

Fragmentation, Integration, Ecosystem Services and the Rural Landscape

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Summary

Despite at least two decades of Government/community partnerships on issue-based NRM actions the state of the catchments evidence (for the environment) continues to show a downward trend across a range of indicators.

Integration of program planning and implementation is proposed in this paper as a key principle in achieving sustainable rural land use. Specifically, integration of farm enterprise activities that are focussed on production and management of ecosystem services¹ alongside production of food and fibre is central to the premise. The concept of integration in this instance translates to:

- integrated actions at the farm enterprise/business scale
- strategically located actions at the regional scale, through the priorities of Regional Catchment Strategies.

This paper reviews natural resource management (NRM) planning, with particular consideration of how State government, regional planning bodies and private land managers might better integrate multiple benefit public and private goods and services into every day activities. The paper also draws upon our experiences emanating from Victoria's Rural Land Stewardship project, and from partnerships between State and Regional 'sustainability' agencies.

There is considerable variability in the ways that NRM planning is practiced, at the enterprise, regional or catchment levels. An overarching issue however is how well the planning caters for differences across space, time and human values and this paper attempts to identify those considerations that impact on that requirement.

1. Ecosystem services are defined as *public benefit services* such as clean air and water, biodiversity increase/management, saline water table mitigation, soil condition management, carbon sequestration, pollination, soil and water nutrient management, waste assimilation etc.



INTRODUCTION

Despite at least two decades of Government/community partnerships on issue-based NRM actions in Victoria, the state of the catchments evidence (for the environment) continues to show a downward trend across a range of indicators (VCMC 2002). There has been a tendency in previous decades to approach rural natural resource issues as non-integrated or single-issue challenges. The reasons for this history are reasonable. For example, resource or knowledge constraints have lead to a predisposition to analyse landscape problems reductively and the likely actions that lead to its cause and then assume (often quite rightly) that understanding the causal relationships will expose the linear remedial actions required. Within the scope of the particular issue, this has often been a successful approach. However, we argue here that while this approach has logical origins and some beneficial landscape outcomes, it is no longer sufficient for the scale of change needed in the rural landscape. A critique of contemporary natural resource management efforts might reveal programs and projects as remaining single focus or issue-based while being directed into inventive asset-based approaches. We argue that the asset-based approach provides a logical and sequential step into the broader framework implicit under the concept, ecosystem services. Critically, we suggest that program integration in both planning and actions is the only way an ecosystem services frame can be successful.

In a recent paper on policy and poverty David Adams (2003) observed that;

Powerful public ideas have consistent features. Specifically they are simple to understand, resonate with people's experience of the world, make normative claims on resources, can be organised through the administrative forms of the day, have few or weak ideas to compete with, appear capable of solving major public problems and have a strong policy network to sustain them over time.

It may be argued that the emerging Rural Land Stewardship (RLS) proposals in Victoria align with most of the prerequisite conditions set out above, although the challenge remains to make the underlying principles *simple to understand*. Critical to the success of this task is to bring a number of currently related, but seemingly disconnected concepts into a coherent line of reasoning. The project uses a range of terminology: land stewardship (behaviour), ecosystem services (landscape product), landscape-scale (a measure), landscape change (an outcome), public good (unbounded benefit), integrated actions (complimentary efforts), duty of care (a standard), etc. It is essential to the core of the project that ultimately the cumulative meaning of these terms sums to represent 'Rural Land Stewardship'.

Drawing on experiences originating from Victoria's Rural Land Stewardship project, and from partnerships between State and Regional 'sustainability' agencies this paper considers how the concept of land stewardship might be supported. In particular we argue that through the use of the ecosystem services model Government might assist regions in integrating rural landscape management actions. Our paper compliments other papers set out in this document by our Victorian colleagues (Major *et al*; O'Kane; Park *et al*), who are providing other insights into some of the aspects that we cover.

NATURAL RESOURCE MANAGEMENT AND INTEGRATION

For this paper we have adopted the definition of natural resource management proposed by Douglas *et al.* (2002); that is natural resource management is the management of the potential and realised direct and indirect impacts of people on the environment with the purpose of attaining ecologically sustainable development. The Commonwealth of Australia (1992) defined ecologically sustainable development (ESD) as using, conserving, and enhancing the community's resources so that ecological processes are maintained or restored, and the total quality of life, now and in the future, can be increased.

