 100 per cent of the answer. There is always some 'fuzzy' component of an NRM decision that defies quantification or structuring. We cannot create a 'grand index' of all environmental and social goods.

Delivering practical and robust decision support tools to Australia's natural resource managers is increasingly

studies on Australia's natural resources, but has not done so well at placing practical decision tools into the hands of natural resource managers. As future years of environmental programs unfold we need to get serious about supplying catchment groups, state agencies and federal agencies with useable decision tools. There



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Land retirement as a conservation strategy

Phillip Hone

Phillip Hone argues that current approaches to biodiversity conservation assume a complementarity between agricultural production and environmental flows from the land base that is well beyond the practically attainable level of complementarity in some areas. This means that current approaches to biodiversity conservation will not satisfy the growing demand for environmental services from agricultural land. His social benefit–cost analysis centres on the opportunity cost of lost wool production on individual properties (which turns out to be less significant than expected) and the true economic costs of the lost wool production to the industry and Australia, which turn out to be a gain, not a loss as often imagined. He calls this the ‘dead sheep paradox’: when wool production falls, society and the industry gain rather than lose. The explanation lies in the higher wool prices that result from falls in wool production. The viability of land retirement is dependent on the ability of the public policy process to mobilise the ongoing surplus value created by the higher wool prices and the enhanced flow of ecosystem services required to fund the required land management processes. Phillip Hone suggests that carefully designed, competitive auction bidding systems are the best instrument to identify land for retirement that will yield net social benefits to enhance conservation outcomes on agricultural land.



Sheep that have unmanaged access to riparian areas can do extensive damage to native vegetation and lead to water quality and bank erosion problems. Photo: Michael Askey-Doran

Background

This project began with the proposition that over time Australians will demand more environmental services from our farming and pastoral lands. This greater demand is likely to exceed the extent of the initial complementarity between agricultural production and the environmental flows from the land base when the agricultural resource use is not ‘intensive’ relative to the capacity of the original ecosystem. As a result, the growing demand for environmental services will call for a wider range of policies than is currently in place. Reflecting these working hypotheses, the primary objective of the project was to provide evidence on the scope for applying land retirement policies in Australia. We have focused, in

particular, on the economics of the retirement of land from extensive farming and grazing activities and the movement of that land into the provision of environmental flows.

Australian agri-environmental policy has largely been based on the development and exploitation of complementarities between agricultural production systems and environmental service flows. This is reflected in the heavy policy emphasis given to the objective of creating sustainable agricultural systems. However, the growing affluence of the Australian community, together with a greater appreciation of the intrinsic value of environmental services, means that the demand for environmental flows from rural land can be expected to far exceed those consistent with the zone of complementarity between agriculture and the environment.

In order to achieve levels of environmental flows consistent with those likely to be demanded in the future, policy options will need to be developed that deal directly with the

policy options... that deal directly with the competition between agriculture and the environment for natural resources



Pastoral country – questions arise over the value of clearing land like this or retaining it
Photo: Desert Uplands Committee

competition between agriculture and the environment for natural resources as use of the land resource intensifies. The displacement of grazing and farming enterprises by land uses directed at creating environmental service flows appears to be part of an optimal longer-term policy mix.

The true economic cost of lost production

The main constraint to this form of policy in the past has been the perceived high cost of retiring land from agriculture. By applying social benefit-cost analysis, however, our research has shown that radical land use changes can be both cost-effective and economically efficient. That is, under some conditions the retirement of land from commercial agricultural

activities can be the least costly way of achieving stated environmental objectives.

This policy approach can result in a net gain to society as a whole, as well as to the affected industries.

The key factor driving our social benefit-cost analysis is the distinction that can exist between the true economic opportunity cost of lost production to individual farmers and the cost of that lost production to an industry and Australia as a whole. Our analysis has shown that the opportunity cost of lost production may not be as high as it is commonly assumed to be. We have shown that in the wool industry at least, the opportunity cost of lost production is likely to be

negative rather than positive. This means that society and the wool industry as a whole gain, rather than lose, when wool production falls. We have called this the 'dead sheep paradox'. The paradox arises because lower levels of wool production result in higher wool prices. The value of this price impact has been shown to be economically significant.

Off-site costs

The extent of the offsite costs of agricultural production has also been found to be of significance. The costs associated with the mobilisation of salts and the increased risk to biodiversity have been valued in a number of recent studies. The cost to the community associated with the off-site impacts of soil erosion may also be substantial but quantitative evidence is not available at this time.

Policy parameters

Our analysis of existing Australian programs and overseas agri-environmental programs has led us to conclude that the cost effectiveness of agricultural land retirement is likely to be highly sensitive to the way policy parameters are selected. These policy parameters (duration of program, scale of application, method of selecting land,

on contractual obligations, lead to high monitoring and enforcement costs in the long run.

Key findings

To explore the relevance of our policy prescriptions for current conditions in Australia we considered three cases: (i) the pastoral zone in general; (ii) the Western Division of New South Wales; and (iii) steep hill country in the upper catchment of the Wimmera River. In each case we concluded that land use changes out of grazing into the provision of biodiversity could be environmentally effective, cost-effective and economically efficient.

For the pastoral zone analysis, we simulated the impacts of a 5 per cent reduction in the area devoted to wool production in the low conservation status areas of the zone. A land retirement program of that order would

as a whole amounting to nearly \$43 million per year, equivalent to some \$880 million in net present value terms. Even where such net gains due to price increases are not large enough to determine the outcomes on their own, they will strengthen benefit-cost results in favour of some environmental policy initiatives. So the 'dead sheep paradox' will provide a justification for increasing the claims of the environment on limited government funds.

In the Upper Wimmera Catchment study, we found that retirement of land from grazing, and the use of the land to reduce off-site costs, appeared to at least justify further analysis. The hill country in this area has a high propensity to mobilize salts and current production practices contribute to the region's high level of soil erosion. The potential to significantly reduce these costs, coupled with a small (but significant for policy) impact on wool price, means that the benefits of land retirement here are likely to substantially outweigh the policy cost involved.

Our analysis of the management of rangelands in the Western Division of New South Wales came up with a similar conclusion to the Wimmera study, even though the factors driving the analysis were not the same. In the Western Division case, the principal benefits were in the areas of enhanced biodiversity protection and wool output

radical land use changes can be both cost-effective and economically efficient

etc.) need to be chosen with a view to minimising the total costs of the project over its full life. The interaction between parameters is likely to be an important factor driving longer-term cost effectiveness. For example, long-term contracts based on simple, single price auction mechanisms may result in low acquisition cost but, by creating the incentive for land managers to shirk

lift the conservation status of the affected land types to the middle range of the conservation spectrum. The simulations show that the resultant loss of wool production would lift gross wool revenues for producers remaining in the industry by around \$19 million per year. Taken overall, the simulated biodiversity program would yield net benefits to the Australian community

prices, while salinity and soil sedimentation were not important issues.

Implications for policy

In all three cases, the viability of land retirement is dependent on the ability of the public policy process to mobilise the surplus value created by the higher wool prices and the enhanced flow of eco-system services from the retired land to fund the required land management process. The ongoing nature of these projects means this funding must also be ongoing. Generating political acceptance of the required funding is critical.

