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Prioritising Integrated Landscape Change Through Rural Land Stewardship for Ecosystem Services

Alistair Phillips and Kim W. Lowe#*

Despite at least two decades of Government - community partnerships on issue-based natural resource management (NRM), evidence across the Victorian rural landscape continues to reveal a downward trend across a range of indicators. Integration of both program planning and implementation is proposed in this paper, as a key principle needed if the decline in catchment or landscape condition is to shift into being a measurably sustainable stewardship of rural land. Central to this integration principle are farm enterprise activities that integrate production and management of ecosystem services with production of food and fibre. The concept of integration in this instance should be understood as orchestrated actions at the individual farm enterprise scale and strategically located actions at a multiple farm regional scale. This paper contemplates NRM planning, with particular consideration of how state government, regional planning bodies (such as Catchment Management Authorities), and private land managers might better achieve integrated multiple outcomes that provide both public and private benefits from 'every day' land management activities. The paper draws on experiences from Victoria's Rural Land Stewardship project.



Introduction

Assessment of the rural landscape in Victoria, Australia, reveals a mediocre future prognosis for landscape assets under current land management practices. This downward trend is noted across a range of indicators, including dryland salinity, increased presence of pest organisms, and the receding distribution of naturally occurring native vegetation (VCMC 2002). This circumstance exists despite two decades or more of Government - land holder partnerships on issue-based NRM actions in Victoria (DNRE 2002).

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There has been a tendency in previous decades to approach rural natural resource issues as non-integrated or single-issue challenges. The reasons behind this history of actions are understandable. Resource or knowledge constraints have led to a predisposition for a reductive analysis of landscape problems. For example, perceived causal relationships between action and problem are assessed to produce linear, remedial actions. Within the scope of specific concerns, this issue-based approach has often been successful.

However, we argue here that, while this approach has logical origins and has produced some beneficial landscape outcomes, it is no longer sufficient for the scale and trajectory of change needed in the rural landscape. In addition, a critique of contemporary NRM efforts might reveal many missed opportunities for broad landscape, asset-based approaches while programs remain unintegrated or issue-based in focus. We argue that the landscape, asset-based approach provides a logical and sequential step into the broader planning framework implicit under the concept of ecosystem services, where these are defined as *public benefit services*, such as clean air and water, biodiversity increase or management, saline water table mitigation, soil condition management, carbon sequestration, pollination, soil and water nutrient management, waste assimilation, etc. In the context of this paper, ecosystem services (as public goods) are produced on private, rural land. Critically, we suggest that program integration in both planning and action is likely to be the only way change is achieved at a scale sufficient to deliver ecosystem services.

In a recent paper, David Adams (2003, p.4) 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.

Disclaimer: the views expressed in this paper are not necessarily the views of the Victorian State Government.

The challenges to achieve alignment with the prerequisite conditions for successful new policy (set out above) are significant, particularly in preparing to deploy a complex program planning concept like 'ecosystem services'.

The Rural Land Stewardship project

The *Rural Land Stewardship* project is a policy development exercise within a stable of land stewardship strategy endeavours - including *Forest Stewardship* and *Public Land Stewardship* - currently in the final phase at the Department of Sustainability and Environment, Victoria. Attributes of the *Rural Land Stewardship* project include background elements, such as seven specialist discussion papers published by the Department, numerous seminars and workshops across the state, steering by three separate stakeholder and technical committees; and resource backing by both state and national governments. The pivotal policy and program concept to emerge from the work to date is the provision and purchase of ecosystem services - produced on private land (for public good) in the rural landscape.

Information from the *Rural Land Stewardship* project and partnerships between state and regional 'sustainability' agencies point to a number of particular operational concepts needed to support rural landscape change. In particular, we argue that through the use of an ecosystem services model, government might assist regions in integrating rural landscape management actions. Critical to the success of this task is to connect a number of related concepts into a coherent line of reasoning via an ecosystem services framework. The project uses a range of concepts: land stewardship (behaviour and ethic), ecosystem services (landscape product), landscape (a scale measure), landscape change (an outcome), public good (benefits that go beyond the boundaries of production location), integrated actions (complementary and orchestrated efforts), duty of care (a standard), etc. It is essential to the rationale of the project that ultimately the combined meaning of these terms sum to represent 'Rural Land Stewardship'.