Inherent in our definition of NRM is the need to recognise that improvement in NRM requires attention not only to the biophysical phenomena but also to the values, activities, and capabilities of resource stewards and to the institutional, social and economic frameworks within which resource stewards operate. Having defined NRM in terms of the impact of people on natural resources it follows that problem representations, analyses, policies, programs, and institutional settings directed towards changing behaviours can be powerful mechanisms for improving NRM outcomes.

Understandably the need for behavioural change is often associated with people having the direct responsibility for NRM decisions, the land stewards. However improvement in NRM will also require the inclusion of activities, people, organisations and institutions that shape the parameters within which the stewards operate. This must include consideration of the globalised trading market, and all levels of domestic government and its bureaucracies as these provide drivers and barriers for the stewards.

We have taken integration to be the assimilation of the anticipated direct, indirect and interactive effects of activities when those activities are developed, implemented, monitored and evaluated. The purpose of integration in natural resource management is to achieve higher levels of effectiveness and efficiency by maximising synergistic interactions and minimising antagonistic interactions between resource management activities, uses, users and sectors.

It is important to note that integration is concerned with activities, processes and outputs at all points from conception of an idea to the point of realising the beneficial change arising from the conception. It may well be that different points (or stakeholders) in these 'conception to realisation' pathways have different integration requirements which need to be met in different ways.

LANDSCAPE-SCALE (CHANGE) AND VICTORIA'S RLS AS A SITE OF INTEGRATION

'Landscape-scale' change is what we need. That is change at a sub region, region or inter-region scale. Farming has produced our current rural landscapes and thus, it is argued here that they are landscapes that can be transformed by farming. It is

understood clearly by reviewing the history of primary industry in Australia that Australian farming is flexible and responsive to change, and is also a land use type that is spatially reducing (Annett 2003). Based on the natural resource decline trends in Victoria's rural landscape (VCMC 2002) new approaches pivot on the rationale that change is needed at a landscape scale. That is, at sub-region, region and/or inter-region scale. At a sub-region scale for example, this may mean a collection of hills, a tributary valley or multiples of these.

At a program level this would come to mean RLS, for example, working simultaneously with many land-holders (farmers) covering many properties with affects measurable in square kilometres of vegetation change, in-stream water quality change, etc—the focus being not just on change at the individual property scale. Given this desired scale of outcome there is likely to be threshold points, below which projects under new approaches cannot proceed. For example a sub-region scale project may need land-holder participation at 75% or landscape coverage at 85% to be effective. These levels are set because below these 'thresholds' the outcomes of the project are prone to be jeopardised. In RLS it is anticipated that lower rates of participation are not likely to deliver 'landscape-scale outcomes'—and thus risking public investment going once again into fragmented (non-integrated), or circumstantial efforts.

ECOSYSTEM SERVICES

As the evidence on natural resource condition continues to accumulate it is becoming clearer that ecosystem services are not the infinitely available resource once assumed in past milieu. At the same time we may be in a period of hiatus where ecosystem services (particularly from the rural landscape) are beginning to be valued 'environmentally' but not economically. This is manifest in the emerging discussion of multi-function agriculture which emphasises the production of appropriate market goods as well as public goods and services (Hall *et. al*, 2004).

The absence of specific investment support, together with a currently assumed provision of ecosystem services beyond a 'duty of care' level is a policy gap. This opening represents a significant opportunity to devise programs that deliver this support in pursuit of the public goods and services generated by production of ecosystem services. The use of the term 'ecosystem services' and related language as a framework to rethink policy and programs to support provision of in the rural landscape is increasing globally. In its Millennium Ecosystems Assessment project the UN declares that,

Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious and other non-material benefits. (UN 2003)

The OECD discusses ecosystem services in the context of land-holder roles and responsibilities. They also imply the importance of metrics in the private production of public benefits.

Many environmental values associated with privately-owned natural resources are actually public goods. For example, private farmland may provide habitat for wildlife, and sinks for atmospheric carbon. The values of these services typically cannot be appropriated by individual landowners, though compensating producers for them should be considered...where there is a problem of under-supply. If under-supply is a problem, and payments or other financial incentives are warranted, they should be clearly related to the public benefits being provided...

(OECD 2001)

In Australia the Australian Museum (2003) argues that:

Ecosystem services maintain the atmosphere, provide clean water, control soil erosion, pollution and pests, pollinate plants, and much more. Their total annual value in Australia has been estimated by the CSIRO to be \$1327 billion...