The overall conclusion from these three case studies is that the retirement of land from agriculture into land uses that enhance biodiversity is most likely to be appropriate where:

- ▶ the private returns per unit of output from the existing agricultural use are relatively low
- ▶ the existing enterprise produces a product whose output price is sensitive to Australian production levels
- ▶ the existing enterprise results in economically significant off-site costs.

We suggest that this land could be identified through a competitive bidding system where landholders, in selected regions, are asked

to bid prices for which they are willing to offer land and land management services. The criteria for selecting bids would include both the implication of the bid for longer-term project costs, and the environmental impact of the land use change.



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Integrating biodiversity conservation in regional natural resource management planning

Viv Read

Viv Read's work explores the approaches and instruments required for the more effective and strategic integration of biodiversity conservation in regional NRM planning. He finds that biodiversity initiatives tend to rely substantially more on non-market, command and control, regulatory instruments rather than on market-based mechanisms. Support is required to ensure that there is capacity to address critical motivational and financial factors in the design and delivery of incentives to achieve practice change for biodiversity outcomes.

Background

Biodiversity is important to the Australian way of life but is threatened in many ways.

National investment in NRM requires a strategic approach to achieve targeted biodiversity outcomes on a regional scale. As the 57 NRM regions in Australia prepare NRM strategies and investment plans, the difficulty of implementing actions for practice change to achieve biodiversity targets is recognised. The major issues of salinity and water quality are often considered ahead of biodiversity issues, and the opportunities for integrated management to achieve

multiple outcomes are not always taken. The shift towards more strategic regional NRM planning provides opportunities for this to occur.

This research project set out to identify the mechanisms and critical success factors for enhancing the adoption of biodiversity conservation in regional NRM planning. It is focused on learning from the experience of others.

Methodology

The study reviewed existing projects (with the exception of the marine environment) and regional planning processes in all states and territories to provide a national overview of opportunities. Information was derived from a scan of 150 projects and semi-structured interviews with relevant people in each state and territory, and a range of NRM regions.

The assessment identified 16 case studies and determined critical success factors. The project made recommendations on opportunities for investment and involvement by the Australian Government to improve the integration of biodiversity conservation in regional NRM processes, assuming appropriate negotiations with states and territories were undertaken.



Bringing scientists and community together to discuss changing landscapes and management implications (central wheatbelt) Photo: Viv Read

Key findings

The project recognises the significant differences between states and territories, and between regions, based on ecological as well as cultural and economic factors. The study identifies the importance of working with these differences rather than pursuing a homogenised approach.

Many current projects are based on adoption of non-market mechanisms substantially more than market mechanisms because of:

- ▶ considerable uncertainty about the long-term effectiveness of market-based mechanisms for biodiversity conservation
- ▶ difficulty in identifying and quantifying a market basis for biodiversity conservation (especially the benefits and beneficiaries)
- ▶ a view that non-market mechanisms are quite effective, so market mechanisms are not required.

Considering this, the key findings are focused on mechanisms for building social and institutional capacity for adoption of biodiversity practice change.

Building capacity

Regions have expressed a high-level requirement for ongoing planning, information and technical support. Many previous mechanisms, including allocation of funding and provision of information, have supported small-scale local actions and were targeted to communities who were receptive to conservation. However, there is a need to achieve landscape-scale planning and actions in areas that are identified as being of highest priority for biodiversity conservation, even though community interest in conservation within some of these high priority areas may not be strong. Regions need to clearly identify the range (international, national, state/territory, regional or local) of values and priorities for biodiversity investment.

Factors critical to successful adoption

Motivational factors that led to successful adoption were:

- ▶ providing effective leadership
- ▶ identifying iconic values
- ▶ providing appropriate support
- ▶ building regional community skills
- ▶ recognising regional and local cultures and knowledge
- ▶ allowing adequate time
- ▶ accessing relevant information
- ▶ building on success
- ▶ developing learning processes
- ▶ applying appropriate scientific practice and knowledge
- ▶ using effective partnership arrangements
- ▶ legitimising management.



Fragile riparian verging vegetation (Avon River). How can we best conserve these areas on farms?
Photo: Viv Read

Some of the financial factors influencing adoption were:

- ▶ clearly identifying biodiversity values
- ▶ rewarding private effort for public benefits
- ▶ recognising biodiversity conservation as an alternative land use
- ▶ achieving multiple outcomes for biodiversity from other NRM investment
- ▶ assured payments in perpetuity.



Recognising the benefits of cost-sharing for conservation: 'good river manager' sign on the fence
Photo: Viv Read

Regulation is an effective mechanism for adoption especially as the 'duty of care' for our natural resources is better recognised.

regulation is an effective mechanism for adoption

Implications for policy and investment

The research identified a set of key principles to guide policy

and investment aimed at integrating biodiversity conservation in regional NRM planning:

- ▶ Identify and sustain distinctive regional difference: processes that homogenise NRM effort across regions will restrict motivation for biodiversity conservation
- ▶ Management decisions occur according to the prevailing 'world view' values: a change in 'world view' values is required to achieve a change in management
- ▶ Efficient and effective decision-making processes for biodiversity conservation through regional NRM planning require clear roles and responsibilities for the range of decision-makers involved
- ▶ Development of effective partnerships in regional NRM planning should be encouraged, with consideration given to identifying clear roles and responsibilities for the partners in biodiversity conservation
- ▶ The use of science-based information is a key factor in successful biodiversity conservation projects: information, and the associated skills for use of this information, must be accessible and applied to areas according to regional priority for biodiversity conservation
- ▶ Private interest and investment in biodiversity conservation will increase with better understanding and tangible evidence of biodiversity values and ecosystem services
- ▶ Allocate resources for projects and capacity building in relative proportion to the priority for biodiversity conservation
- ▶ Outcome-based program and project performance measures should prevail over time-based performance measures
- ▶ Investment in integrated NRM projects with biodiversity components should be contingent upon expectations of 'net biodiversity gain' for regional biodiversity conservation priorities.




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Mapping regional capacity for natural resource management

Trevor Webb and Allan Curtis

Trevor Webb and Allan Curtis characterise a region's capacity as best assessed by the community itself, using the toolkit of indicators developed in this project. They emphasise that capacity is vested in different segments and parts of regional communities with varying specific interests, skills and responsibilities and that it is specific to a particular entity in the context of a particular objective. The business of natural resource management (NRM) is the process of negotiating outcomes between stakeholders with competing value orientations. Indicators of regional capacity offer insights into the trajectory of those processes and their likely outcomes.

Background

The National Action Plan for Salinity and Water Quality (NAP) and the Natural Heritage Trust (NHT) recognise the central role that regional organisations and regional communities will play in the future of NRM in Australia's agricultural landscapes. It is expected that the Australian Government and the states will invest substantial resources in regional communities to assist and encourage the land management changes required under the NAP. The capacity of individuals and communities to effectively invest NAP and Trust funds will vary as a consequence of differences in their bio-physical and socio-economic settings.

On behalf of the Board of Management for the NAP, Land & Water Australia commissioned the Bureau of Rural Sciences to develop 'a standardised method for mapping the socio-economic profile and capacity of NAP regions to accommodate change and to help in identifying current and future capacity building needs'.