NRM and integration

For this paper, we have adopted the definition of NRM proposed by Douglas *et al.* (2002): NRM is the management of the potential and realised impacts of people on the environment with the purpose of attaining ecologically sustainable development. The Commonwealth of Australia (1992) defined ecologically sustainable development 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 behaviour can be powerful mechanisms for improving NRM outcomes.

Understandably, the need for behavioural change is often associated with the people having 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 stewards.

We have taken integration to be the direct, indirect and interactive effects of orchestrated and complementary activities. The purpose of integration in natural resource management is to achieve higher levels of effectiveness and efficiency by maximising synergistic effects and minimising antagonistic or perverse interactions between resource managers and users. Integration for effective NRM is proposed here as not being simply co-investment by multiple interests into a single issue. It is projected to be the alignment of complementary actions across multiple land issues to produce broader change in the landscape. It is also argued that integration of collective farm-scale actions may be most effective when directed through landscape-scale priorities for change such as those set out in the State of Victoria's ten *Regional Catchment Strategies*.

It is important to note that integration is concerned with activities, processes and outputs at all points from the conception of an idea to the realisation of beneficial change arising from action. It may be that different points (or stakeholders) in the 'conception to realisation' pathway have various integration requirements which need to be supported in a range of ways to be effective.

Landscape-scale (change) and participation

Farming has produced our current rural landscapes and, accordingly, we argue that these landscapes can be

transformed again by farming or farmer activity. Reviewing the history of primary industry in Australia shows that Australian farming has a record of being flexible and responsive to change (Barr and Cary 1992), and is a land-use type that is spatially contracting (Annett 2003).

To meet global sustainability imperatives and the challenge of arresting declining natural resource conditions in Victoria's rural landscape, we propose that landscape change at a sub-regional, regional or inter-regional scale is needed. At a sub-regional scale, for example, this may represent land-use change within a collection of hills, a tributary valley, or multiples of such rural landscape types. At a program level, this would necessitate working simultaneously with many landholders (farmers) covering many properties with project outcomes measurable in square kilometres of vegetation change, in-stream water quality change, etc. In other words, the focus is not just on change at the individual property scale.

Given this desired scale of change, there are likely to be threshold points below which projects under new approaches should not proceed. For example, a particular sub-region-scale project may need landholder participation rates that represent 85 per cent landscape coverage to be effective. High involvement levels or involvement thresholds are considered important to ensure scales of change are adequate to lead to ecosystem service production. Landholder participation rates and capacity will reasonably need to be considered across site-specific issues. In the firming *Rural Land Stewardship* approaches, it is anticipated that lower rates of landholder participation are unlikely to deliver landscape-scale outcomes inside appropriate time-spans - within five to ten years, for example.

Ecosystem services

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

The use of the term 'ecosystem services' and related language is increasing globally as a framework to rethink policy and programs to support provision of services in the rural landscape. In its Millennium Ecosystems Assessment project, the United Nations (2003, p. 3) declared 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.

The Organisation for Economic Co-operation and Development discussed ecosystem services in the context of landholder roles and responsibilities. They also implied 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, p. 92).

In Australia, the Australian Museum (2003, p. 1) argued 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 theme that might be characterised from the various definitions quoted 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 these definitions is that assessment of landscapes in terms of the provision of ecosystem services requires us to consider the landscape at a significant scale. We may contemplate 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 appropriate scale project to close the sub-region gap in ecosystem services.

The increasing policy interest in developing ecosystem services and related concepts indicates a policy trend toward institutional investment support for the provision of ecosystem services by landholders (e.g. DEFRA 2002). This movement represents a significant opportunity for agencies of many jurisdictions to devise strategies and programs that provide support for ecosystem services production.

Purchasing ecosystem services

One of the key background principles identified in early workshops in the *Rural Land Stewardship* project was a need to keep people in the landscape. This is based on the argument that our rural landscape is a much-altered ecosystem and no longer has the stasis of naturally occurring landscapes, consequently requiring people 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) suggested it is only profitable farming operations that can 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 *Rural Land Stewardship* project aims to increase the likelihood of people remaining in the rural landscape.