As the signs mount there seems little doubt that ecosystem services (and related terms) are becoming, or have become the acknowledged framework for planning and implementation of change in the rural landscape. One of themes that might be characterised from the various quotes above is that society is rapidly reaching a point where it wants to procure currently non-marketable 'public goods' from the rural landscape. However, an aspect that is not clear in the quotes above is that thinking about landscapes in terms of the provision of ecosystem services, requires us to engage in the landscape at a significant scale. A scale that may be considered a 'natural integration'. We may consider a particular sub-region (or sub-bioregion) and produce an assessment of the ecosystem services that are in deficit (including those services that ought to be provided under a duty of care), and then design the right scale project to close the sub-region gap in ecosystem services.

PURCHASING ECOSYSTEM SERVICES

A focus throughout the RLS project has been around the concept of reward for outcomes (as opposed to reward for activities). There has been general agreement through the course of numerous workshops and seminars that ecosystem services are clearly a potential deliverable service (or product) from farms, and that land-holders should be rewarded for the production of such services. Effective policy mixes must be able to address some of the questions surrounding the production and reward of ecosystem services, such as:

- What are the services which are above and beyond what is normally expected?
- How can they be produced?
- How can they be measured, what are the range of metrics needed?
- How can this knowledge be transferred to land-holders?
- How can the services be paid for, and how much should they cost?

Some of these questions were identified early in the Land Stewardship project (VCMC/DSE 2003). The work of the project during the past year has indicated that some of these questions can be addressed through duty of care approaches, improved knowledge and information systems and improved payment arrangements. These mechanisms are discussed in the following section.

THE SUBJECT MATTERS FROM VICTORIAN RLS PROJECT

One of the key background principles identified in early workshops was the need to keep people in the landscape. The argument for this is uncomplicated—that the rural landscape of the state is a much-altered ecosystem and consequently requires people present to manage it. The contemporary literature reveals the ‘farm gate’ level complexities in the proposition of retaining people in the landscape for its management. Geno (1999) and Rhodes *et al* (2002), suggest it is only profitable farming operations that can most afford to meet sustainability objectives. In addition to this farm management can be in a state of flux driven by complicated changes in farmer demographics (Barr 2002), and adoption or disregard of sustainable practices often correlates with financial advantage or disadvantage (Cary *et al* 2002, Lundqvist 2001). Through the creation of an additional income stream—farmers generating income from production of ecosystem services (in addition to income from production of food and fibre)—the RLS project aims to increase the likelihood of people remaining in the rural landscape.

A number of common themes emerged from the contributing papers to the RLS project. Firstly, the need for a portfolio of policy tools to be used in addressing the complex problem of natural resource management, has been repeatedly described through various RLS background papers (eg. Chaudhri 2003, Young *et al* 2003). This portfolio approach means in its simplest form that a palette of policy mechanisms are available and agile enough to be applied in varying degrees depending the circumstances. For example, applying leverage through the right mix of mechanisms to support volunteered, regulated or contractually driven practice change. Some tools will also operate in a mutually inclusive manner—the use of market mechanisms require regulation to clearly define boundaries, and appropriately designed auctions can actually help to change the boundary between the marketed and non-marketed parts of the economy (Chaudhri 2003). There are a number of existing and new tools which could form part of such a portfolio, drawing from the spheres of ‘information’, ‘regulation’, voluntary and market-based instruments (Stoneham & Chaudhri 2000, MEI 2001).

Secondly, there is a pressing need for ‘big picture’ or landscape-scale goals to work towards. The goals and targets were described as being needed at state, but particularly at regional or catchment levels (eg Mech *et al* 2003, Young *et al* 2003). There was strong agreement relating to the need for better information, and understanding of the activities/practices, which will move us all towards achieving those landscape goals.

Several of the RLS background papers raised the issue of ‘heterogeneity’. The reality that the same actions cost different land-holders different amounts, and combined with this, the same actions will almost always have different results in different parts of the landscape (Chaudhri 2003, Young *et al* 2003). The complexity that this situation presents has led the project to have more of an outcome-focussed approach. That is, attention is focussed on how to generate the most outcomes for the least public cost.

It was made clear in most of the papers that regulations are essential to underpin natural resource management. For instance it is key to ensuring that landowners are not paid to undertake management actions that are part of their legal obligations. Specifically regulations are critical to ensuring that some of the new market-based policy tools can function effectively (Chaudhri 2003, Young *et al* 2003, Mech *et al* 2003, Sammon and Thomson 2003). A key point made was that regulation could be enabling rather than restrictive. It was also highlighted that there are provisions, which exist within our current legislation, which have either been under-utilised or not yet applied (Walters in prep).