Methodology

The project developed a framework for characterising regional community capacity for more sustainable NRM. The framework identifies:

- ▶ 10 elements of capacity that span three of the four types of capital (see Table 1)
- ▶ 52 indicators that can be employed to guide characterisation of regional capacity (see Table 2).

Capacity is vested in different parts of regional communities. The framework distinguishes between the community with specific interests and responsibilities for NRM and the broader community that provides support, skills and services to NRM participants.



Riparian management workshop bringing together scientists, facilitators and government agencies to discuss how to implement latest NRM recommendations. Photo: James Morris

Defining capacity

Capacity relates to the capability of some entity to undertake some action. Two features of capacity are important.

- ▶ Capacity is related to some action or output and only makes sense in relation to some desired end point. In this case, the end point is improved NRM.
- ▶ Capacity is a characteristic of some entity; some 'thing' has capacity to reach the desired end-point.

In this project we are talking about regional capacity, which is comprised of the capacity of a range of social aggregates, for example individuals, organisations and broader communities.

The framework is targeted towards a range of users. Regional organisations, such as catchment management authorities/boards (CMA), have been delegated responsibilities for considering capacity and its enhancement in developing integrated NRM plans. As these regional organisations collect and interpret data for the elements of capacity identified in the framework, they will enhance their understanding of the social, demographic and economic resources available in their region, and acquire skills in the collection and interpretation of these data. In other words, using the framework to assess regional capacity should itself be a capacity building exercise. The framework will also provide useful information to Australian Government and state agencies with responsibility for NRM.

Table 1: Elements of capacity

Category of capital	Element of capacity
Human capital	age and population
	education
	health
	cultural diversity
Produced economic capital	economic resources
	physical infrastructure
	knowledge infrastructure
Social capital	social participation
	civic participation
	governance

How does it work?

The framework we have developed uses ten elements of capacity, categorised in terms of three types of capital—human, produced economic, and social capital (see Table 1). Our framework is underpinned by two important concepts.

- ▶ Capacity is held within social aggregates; our framework recognises that individuals, organisations and the broader regional community are relevant social aggregates for NRM.
- ▶ Capacity is the product of human, social, produced economic and natural capital. Exploring three of these four types of capital, we identified 10 elements of community capacity for regional NRM.

A set of 52 indicators was suggested (outlined in Table 2) that provided a mechanism to characterise the 10 elements.

Table 2: Indicators of regional capacity¹

Element of capacity	Indicator	Relevance ²	Mappability ³
Age and population			
HC1	total population	sc	y
HC2	population growth	sc	y
HC3	population sex ratio	sc	y
HC4	child dependency ratio	sc	y
HC5	elderly dependency ratio	sc	y
HC6	total dependency ratio	sc	y
HC7	median age	l	y
HC8	median age of landholders	m	y
HC9	land force participation rate	sc	y
HC10	unemployment rate	sc	y
Education			
HC11	highest level of formal education	l	n
HC12	field of formal education	l	n
HC13	farmer's highest level of formal education	m	n
HC14	farmer participation in training course	h	d
HC15	specific skills: rural leadership	m	d
Health			
HC16	infant mortality rate	sc	n
HC17	life expectancy at birth	sc	n
HC18	suicide rate	sc	n
HC19	prevalence of mental disorder	sc	n
Cultural diversity			
HC20	mainly English-speaking background	sc	y
HC21	non-English-speaking background	sc	y
HC22	Indigenous population	sc	y
Produced economic capital			
Economic resources			
EC23	median level of weekly household income	l	y
EC24	farmer median level of weekly household income	h	y
EC25	farmer median level of off-farm household income	m	n
EC26	farm equity ratio	m	n
EC27	public investment in NRM	h	d
EC28	level of community NRM project funding	h	d
EC29	index of business diversity	sc	y
Physical infrastructure			
EC30	ARIA	l	y
EC31	property size	m	n
EC32	road condition	sc	d
Knowledge infrastructure			
EC33	paid NRM facilitators	h	d
EC34	level of regional R&D	l	d
EC35	regular local newspapers	l	d
EC36	access to computer at home	l	y
EC37	access to internet at home	l	y

1. Natural capital is not considered in this report.

2. Relevance: l=low direct relevance to NRM goals; m=medium; h=high; sc=providing social context.

3. Mappability: y=mappable; n=not mappable; d=dependent upon data.

Details of how to use the table are provided in the final report on the project, available on the Land & Water Australia website. The framework

process of assessing capacity to facilitate capacity building rather than to produce some absolute value or measure of capacity.

Thus, while we have suggested several indicators of education at the broad community and landholder levels, following the compilation of data at that scale it may be appropriate for a region to consider the level of specific skills and knowledge among specific community members.

The 10 elements identified do not cover the universe of elements that impact on the capacity of a community to respond to NRM challenges. They represent a slice across the most important aspects of human, social and produced economic capital. Using the framework will provide an overview of the region's capacity and highlight areas for additional data collection and interpretation.

The community itself is best able to characterise a region's capacity. Community sources of data and expertise in the interpretation of data are invaluable in understanding local capacity. The process of reviewing a region's capacity is, in itself, a capacity-building exercise.

reviewing a region's capacity is, in itself, a capacity-building exercise

enables people to put into effect the 10 elements of capacity by identifying 52 indicators or measures that can be considered when characterising regional community capacity for NRM. In developing these indicators we articulated a set of criteria to assist with assessment of the value of particular indicators; these are also outlined in the final report.

Key findings

Our framework may be used as a tool kit to assist local and regional stakeholders understand their situation. The framework can also be used by state and national organisations to gauge the nature of capacity in various regions.

The large number of indicators presented in our framework are not reduced to a single index that measures regional community capacity. Capacity development is more likely to be facilitated through discussion of the relative merits of the different indicators as opposed to applying a single index measure. Regional information needs will vary, and so will the availability of data across regions. We feel it is important to allow discussion of the

Ultimately, any set of regional capacity indicators must have some meaningful relationship to the outcomes of NRM. Clearly, there is a range of stakeholders in the management of Australia's natural resources, and these stakeholders may subscribe to a range of outcomes. For example, some individuals may wish to maintain profit flows through consumptive or other use of the landscape, others may wish to maintain the ecological integrity of a landscape to ensure ecological services such as clean air and water, and others may wish to manage the landscape to maximise its aesthetic qualities. NRM can be conceived as the process of negotiating outcomes between stakeholders with competing value orientations. The outcomes of these negotiations are typically manifested in the bio-physical (and social) environment.

The indicators suggested consider capacity in the context of the regional scale, in an attempt to gain an overview of the whole community as well as the NRM community of interest. More detailed understanding of a particular region will require the collection of data at a much more localised scale.



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THE HUMAN ELEMENT IN NRM

Siwan Lovett

Understanding how different people relate to their environment in work, rest and play provides insights into what motivates behaviour, develops perspectives and directs action. However, it is often the case in natural resources management (NRM) that the 'human' element is ignored in favour of research into the biophysical processes that might be governing a particular environmental outcome. This is nonsensical when people and the relationship they have with their environment are at the core of NRM. If we fail to understand ourselves, we will fail to improve our management of scarce and precious resources in equitable and sustainable ways.

