Reinterpreting Conservation

Developing Pragmatic Approaches to Managing Indigenous Biodiversity

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ABSTRACT

Biological diversity, a term that encapsulates all of life – the diversity of plants and animals and the places they live, has changed the way we think about nature conservation. No longer can we rely on the creation of national parks or even the protection of areas of "significant indigenous vegetation" as required under the *Resource Management Act 1991*.

Rather, the conservation of biodiversity demands that we understand the role of natural systems and ecological processes in sustaining landscapes. Landscapes and the issues embedded within them vary enormously from the protection of remote wilderness areas to maintaining the productivity of agricultural regions and the quality of life within cities.

This paper draws on Australian and international experience to outline a range of pragmatic approaches to the protection of biodiversity in different landscapes.

Firstly, the importance of developing institutional structures that balance the need for scientific assessment, leadership and centralised planning from the "top down" with strategies for engaging landholders and local communities from the "bottom up" is highlighted. Particular emphasis is placed on the role of action oriented regional plans in bridging the gap between national policy and local communities.

Secondly, a model toolkit of practical policies and programs for engaging communities and landholders is outlined. The importance of developing a complementary set of tools is highlighted ranging through education and motivational instruments, land-use planning and regulatory structures, and financial incentives.

Finally, the application of these concepts is demonstrated through a number of case study examples at national and local scales.

INTRODUCTION - HOW DO WE MANAGE BIODIVERSITY?

The management of biodiversity is a complex task. Whilst the concept of biodiversity – the variety of all life and the physical environment in which life is found – is simple and all embracing, it is the intersection between biodiversity and human systems that is complex.

Biodiversity pervades our everyday life to the extent that products directly derived from living organisms feed, clothe and shelter us. Indeed the functions performed by natural systems underpin the production of most of the goods of services that humans value. Examples of the services provided by biodiversity include nutrient cycling in soils, pollination, and the assimilation of wastes to provide clean water. More indirectly biodiversity provides services not as closely associated with the natural world such as medicines and other high technologies (Daily, 1999). However, the connections between our everyday actions and biodiversity are increasingly indirect, particularly for the majority of the population who are city dwellers.

This is a critical point because it is the economic and social drivers that dominate our cities that ultimately the cause of the loss of biodiversity. A major challenge in developing pragmatic approaches to biodiversity is the design of social, economic and environmental policy instruments that reconnect urban and rural communities.

The term "threatening processes" is used to describe a wide range of physical processes and human activities that cause the loss or decline of biological diversity: loss in the diversity of genes, species and ecosystems. It is useful to distinguish between the various pressures or drivers: the actual physical process that threatens biodiversity, the land-uses that contribute to this process and social and economic factors that drive these land uses. For example, it is land-uses such as forestry or agriculture that are often cited as a threatening process, whereas it is the actions associated with these land-uses that ultimately cause a decline in biodiversity. Table 1 distinguishes between different categories of threatening processes drawing on the work of the OECD (1996) and Young *et al*. (1996).

> **Direct threatening processes:** relate to the physical process through which biodiversity values are lost or eroded through time;
>
> **Land-uses:** identify the human activity that is likely to lead to one of the direct causes of biodiversity loss;
>
> **Underlying causes:** relate to our ability to reflect biodiversity values in markets and decisions made by governments. A failure to take biodiversity values into account when developing a strategic land-use plan would be an example of a potential policy failure; and
>
> **Fundamental causes:** relate to those factors that are often thought to be beyond our control, but which have a profound impact on the decisions that ultimately drive biodiversity loss.

Table 1: The processes that threaten biodiversity

Direct Threatening Process	Land-use	Underlying causes	Fundamental causes
• habitat modification or destruction • habitat fragmentation • over harvesting of species • environmental change	• Urban development • Infrastructure • Agriculture • Forestry • Industrial processing • Mining	• lack of information • market failure • policy failure	• population growth • inequality • economic growth • consumption patterns

The fact that such a wide range of factors, which operate at different scales, drive biodiversity loss demonstrates that strategies for the management of biodiversity are complex and are linked to our everyday actions and activities.

Indeed in addressing the fundamental causes of biodiversity loss the OECD concluded:

> "Policies which attempt to conserve biodiversity without addressing the fundamental pressures that cause biodiversity loss cannot succeed in the long run." (OECD 1996)

This is particularly relevant in the context of planning for the conservation of biodiversity at a national scale. The first and most important role of policy is to address the impacts and pressures that economic production and consumption have on biodiversity. This involves ensuring that impacts on biodiversity are integrated with other policies including economic and social policies. This is essentially the challenge of sustainable development.