Finally, many of the contributing pieces of work acknowledged the complexity of issues impacting on management of the rural environment. In particular the inter-relationships between social, economic, and environmental aspects—reward for early adopters, duty of care and point of sale thresholds for selling ecosystem services, streamlining regulations and Government investment processes—have been discussed (eg Cocklin *et al* 2003, Young *et al* 2003).

The concept of purchasing ecosystem services was first raised for the project by the VCMC (2002), then explored further in the Land Stewardship Issues & Options paper (VCMC/DSE 2003). The idea represents a fundamental shift in the way land management change could be supported: instead of focussing concern and expenditure on repairing the land, the focus is on what ecosystem services could be produced and paid for. A principle behind this approach is the need to secure and increase the production of more of these essential ecosystem services, which are currently in decline. It has the distinct potential to be a more positive approach to land management change than a focus on decline of land health and the need for repair. It represents a shift from support for ‘activities’ to support for measurable ‘outcomes’.

THE APPROACHES TO INTEGRATED SUSTAINABLE RURAL LANDSCAPES

Gathering support and clarity about landscape scale goals is a political process, and can be time-consuming and difficult. Currently the Regional Catchment Strategies come closest to describing regional aspirations of the people in each catchment area. With time, more information and increased community understanding, even clearer goals will be developed at this level. Additionally, agreed goals for important cross-catchment assets (for eg the Murray River) are also needed. The process of ‘transacting’ ecosystem services is likely to rely heavily on information capacities, which in some cases is not

currently in place. There is however, a general information base available concerning ‘more sustainable practices’ for farm enterprises. We generally know which practices are ‘better’, or less damaging to environmental assets or values, than others.

Land managers need clarity and understanding about how that information can be applied. Some of the key pieces of information identified in the RLS project as being required by land-holders and potential investors are:

- clearly articulated regional/landscape-scale goals and targets
- practical knowledge of the actions which will achieve those goals

Further, it is likely that approaches such as Environmental Management Systems—as a potential implementation tool—will not work well without these goals, targets and knowledge systems in place (Mech *et al* 2003). To address the variability of landscapes and their management across Victoria, it would be appropriate to articulate regional goals through the Regional Catchment Strategies. Codes of practice might then be used to describe the actions required to achieve those goals. When all of these are in place, the role of Environmental Management Systems as a business management tool will be strengthened, by focussing preferred outcomes at the catchment scale. With an ecosystem services approach, those innovators who achieve the desired outcomes can be rewarded, but a RLS program must include ways of continuing to build capacity, so that all interested land-holders can engage as the interest and other imperatives increase.

THE MECHANISMS FOR MOVING FORWARD

The need for clarity in broader community expectations of land-holders through a standard for duty of care and regulation has been commonly noted through the work to date of the RLS project (see Cocklin *et al* for example). Young *et al* (2003) identify that high level clarity and understanding of what is currently defined as being reasonable can be provided to land-holders and other land managers by defining an environmental duty of care. They go further to discuss the potential need for transition payments where land-holders are unable to meet base-line duty of care expectations, or where the duty of care changes over time.

Clarity of understanding will contribute greatly to the identification of those ecosystem services which are being produced over and above what is ‘expected’, and which then could rightly be available for purchase, either by government or third party investors.

If framed appropriately it is likely that duty of care can operate and perhaps maximise benefits in the framework of landscape/social heterogeneity. This potential is particularly evident in creating more flexible forms of regulation that have various outcome foci. It has also been suggested that to deal with regional differences and varying regional goals agreed notions of ‘reasonableness’ could be set out in Regional Catchment Strategies (Young *et al* 2003).

An effective payment or reward system for the production of ecosystem services would require a cluster of tools to support it. It would require a move beyond the traditional fixed grants or cost share type of approaches, which are confining, issue-based and activity focussed (e.g. kilometres of fencing, number of rabbit-warrens destroyed, number of trees and shrubs planted) to approaches which are more outcome focused (e.g. area of habitat restored and managed, regional ground water flow mitigation, kilos of carbon sequestered). Market-based approaches may be used to determine how much a specific outcome-producing action would cost a specific land-holder.