Theme 3 of the Social and Institutional Research Program tackles these issues. Its objectives are to:

- ▶ assess social, cultural, economic and institutional values and aspirations in relation to current practices and future plans for using and managing natural resources
- ▶ investigate what conditions will enable effective arrangements for NRM program delivery in Indigenous areas of Australia
- ▶ identify the factors that could influence how rural and peri-urban lands are used in the future and the impact of different approaches to NRM.

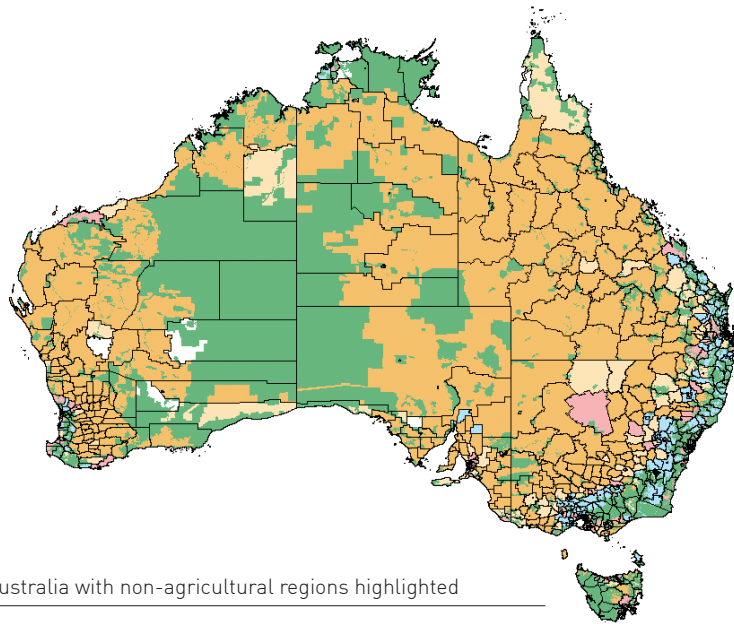
The five articles brought together in this final section of *People, Practice and Policy* examine NRM through the eyes of Indigenous Australians, groups involved in regional planning, and researchers seeking to chart what the 'social landscape' of Australia might look like in the future. All the articles focus on people, the socio-cultural world in which they live, and how this impacts on NRM. Each has valuable lessons for those of us working in NRM about the importance of valuing and respecting people, their attitudes, perceptions and the factors that motivate their behaviour.

Changing social landscapes — why, what and where?

Neil Barr

In recent decades of catchment management and natural resource protection there has been a mismatch in the priorities of the policies and the various disciplines involved. For example, assessment of salinity risk and priorities has been increasingly based on the capacity to model the behaviour of groundwater systems 20, 50 or 100 years ahead, yet policies are being made with much shorter timeframes in mind.

Neil Barr believes we need to question how the social and environmental value placed on the assets in these catchments may change over the same time as some of the biophysical processes governing our environment. What communities might be living in these catchments and what will they value? And will the agricultural production be as important as it is now 100 years from now?

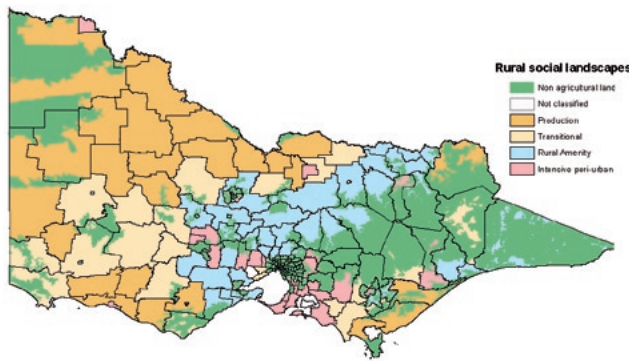


Australia with non-agricultural regions highlighted

There's an old cliché about research being ninety-nine per cent tedium and one per cent inspiration. Let's call this the first law of the research career. I'm not at the end of my career yet, but I have enough years clocked up to make looking backwards for the moments of inspiration revealing. Inspiration is often unexpected, sometimes inconvenient and impossible to program. And often inspiration is not what it at first seems. More than once I have grabbed a pen and notepad in the dark to jot down an idea that flashed

through my mind while I was trying to fall asleep, and on inspection in the morning wondered what the devil I was thinking. I suspect there is a corollary to the fundamental law of the research career. It states that not all inspiration is inspirational. Thirty-three per cent of inspiration is merely catching up with the thoughts of others; thirty-three per cent is self-delusion; thirty-two per cent is useful and one per cent is career changing.

Three particular moments of inspiration stand out to me as personally career changing. One was while listening to a farmer explaining that the pressure on him to plant trees on his property to control salinity was ill-advised as the property had been grassland before the arrival of white settlers. That moment eventually led me to write a book on the environmental history of Australian farming.



Mapping elements of the rural social landscapes of Victoria

A second moment was when I followed my curiosity and took the time to combine data on land values and value of production. The resulting map has become another major report on social landscapes.

The third moment was during a meeting at an airport hotel. Gathered around the table were hydro-geologists working on the Dryland Salinity Theme of the National Land and Water Resources Audit. I believe the Audit Salinity Theme is having a paradigm-shifting influence on policy frameworks for

bet' options, often based upon small tree plantations on the tops of hills.

These revelations led me to think about the catchment plans to which I had contributed. In retrospect, I wondered if we had developed our catchment plans with an implicit assumption that the social structure of the catchments would be little changed during the period of plan implementation. If implementation was to take generations, perhaps the greatest threat to catchment plan proposals was their social unsustainability.

there is a thirst for understanding the 'what's, why's and the where's'

dryland salinity. That day in the meeting, as I listened to the findings of groundwater modellers, my own views of salinity were changed. Intervention in the landscape to lower watertables was going to take many more trees and potentially many generations. This was a revelation to a social scientist who had spent a decade in a world where salinity control was addressed through 'best-

From that meeting, I began to think more deeply about how rural Australia has been changing in my lifetime, and how it may change further in the coming decades. Out of this have come reports on farm demographic change, and changes in the social landscape of rural communities. The work is based on data from Australia's population and agricultural censuses, from

many one-off research projects conducted across Australia, and from contact with rural communities.

This research has generated interest from rural communities and organisations. The social structure of rural Australia is changing rapidly, and there is a thirst for understanding what is happening, why it is happening and where it is taking us. Inevitably, each invitation to speak is an opportunity for me to learn from the community.

I live in rural Victoria, so it is natural that much of my work has focused on the changes that have occurred in that state. Many of my contacts in the rural community are Victorian. Inevitably, most of my extension work is with Victorian communities. Land & Water Australia has provided an opportunity to make my work relevant and accessible beyond the borders of Victoria.

I am currently engaged in writing a book about my research. The intention is to produce a document that is more readable than the average research report and extends its focus beyond the social landscapes of Victoria. The hope is that the final report will be both interesting and useful to professionals and community involved in natural resources management. It won't pretend to provide answers to the burning natural resources questions they face

but, hopefully, it will provide a conceptual framework to help explain the changes that are happening in rural communities, the social forces that are creating these changes, how we all contribute to these social forces and what the communities we live in may look like in twenty years time.