The Victorian Catchment Management Council (VCMC 2002) raised the concept of purchasing ecosystem services as a fundamental shift in the way land management change could be supported by government policy. Instead of concentrating effort and expenditure on repairing land, the focus shifts to production and payment for ecosystem services. A principle behind this approach is the need to protect and enhance broader ecosystem health, thereby securing production of ecosystem services.

The policy-level shift may be seen as being to a more positive approach to land-use change and away from a focus on the tension between decline and repair. At the policy level, an ecosystem services framework may also represent a shift from support for activities to support for measurable outcomes. There has been general agreement through the numerous *Rural Land Stewardship*

workshops and seminars that ecosystem services have the potential to become a deliverable service (or product) from farms, and that rewarding landholders for producing ecosystem services needs further consideration. Key policy issues to consider include:

- What ecosystem services are above and beyond community, or legislated, expectation?
- How can ecosystem services be measured and paid for, what are the range of metrics needed?

How can this knowledge be transferred to landholders?*

The work of the project over the past two years indicates that some of these questions may be addressed through standards of care approaches, improved knowledge and information systems, and improved payment arrangements. A number of related program support methods are discussed in the following section.

Matters from *Rural Land Stewardship* and related policy papers

The *Rural Land Stewardship* project supported the preparation and publication of several policy discussion papers (available at www.dse.vic.gov.au). A number of pivotal policy and program themes emerged from these contributing papers. Primarily, the need was identified for a more formal alignment of current policy tools to be used in addressing the complexities of NRM (see VCMC/DSE 2003; Chaudhri 2003; Young *et al.* 2003).

This 'portfolio of tools' approach translates in its simplest form to mean the use of a palette of policy mechanisms that are responsive enough to be applied in varying degrees depending on a rigorous understanding of both the biophysical and social circumstances of particular rural landscapes. An example is applying leverage through an appropriate mix of mechanisms to support *volunteered*, *regulated* or *contract-driven* change in management practice. 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 and Chaudhri 2000).

Another key theme to emerge was the pressing need for 'big picture' or landscape-scale goals to work toward. The goals and targets were described as being needed at

state, but particularly at regional or catchment levels (e.g. Mech *et al.* 2003; Young *et al.* 2003). There was strong agreement among discussion paper authors relating to the need for better information and understanding of the activities and practices which will move society toward achieving such landscape goals.

Several of the *Rural Land Stewardship* background papers raised the issue of ‘heterogeneity’ in both landscape and social capacity. The reality is that the same actions cost different landholders 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 be focused 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 NRM. 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 was that regulation should be framed as enabling rather than restrictive, and that provisions, within existing Victorian legislation, have either been under-utilised or not yet fully applied.

Many of the contributing papers 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 - are issues discussed and evaluated by Cocklin *et al.* (2003) and Young *et al.* (2003).

Approaches to integrated sustainable rural landscapes

Gathering support and clarity about landscape-scale goals is as much a political process as it is technical, 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 (e.g. the Murray River) are also needed. The process of ‘transacting’ ecosystem services is likely

to rely heavily on information capacities, which in some cases are not currently in place. As transition to higher order information occurs, however, there is a general information base available concerning ‘more sustainable practices’ for farm enterprises. We generally understand 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 information identified in the *Rural Land Stewardship* project as being required by landholders and potential investors is:

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

Further, it is likely that potential implementation tools such as Environmental Management Systems - a business management tool for property level environmental management by agricultural enterprises - are unlikely to work well at a landscape-scale in the absence of having strategic landscape-scale 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 such prerequisites are in place, the role of Environmental Management Systems as a business management tool will be strengthened, by allowing focus on preferred multiple outcomes at the catchment scale. With an ecosystem services approach, those innovators who achieve the desired outcomes can be rewarded, but a *Rural Land Stewardship* program must include ways of continuing to build capacity, so that all interested landholders can engage as interest and other imperatives increase.

Mechanisms for moving forward

The need for clarity in broader community expectations of landholders through a standard for duty of care and regulation has been commonly noted through the work to date of the Rural Land Stewardship project (e.g. Cocklin *et al.* 2003). Young *et al.* (2003) identify that high level clarity and understanding of what is currently defined as being reasonable can be provided to landholders and other land managers by defining an environmental duty of care. They go further to discuss the potential need for transition payments where landholders 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 or standards of care may operate and perhaps maximise benefits in the framework of landscape and 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 in support. This would require a move beyond the traditional fixed grants or cost-share type of approaches, which are confining, issue-based and activity focused (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, kilograms of carbon sequestered). Market-based approaches may be used to determine how much a specific, outcome-producing action would cost a specific landholder.