Approaches such as those using auction mechanisms, firstly require a clear understanding of the rights and expectations of a land-holder (it needs to be underpinned by regulation or a duty of care approach). It then requires good quality information concerning the actions, which could result in the desired services. Once these criteria have been met, it is possible for a purchaser and a seller to 'do business'. An auction approach can reveal the best value for money for the buyer, and ensure that the seller is paid the true cost of the action, rather than an average cost, which may not meet his or her needs.

A clear understanding of rights and expectations can also pave the way for other market-based approaches such as cap and trade and eco-labelling. All of these arrangements will require contracts and agreements to underpin them, and these can provide confidence needed by potential third party investors.

Throughout the RLS work, it has also been made clear that there may be circumstances where fixed grant type approaches will still be needed (Young et al 2003). These circumstances include; situations where the 'public good' required is restricted to one specific property or area (EG threatened species protection), or where the desired outcome is clearly one which should be paid for by the government on behalf of the public.

GOVERNANCE

To ensure all interested parties to the concept of buying/selling ecosystem services are able to engage, new governance arrangements may also have to be considered. Traditional approaches remain useful, particularly those approaches that have included the use of regulatory settings and taxes to ensure that the impacts of certain activities do not affect others in a negative way. However, in order to make effective use of the portfolio of approaches discussed in previous sections, existing governance arrangements within and between the public, private and third sectors may need closer examination. The way governments do business is changing. Greater flexibility and an increased focus on *governance* rather than *government* is an emerging global trend (Hodge 2001). New approaches often include empowering communities to make decisions about their regions, ensuring that policies are flexible and responsive and re-aligning traditionally separate objectives such as agricultural, environmental and social goals.

ENGAGING WITH THE PRIVATE AND THIRD SECTOR.

With the scale of natural resource management required across Victoria, and the limits to government funds, there is a need to leverage private investment. Sammon and Thomson (2003) highlight that government policy arrangements and regulatory intervention can overcome the impediments to private investment. Examples given include policies aimed at increasing consumer awareness and the implementation of a regulatory structure, which provides for accreditation of public companies. These examples of government intervention could both drive consumer demand, and thus stimulate further investment.

In addition, taxation reform can assist and promote private investment in research and development, and other alternative investments. Specifically, Sammon and Thomson (2003) mention the options of increasing tax concessions for investment in research and development, an Infrastructure Borrowing's Tax Offset Scheme (IBTOS) to offset the high cost of infrastructure, and a range of other tax policy options designed to encourage investment in environmental land use change. These options have been suggested to address the fact that currently, philanthropic donations of land to recognised organisations attract capital gains tax, and expenses for maintaining covenanted land are not tax deductible.

Sammon and Thomson (2003) also indicate that there are opportunities for government to assist the investment community in setting targets for superannuation fund investment in sustainable landscape practices.

WHAT MIGHT NEW INTEGRATED APPROACHES LOOK LIKE?

Two hundred years of European development has produced a complex landscape system across Victoria. The land matrix has many success stories across the functions of natural, amenity and productive landscapes. At the same time significant impairment has occurred, or is occurring to parts the rural landscape. The issues facing rural land management are numerous and complex.

Those involved in the concept of an ecosystem services transaction may include the producers, the measurers / monitors, and the purchasers. The producers could include private land-holders, larger industry bodies, or even public land managers such as rural Local Government. The measurers and monitors will possibly include bodies such as Catchment Management Authorities, universities and other science providers. The purchasers may include national programs such as NAP or NHT, state-wide Government programs, private sector investors or philanthropic organisations. If investment in a Victorian RLS initiative (DSE) for example came in through the Regional Catchment Investment Plan program—the potential may exist to attract Australian Government interest (DAFF/DEH). This is an important point under the concept that powerful public ideas can be organised through the administrative forms of the day (Adams 2003).

Under a theoretical RLS project, Catchment Management Authorities or Local Government may propose a project, under large-scale (high threshold) criteria—covering biophysical, social and financial questions. Biophysical includes estimated big scale delivery of ecosystem services—ground water flows, biodiversity, pests organisms, etc—from an entire sub-catchment or valley, not just a single hill top or valley head.

‘Operationalising’ RLS should encapsulate a functional or implementation aspect of the elusive next paradigm shift in rural NRM—increasing the scale of change, through increasing possible income sources for land-holder (ecosystem services transactions). Integration of effort at both the farm, regional and inter-regional scales is clearly pivotal to the RLS concept of buying and selling ecosystem services.

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