The report will have chapters on productivity and trade in farming, the implications of the changing demographic structure of Australia, urban migration to rural Australia,

the outcomes of changing gender roles on farms and in Australian households and the changing social values of urban Australia. There will also be chapters on different landscapes within rural Australia and the differing social futures each of these landscapes may face. The analysis will be interwoven with personal stories from my family and from the many very interesting people I meet in my work. I hope it will be interesting reading, rather than just worthy reading.



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Northern Australia: our tropical rivers

The rivers, floodplains, wetlands and estuaries of northern Australia are relatively undisturbed and highly distinctive compared to other regions of Australia. These ecosystems provide multiple benefits to the Australian community, and through ecosystem services they provide benefits to regional industries.

Currently the knowledge to inform future regional planning and NRM is limited, fragmented and insufficient for addressing the management demands of the future.

Through joint research between Land & Water Australia's Social and Institutional Research Program and Tropical Rivers Program there is an opportunity to understand, in an integrated way, how to develop and manage water resources while protecting aquatic ecosystems and the benefits they provide.

In collaboration with Land & Water Australia's Tropical Rivers Program, the Social and Institutional Research Program (SIRP) has invested in a project to assess the social and economic values of Australia's tropical rivers (Land & Water Australia project code CSE29).

This profiling and scoping study will:

- ▶ develop an integrated social and economic profile of the tropical rivers region, focusing on the collation and reporting of data relevant to rivers and river management
- ▶ identify important social and economic values and issues relevant to rivers
- ▶ explain significant processes and pressure points that will impact on future management of tropical rivers, including conflicting stakeholder aspirations
- ▶ scope future research needs and priorities based on the identification of key social and economic management questions
- ▶ recommend questions for further research and development that will generate an understanding of the social and economic processes and pressure points that will have an impact on the health of the rivers, floodplains, wetlands and estuaries in the study area.

Engaging stakeholders in regional NRM practice change

Don Thomson and Janelle Allison

The devolution of much of the responsibility for NRM decision-making to catchment management and other regional bodies is an experiment involving thousands of people across Australia. Making decisions is a complex and inherently messy business. This project seeks to assist regional bodies in understanding how to connect with their stakeholders, implement practice change and manage their organisational and institutional arrangements so that they can make decisions that involve and meet the needs of their regional community and optimise NRM outcomes.



People from a range of differing organisations coming together to consider regional NRM targets. Photo: Don Thomson

Background

This is a collaborative project between the Australian Government's Joint NRM Team, Land & Water Australia and four regional NRM bodies, operating in diverse settings across Australia with the support of the respective state governments. *The four regions are the Swan region of Western Australia, North-East Victoria, the Southern Gulf region in Queensland and the Southern Rivers region of New South Wales.

The project explores three key issues:

- ▶ what makes stakeholder engagement and communications effective at the regional level
- ▶ how regions use processes and tools to achieve practice change
- ▶ the effectiveness and integrity of the logic that underpins planning to achieve long-term NRM targets and goals.

These are key issues facing all 56 NRM regions across Australia. By working with the four case study catchments, the project seeks to understand how investment in people (skills and relationships) contributes to changes in practice that deliver long-term improvements in natural resource condition.

Methodology

A team of seven consultants completed the project: four working with each of the case study regions, and one communications consultant and a principal research consultant looking across the four regions. A project coordinator was engaged to oversee the project. The consultants adopted an action learning approach structured around three 'lenses' or perspectives on the three core research questions. This approach was adopted because of the diversity of the case study regions, as illustrated in Table 1.

* The consultant team comprised, in addition to Don Thomson and Janelle Allison: Mary Dickie, Greg Hayes, Sue Middleton, Viv Read, Les Robinson, and the staff and directors/board members of the participating NRM regional bodies.

The three lenses were:

Lens 1: 'My place': This was a reflection on the way in which NRM 'business' is done in each region and the extent to which this is driven by the characteristics of the 'place'. It was about the cultural, social, economic and biophysical characteristics of the region, how they interact, and how they have influenced the shape of NRM activities and priorities now. The information collected through this lens shed light on when, where and why particular communications, stakeholder engagement and capacity-building methods work.

Lens 2: Stories of practice change: This looked at the way in which NRM planning processes have been undertaken in the case study regions, and what the regions themselves have learnt through their experiences. The project sought to collect data through this lens on how and why NRM planning processes have worked, and the way in which investments in NRM planning and support have resulted in practice change at institutional, community and individual levels.

Lens 3: 'Live' projects: This was a key activity of the project and the area in which the action learning approach came to the fore. The project took the observations and learnings from lenses 1 and 2 and applied them to a current, real project. The four regional consultants worked with their respective region to identify issues and ideas they would like to explore, and then helped the regions apply them to a current project. The regional consultants facilitated and observed the processes as they unfolded. They documented new learnings, particularly in

stakeholder engagement could be more deliberative and purposeful

terms of the effectiveness of these new ideas in bringing about practice change and ultimately resource condition change.

Concurrently, the communications consultant looked across all four case study regions, as well as some of the other 56 regional NRM bodies, to identify commonalities and principles for stakeholder engagement and communications.

Table 1: Characteristics of the case study regions

Region	Population density	Type of organisation	Management structure	Number of staff*
North-East Victoria	5 people/sq km	Catchment management authority	11-member board, 2 asset-focused advisory committees.	50
Southern Rivers, NSW	15.5 people/sq km	Catchment management authority	7-member board	57
Swan, WA	2000 people/sq km	Council	18-member council	7
Southern Gulf, Queensland	0.14 people/sq km	Company	9-member board of directors	7

*Staff numbers are approximate and include full-time and part-time staff, around the period January to June 2005.

Key findings

This project has revealed an enormous amount of information about the way NRM 'business' is done. It has revealed perhaps as much about the practices of regional NRM bodies and their staff as about how to influence the practices of land managers. Many of these findings are still to be developed and fully explored. That will occur during phase two of this project, beginning in March 2006.

Some of the key findings of this first stage are summarised below and grouped into three themes, based on the core research questions.

Effective stakeholder engagement

- ▶ There is a very wide range of current and potential stakeholders in regional NRM. Identifying, prioritising and managing communications with stakeholders is a huge task for NRM regions. This is especially so for regions with a high proportion of urban residents, those with a range of land uses, and those with sparsely distributed populations like the Southern Gulf region. Regional NRM bodies need support to develop and implement stakeholder management and communications systems.
- ▶ Regional NRM bodies are successfully engaging a wide range of stakeholders, but these tend to be the traditional and willing participants – or the 'low-hanging fruit'. Broadening stakeholder engagement in NRM process requires innovation, resources and time.
- ▶ Stakeholder engagement tends to be reactionary and based on historical activity and initiatives. Stakeholder engagement could be more deliberative and purposeful.
- ▶ Deciding when and how to engage stakeholders requires knowledge of a wide range of stakeholder engagement and facilitation tools, methods and approaches. These can be most successfully applied when the purpose of the engagement is well defined. Building stakeholder engagement principles and practice into NRM planning processes is critical to ensure effective stakeholder engagement.
- ▶ One of the key outcomes of the project in relation to stakeholder engagement is the development of a schema to map stakeholders according to their power to effect change, and their alignment with the regional NRM body's charter. This is a useful tool to assist in strategically planning and prioritising stakeholder engagement.
- ▶ The project identified that good stakeholder engagement is purposeful, mutually beneficial, open, strategic and sustainable [see Figure 1].