However, a range of the underlying and fundamental causes of biodiversity loss such as population growth and wealth distribution are intractable at a local, regional or even national level. Further, it would be naive to presume that we can work to fully integrate biodiversity into our decision making and thereby address the underlying causes. Integrated decision making implies an ability to be able to incorporate consideration of the values of biodiversity into market decisions, or in other terms to "get the price right". In an imperfect world the tensions between economic activity and protecting natural ecosystems are likely to continue in the long term. For these reasons policies which target the direct pressure on biodiversity such as vegetation clearance are also required.

Hence, successful approaches to the management of biodiversity will need to operate on a number of scales ranging from the paddock/property to national and international responses (see figure 1). It would be tempting to argue that pragmatic approaches, the subject of this paper, can be restricted to an analysis of responses at local and regional scales. Yet even these responses must be nested with other scales of management.

For these reasons the design of institutions for biodiversity is addressed in the next section before introducing a range of policies for pragmatic management in the remainder of the paper.

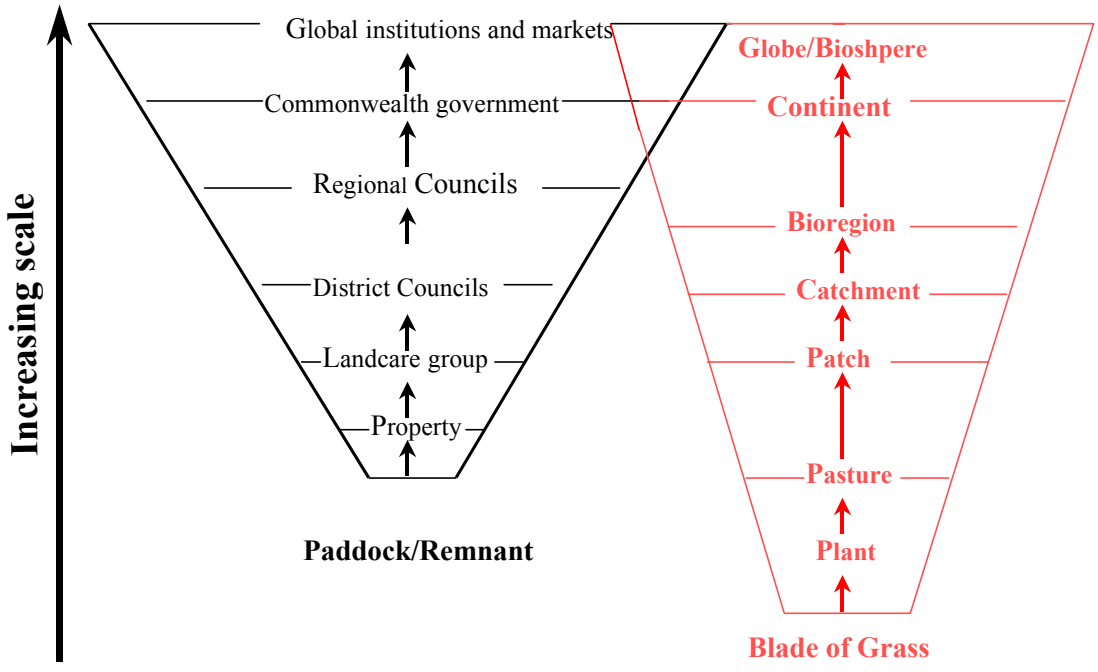

Figure 1: Different scales of ecological and institutional planning

INSTITUTIONS FOR MANAGING BIODIVERSITY

Identifying roles and responsibilities

Figure 1 highlighted the different scales at which biodiversity can be assessed and management planned for – from both ecological and institutional perspectives. Conflicts in natural resource management often arise because managers at different scales have differing objectives. For example, a farmer or developer may be seeking to maximise the economic return from their property while a land use planner at local government or regional level may be seeking to retain a representative range of the different kinds of native vegetation found within the catchment.

Planning and involvement at each scale is necessary. To be effective the outcomes of decisions at different scales should be integrated and reinforce each other.

- At a **national scale,** decisions are made in relation to the objectives of natural resource management and how these are to be balanced and integrated with other social and economic objectives.
- Planning at a **regional scale** provides an opportunity to evaluate natural resources within natural boundaries that are relevant to meeting particular management objectives, for example, catchments for water management or a bioregion for biodiversity conservation. Careful and spatially explicit planning is required to, maintain the variety of native plants and animals within a region, particularly when areas of indigenous biodiversity are fragmented. Corridors that connect remnants are required, in addition to giving priority to the types of habitat that are rare or required to sustain focal species (Lambeck, 1999).
- At the **local scale** it is possible to interpret the objectives of higher scales and reconcile and apply them to local circumstances. At a local scale the immediate concerns of the community may be most effectively voiced. The implications of regional strategies can be determined and adjusted to meet local needs.
- At the **property and paddock scales,** more pragmatic decisions are made about management needs and how these can be dealt with 'on the ground'. At this scale, management guidelines and prescriptions are more likely to be accepted if they are flexible. This is because different landholders have differing aspirations and imperatives for the management of their land management. If flexibility is provided, landholders have the ability to be entrepreneurial and create innovative solutions for the conservation of threatened habitat, the maintenance of the economic viability of the family farm, or both. The critical importance of this scale of management is reinforced by New Zealand's culture and its legal institutions, which emphasise a landholder's entitlement to autonomously manage their land within a framework of very broad constraints and obligations.