Approaches such as those using auction mechanisms firstly require a clear understanding of the rights and expectations of a landholder (it needs to be underpinned by regulation or a duty of care approach). It then requires dependable information concerning both the biophysical circumstances and the actions proposed to deliver the desired services. Once these criteria have been developed and reliably described, it is possible for a purchaser and a seller to 'do business' (Stoneham and Chaudhri 2000). 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 (Chaudhri 2003).

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 the confidence needed by potential third party investors.

Throughout the *Rural Land Stewardship* 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 (e.g. 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 and 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 NRM required across Victoria, and the limits to government funds, there is a need to consider leverage of private investment. Sammon and Thomson (2003) highlight government policy arrangements and regulatory interventions that assist in overcoming perceived impediments to private investment. Examples given include policies aimed at increasing consumer awareness and the implementation of a regulatory structure that provides for accreditation of public companies. These examples of government intervention have the potential to drive consumer demand, and thus stimulate further investment.

In addition, taxation reform can assist and promote private investment in research and development, and 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 to offset the high cost of infrastructure, and a range of other tax policy options designed to encourage investment in environmental land-use change. 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 and landscape change have produced a complex system of natural, amenity and productive land across Victoria. While the resulting matrix of landscapes offers many success stories, significant impairment has occurred and continues to occur in parts of the rural landscape. The challenge of integrating rural land management is broad and perhaps mirrors the multifarious nature of the landscape.

Integration through ecosystem service production is likely to require close collaboration between the producers, the measurers or monitors, and the purchasers. The producers might include private landholders, 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 government programs, state-wide government programs, private sector investors or philanthropic organisations.

If state investment in a Victorian *Rural Land Stewardship* initiative (Department of Sustainability and Environment), for example, was conducted through the *Regional Catchment Investment* program - the potential exists to also attract (national) Australian Government investment (Department of Agriculture Fisheries and Forestry/ Department of Environment and Heritage). This is an important point under the concept that powerful public ideas have resonance when they can be organised through the administrative forms of the day (Adams 2003).

Under a *Rural Land Stewardship* 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 extensive scale delivery of ecosystem services - ground water flows, biodiversity, pest organisms, etc - from an entire subcatchment or valley, not just a single hill-top or

valley head. The central challenge is being able to confidently model biophysical outputs (the ecosystem services) required to fulfill the scale of landscape change needed to not only halt, but reverse natural resource base decline. Reliable modelling of specified actions for required outputs across a range of indicators and metrics may reveal the extent of land-use change sought, and therefore the minimum landholder participation rate considered necessary for a viable *Rural Land Stewardship* project.

Conclusion

The *Rural Land Stewardship* project in Victoria is aimed at production of strategy and program to integrate currently fragmented or single issue-based approaches to sustainable management of the rural landscape. The project has constructed a significant foundation of guiding principles through the publication of numerous background papers and information documented through numerous consultation exercises.

The central conclusion of the project is that integrating single issue-based approaches to land management actions is imperative and has the greatest chance of being achieved through the use of an ecosystem services framework. This framework opens the potential to consider the rural landscape at a significant scale; that is, to produce ecosystem services from private rural land for broader public benefit will require planning and implementation at a landscape or sub-region scale, rather than at the individual property level.

It is planned that the 'operationalisation' of *Rural Land Stewardship* will symbolise a practical aspect of the elusive next paradigm shift in rural NRM - expanding the scale of land-use change through increasing possible income sources for landholders (ecosystem services transactions). Integration of effort at both the farm, regional and inter-regional scales is clearly pivotal to the *Rural Land Stewardship* concept of buying and selling ecosystem services.

The challenges are many. They include: rural landscape governance arrangements, measuring, modelling and valuing ecosystem services across multiple metrics and indicators, understanding the complex interaction between social and landscape capacities, and describing a practical mix of policy tools. In order that we meet the sustainability imperatives of the rural landscape, tackling these challenges is a vital endeavour.

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