Figure 1: Characteristics of good stakeholder engagement



Practice change

▶ The case study regions use a wide range of approaches to achieving practice change among land managers. The most commonly used approaches are the more traditional one-on-one interactions based on traditional extension models. These can be effective, but are resource intensive and do not always foster innovation and



Regional communities are managing highly modified landscapes that reflect economic and social priorities. Photo: Don Thompson

integration. There are also many examples of innovative and integrated approaches to encourage practice change, such as Bush Tender and River Tender schemes, innovative delivery of training, group-based learning and the strategic packaging of NRM products in partnership with key industries (such as the dairy industry in the Southern Rivers region and the ornamental horticulture industry in the Swan region).

many examples of innovative and integrated approaches to encourage practice change

- ▶ There is much evidence of significant practice change within regional NRM bodies themselves as they gain more experience in developing and implementing regional NRM plans and strategies.
- ▶ Significant change is occurring within the minds of land managers, resource users and the general community. These outcomes are difficult to measure and assign causality.
- ▶ The project developed a method of mapping practice change initiatives, which could be used to facilitate a more deliberative and strategically targeted stakeholder engagement effort (see Figure 2).

Figure 2: Mapping practice change tactics and strategies



The Australian Government NRM Planning Logic

- ▶ The case study regions used, to varying degrees, the Australian Government's NRM Planning Logic, and Capacity Building Planning Logic during the preparation of their regional strategic plans. Some were frustrated by the fact that these guidelines were in themselves evolutionary, and sometimes changed during the course of their planning activities.
- ▶ Each of the case study regions had different levels of experience in strategic regional NRM planning. Some, like the north-east CMA in Victoria, have undertaken several regional planning processes over the past eight years. Others, like Southern Gulf Catchments, have only undertaken one.
- ▶ Previous experience in developing regional plans was a distinct advantage in the latest round of planning under Natural Heritage Trust 2 (NHT2), especially in relation to negotiations within state assessment processes.
- ▶ Many of the case study regions employed consultants to assist with the development of regional strategies and investment plans, mainly because of the tight timelines and a lack of capacity within the regional bodies. This practice has mixed outcomes. A disadvantage is that the knowledge and understanding of stakeholders, planning processes, partnerships and negotiations is often held within the consultants' heads. In some cases, the board or committee members of regional bodies

were not able to engage with the process satisfactorily because of a lack of capacity in terms of time and understanding of the process.

the silo effect of the planning logic constrains innovation, and integration

The less experienced regional NRM bodies may benefit from the experience of staff or board members from other regions or consultants with specialist expertise in specific areas. A mentoring and support programme would be a beneficial investment in enhancing the capacity of regional NRM bodies.

- ▶ The NRM Planning Logic tends to be a lineal planning model and has the effect of directing strategies and investment plans (and therefore on-ground activities) into asset-based silos.
- ▶ The silo effect of the planning logic constrains innovation, and integration of the economic, social and biophysical responses to complex NRM issues.
- ▶ The Planning Logic could be improved by making it more explicitly based on an action-learning cycle. This would be further enhanced by making sure all monitoring and evaluation activities are integrated at each step of the planning process. The approach would encourage more deliberative practice among NRM professionals.
- ▶ The NRM planning process is onerous when compared to the statutory planning processes employed by local government authorities around Australia. In some cases it took 18 months to plan for a one-year program of delivering NRM practice change.
- ▶ The NRM Planning Logic could benefit from statutory planning processes in many ways. More explicit attention to developing and debating scenarios for landscape futures would foster greater innovation in NRM responses and potentially engage a wider range of stakeholders.
- ▶ Monitoring and evaluation is a significant challenge for regional NRM bodies. Presently, their focus is on reporting on outputs. This is further complicated by the myriad programs, funders and timeframes. Monitoring and evaluation needs to be more outcome oriented and become an integrated part of the daily work of NRM practitioners. This requires a significant investment in developing systems and process tools, and integrating monitoring and evaluation into the planning frameworks that guide NRM practice at the regional level.

Implications for policy

The implications of these findings relate to the institutional and governance arrangements underpinning regional delivery of NRM across Australia, and the investment made in supporting and facilitating these arrangements.

In summary, the key implications are:

- ▶ The NRM system of regional bodies is a fantastic initiative that has significant potential to positively impact on the condition of Australia's natural resources. It has already achieved a good deal, but the outcomes are currently difficult to measure because we are not always looking in the right places and because change in resource condition will take time.
- ▶ Investing in people is critical to generating and maintaining momentum towards achieving resource condition change.
- ▶ Regional NRM bodies need secure resourcing so that they can:
 - develop and maintain partnerships and networks
 - make long-term commitments to staff, communities and works programs
 - maintain a consistent presence and approach.
- ▶ Regional NRM bodies need support in:
 - identifying stakeholders and managing stakeholder engagement
 - monitoring and evaluating the impact of their actions, and perhaps more importantly enabling adaptive, deliberative practice
 - developing and implementing effective and efficient planning and decision-making processes
 - developing and managing efficient investment plans to ensure on-ground works are effectively targeted and efficiently implemented
 - training, equipping and keeping staff.

These findings highlight the need for a new focus on the way in which NRM is practised in the regions. The project has demonstrated that there is not only room for a diverse range of institutional structures and business delivery models, but that this is essential given the diversity of regions across Australia in terms of their economic, cultural and biophysical characteristics. What is needed is a more deliberative practice by both federal and state governments in support of regional NRM processes, and among regional NRM practitioners themselves so that they can better match their service delivery models to the needs of their regions and their stakeholders.



Finding ways of bringing people together to discuss local issues is important for NRM
Photo: Don Thompson



Project reference: UQL25

Project completion: 2005

Fact sheet: website

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Sustainable northern landscapes and the connection to Aboriginal health

Aaron Petty, David Bowman and Fay Johnston



Aboriginal ranger, Sandra, in the field
Photo: Aaron Petty

Does Indigenous participation in NRM result in nationally significant benefits to both northern Australian landscapes and to Indigenous health? David Bowman and his team are exploring the connection between Aboriginal people and their land—a connection that links ecological health with human health. Northern Australia has unparalleled opportunities to avoid treading the same path of environmental degradation as southern Australia but, without active management, wildfires, weeds and feral animals will degrade these lands. A core problem in managing northern Australia is the recent depopulation of Indigenous people from their lands, which has almost uniformly resulted in unemployment, poverty, ill-health and social disruption. Will there be a continuing decline in biodiversity and Indigenous well-being in the north? Or can Indigenous participation in land management activities result in nationally significant benefits to both northern Australian landscapes and Indigenous health?

Background

Despite many years of research and increasing investment in health service provision, the public health status of Aboriginal people, particularly in remote areas, has failed to substantially improve, remaining at what many consider to be a crisis level. Meanwhile, there is growing awareness among natural resource managers that the ecological status of remote Australia, particularly the Top End of the Northern Territory, is under threat from changing fire patterns and increasing disturbance by feral animals and weeds. In the broader Australian society, these issues are considered unrelated and are addressed separately by experts with broadly different backgrounds. However, from an Aboriginal perspective it is not surprising that ecological health and human health are co-related.

Aboriginal people have long maintained a strong identification between themselves and 'country'—a common term for Aboriginal homelands. For most Aboriginal people, the sense of self and identity is built upon a relationship with country. The well-being of one is connected with the other (see the discussion in Burgess et al 2005). This insight has not generally been part of research or interventions by natural and medical scientists, as these disciplines tend to be more dependent on a reductionist, empirical approach to exploring the mechanisms behind phenomena—figuring out mechanistically 'how things work.' As well, the challenges of mastering one field of study often mean there is little overlap between disciplines, increasing the conceptual divide between ecosystems and human health and wellbeing.

Unfortunately, the outcome of this division is more than philosophical. It is perhaps easier for most non-Aboriginal land managers to understand the decline in ecological integrity in the Top End than it is to understand, from a scientific

larger population centres. In these townships, Aboriginal people often spend more time at home and less time out bush as they are often not the traditional owners of the land near the townships. This leads to multiple behavioural changes that can result in

the link between Aboriginal and landscape health, and help tackle the twin ecological and health crises now facing the Top End.

To investigate the link between Aboriginal health and ecological integrity, we have engaged a multidisciplinary team of researchers to examine several aspects surrounding this issue. The team is led by Professor David Bowman of the School for Environmental Research at Charles Darwin University (CDU). Dr Paul Burgess and Dr Fay Johnston of the Menzies School of Health Research are conducting an investigation of current health status in relation to natural and cultural resource management by Aboriginal people in Maningrida and neighbouring outstations in central Arnhemland. Dr Bevlyne Sithole of CSIRO is investigating the social policy side of NRM activities in Aboriginal communities with particular emphasis on the community ranger programmes. Amy Jo Vickery is documenting the views of Aboriginal people about the relationships between their health and their country. Finally, Aaron Petty of CDU is contextualising the ecological health of Aboriginal lands with adjacent non-Aboriginal lands using three simple indicators of ecological health—grass fuel loads, fire patchiness and extent, and feral animal impact.

understanding the link between Aboriginal health and ecological integrity

perspective, the continued unacceptably poor status of Aboriginal health. The forces that continue to drive the decline in ecological status—changing land use patterns, invasions of exotic species, and changes in fire management—are well documented but have failed to be adequately addressed because of the costs involved in managing such a large area. In the case of Aboriginal health status, under-resourcing in health service provision is a factor but it is by no means the whole story.

Several potential mechanisms behind the link between healthy people and healthy country have been broadly discussed in recent years (see Burgess et al. 2005). For example, the decline in Aboriginal health is likely due to numerous social factors, not least of which are the loss of empowerment following white settlement and movement from their traditional homelands to

health problems, including decreased levels of exercise, increased drug and alcohol abuse due to boredom and loss of self-esteem, and increased reliance on poor quality store-bought foods. Meanwhile, as the Aboriginal hinterlands are depopulated, critical ecosystem services performed by Aboriginal people, including fire management, are lost. Large areas are left without land managers to deal with emerging threats including the control of exotic animals and plants.

Methodology

This project is designed to address the gap between Aboriginal and non-Aboriginal understandings of human and ecological health. The project responds to the views of Aboriginal people who have long articulated the importance of this relationship. It uses scientific principles to develop a correlative understanding of



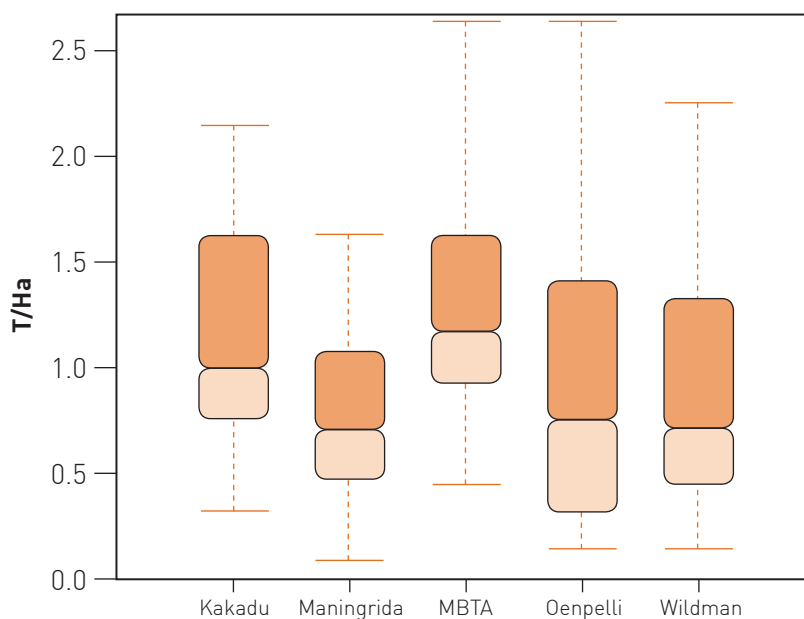
Key findings

The Landscape and Health teams are now completing their first year of field research. Their aim is to develop a picture of the human and landscape health status of the Top End. Dr Burgess, in collaboration with the local health service, is completing a comprehensive health check of the residents of Maningrida and neighbouring outstations. In addition to providing data for the project, this has allowed the health team to identify and address many longstanding unreported health problems.

From Aaron Petty's ecological surveys, we have found a clear difference in fuel load levels. They are broadly lower in Aboriginal lands, particularly around Maningrida, and highest in Kakadu National Park and the Mt Bundy Defense Training Area, both of which are subject to aggressive fire management programmes (see Fig. 1). Conversely, preliminary results from the feral animal impact survey indicate that Maningrida has much higher levels of feral animal damage than Kakadu, particularly for levels of buffalo impact. This is not surprising, as Kakadu has devoted significant resources to dealing with feral animals, including a successful buffalo eradication campaign in the 1980s, and continuing efforts to kill feral pigs. It would appear that, in Maningrida at least, tackling emerging non-traditional threats such as feral animals is suffering due to a lack of resources, while traditional activities continue to maintain very low fuel loads throughout the region.

In the following year we will continue our field investigations, concentrating specifically on Aboriginal conceptions of healthy country, the qualities that country possesses, and how both human and ecological health is maintained. Although this is a large and ambitious project, these explorations are only a small step towards the goal of successfully addressing the twin ecological and health crises facing the remote areas of Australia's Top End.

Figure 1: Boxplot showing median, 25% and 75% quantiles, and extreme values for grass fuel loads in Maningrida, Oenpelli, Kakadu National Park, the Mount Bundy Defense Training Area, and Wildman Reserve (Mary River National Park).



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Project completion: 2006

Project summary: website

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Kinship with country — acts of translation in the cross-cultural performance space

A case study on the Anangu Pitjantjatjara Lands of Central Australia

Diana James

Diana James bases her work on recognition that there exists a conceptual gap in current approaches to NRM on Indigenous lands. This gap exists because traditional Western knowledge separates culture from nature, while Indigenous knowledge values and perceives the holistic natural and cultural landscape. This project seeks to expand the NRM concept and practice to include the Indigenous perspective that caring for country involves both cultural and natural landscapes.



Carved circles in the rock indicate water sources are nearby in the north-west Anangu Pitjantjatjara Lands. Photo: Diana James

Background

Two maps of country can represent the Anangu Pitjantjatjara Lands Council of Australia, its lands and peoples – one an Indigenous map of a continent linked by the Songlines of the Western Desert Peoples' creation ancestors under Anangu law, and the other a Western map of a continent divided by the state borders of colonial ancestors under British law. My research investigates how these two laws can work together caring for country and communities involved in the modern industry of tourism on these Indigenous Lands. The research problematic was stated by Nganyinytja, a senior Pitjantjatjara elder of Anangu law, who said:

*Reconciliation means bringing two cultures together,
maru munu piranpa tjunguringanyi — black and white coming together.
The two laws need to become one to care for the land.
(Nganyinytja, 1993: 23).*

My research explores the difficulties and possibilities inherent in attempts to reconcile these two cultures of knowledge and their relationship to land in Australia today. The case studies examine the convergence of Western and Indigenous explicit and implicit principles of cultural and natural resource management (CNRM) in the practice of tourism on the Anangu Pitjantjatjara (AP) Lands of Central Australia. The central question for my work is whether Indigenous knowledge of the complex interrelationships of kinship between nature and culture can be translated into the languages, cultures and disciplines of Western knowledge.



Simple Western labelling of what is for Aboriginal people a more complex ecological and cultural landscape
Photo: Diana James

Methodology

My approach is derived from a bi-cultural research model developed by the Ngaanyatjara, Yankunytjara and Pitjantjatjara Women's Council that integrates Anangu method into the framework of Western action

Key findings

The findings are that, while recognition of Indigenous cultural landscapes in Australia is not new, the integration of this holistic conceptual approach into Western knowledge is proving problematic in both theoretical and practical arenas. This can be partly attributed to the ontological divide of culture and nature, spirit and matter in the Western intellectual tradition, and partly to the problems of conceptual translation of knowledge across the gap of language and cultural difference. Within the performance space of Desert Tracks tours on the Pitjantjatjara Lands this gap of understanding had to be bridged to develop a successful Indigenous and Western co-management of an ecologically and culturally appropriate tourism business.

peoples of different cultures can occur.

Implications for policy

The application of the research findings to NRM policy would expand the frame of reference of research and practice to include cultural perceptions and values as integral components of natural resource management.



Water in rockholes is a scarce and sacred resource in the desert
Photo: Diana James

integration of this holistic conceptual approach into Western knowledge is proving problematic

research. The field research conforms to the protocols and accountability requirements set for Western researchers by Indigenous academics and traditional elders. The results section contains an analysis of discourse within the cross-cultural performance space, such as through print, diary, poems, dance, and conversations and films about the Desert Tracks tours on the Pitjantjatjara Lands from 1988 to 2005. The research has also been guided by the formal ethics requirements of the Australian National University and AP Council.

Building on these findings, a schema is proposed whereby mainstream natural resource management (NRM) is able to expand into a holistic conception and practice of cultural natural resource management (CNRM), joining together Indigenous and Western knowledge. The schema provides translation between the two conceptualisations of ontology, ecology, culture, economics, and spirituality of shared tangible and intangible landscapes. It provides a performance space in which knowledge translation between



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Project timeframe: 2006

Project summary: website

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Social, cultural and institutional issues that impact on the commercial kangaroo industry in South Australia

Dana Thomsen

The commercial kangaroo industry is considered by natural resource scientists to be one of the few rural industries to provide economic return from arid Australian ecosystems without significant environmental impact. However, the commercial kangaroo industry is experiencing development limitations, which means that the best outcomes for stakeholders and for the land are not being realised. Dana Thomsen's work investigates the factors that are constraining the development of this industry in three case study regions in an effort to understand how policy and institutional settings might better align to deliver social and economic benefits to industry stakeholder and regional communities.



Sign for Red Kangaroo with Indigenous name 'Malu'.
Photo: Dana Thomsen

Background

This project addresses a lack of understanding about social issues that influence the sustainable development of the commercial kangaroo industry. Because social and institutional factors influence kangaroo harvest, we need to understand what constraints and opportunities these factors present in order to help further the sustainable development of the commercial kangaroo industry. An outcome of this research will be recommendations for institutional and policy changes that deliver social and economic benefits to industry stakeholders and to rural communities.

An integral component of this research is the consideration of Indigenous perspectives about the commercial harvest of kangaroos. This research is, to the best of our knowledge, the first time that Indigenous people have been asked about what issues the commercial kangaroo industry presents for them and how they wish to bring these issues forward. In South Australia, there are very few Aboriginal people involved in this industry and there are no mechanisms for the inclusion of Indigenous people in decision-making processes for management. This is the case despite various agencies advocating Indigenous involvement in the commercial harvest of kangaroos as a pathway for economic development.

Methodology

Our research of Aboriginal perspectives regarding kangaroo management focused on two geographic regions of South Australia—the far north-west of the state and the northern Flinders Ranges. We consulted with senior initiated men from the Western Desert region in northern South Australia, following protocols established during consultations. Methods used in this region needed to be appropriate to the existence of knowledge about Red Kangaroo (Malu) that is restricted to men.

The inclusion of initiated men from the region (Kado Muir, Yami Lester and Joseph Lennon) in the research team facilitated discussions with senior men based in Coober Pedy and Oodnadatta in March 2003. Input was also sought from a group of men from the Anangu Pitjantjatjara Lands. The senior men included in the research team passed only non-sensitive information to the non-Indigenous researchers.

Aboriginal people's willingness to talk about kangaroo management provides government and industry decision makers with an opportunity

In contrast, Aboriginal people in the northern Flinders Ranges advised us during a scoping study that the cultural protocols around kangaroos for them are quite different and do not involve gendered sensitivities. Therefore, a cross section of Adnyamathanha people were involved in consultations about kangaroos and the commercial kangaroo industry in July 2003.

Key findings

- ▶ This research established that Red Kangaroo and Euro are culturally significant to Aboriginal people of both regions. This significance means that the animals must be treated with respect.
- ▶ For Aboriginal people from the Western Desert region, strict cultural protocols preclude any involvement in, or endorsement of, commercial kangaroo harvest.
- ▶ For Aboriginal people from the northern Flinders Ranges, where the cultural protocols concerning kangaroos are quite different, there is some interest in developing businesses based on kangaroo harvest.
- ▶ While there is a diversity of Aboriginal views about commercial kangaroo harvest, Aboriginal people across South Australia highly value kangaroos and want to be included in decision-making processes for kangaroo management.

Implications

The advice provided by the Aboriginal people consulted for this research is not complicated. Basically people said that they want to talk, to have the chance to bring their views and issues forward and to be included in the decision-making processes. Aboriginal people's willingness to talk about kangaroo management provides government and industry decision makers with an opportunity to involve Aboriginal people in kangaroo management in a meaningful and positive way.



Kangaroo harvesting is a commercial opportunity for Indigenous communities.

Photo: Angus Emmott





Project reference: UAD17

Project completion: 2005

Fact sheet: website

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Alice Roughley 2004 (pdf 883Kb)

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