How can the tensions between different scales of management be reconciled? In the next section the importance of developing action oriented regional plans for the conservation of biodiversity is explored.

Regional planning: Balancing "top-down and bottom-up" strategies

Figure 2, illustrates the hierarchy of institutions that have an interest in natural resource management, and the roles they may play at different scales.

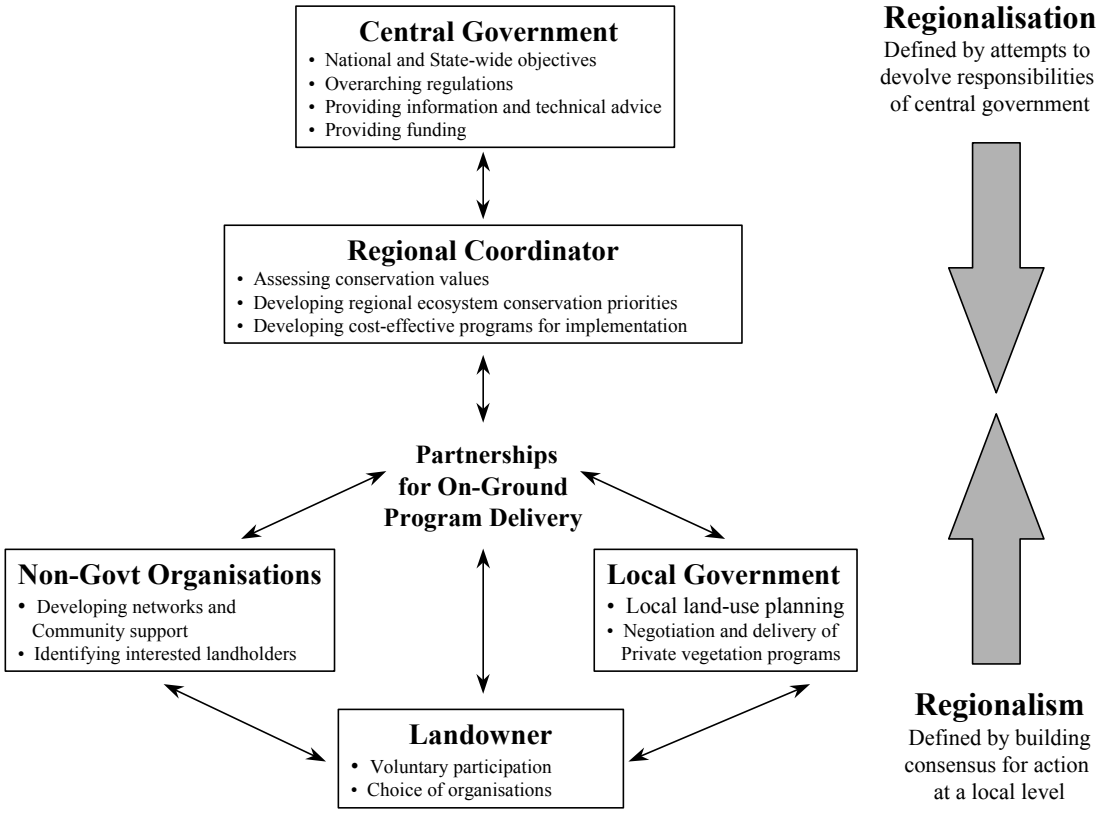

Figure 2: Institutional approaches to natural resource management

The figure highlights a number of critical issues and principles for institutional design.

- Management needs to be linked across scales with each tier of management having unique responsibilities within a nested hierarchy.
- Regional coordination and planning is critical in bridging the gap between "top-down" and "bottom-up" approaches.
- A diversity of partnerships between government and non-government players are required to develop successful programs for developing partnerships with local communities and landholders (this issue is addressed in greater detail below).

It is tempting to use a model of this kind to simply prescribe a universal solution to biodiversity management. In this model:

- New Zealand central government would take the lead in developing legislative frameworks and ensuring adequate resources are available at a regional scale
- Regional and unitary Councils would take the lead in developing regional strategies and brokering partnerships for on-ground delivery with District Councils and the private sector.
- Local governments, non-government organisations and private individuals would be actively encouraged to develop and deliver on-ground management programs.

However, it is important to recognise that the capacity and willingness of these organisations to manage biodiversity vary across regions. A particularly important issue is who should take the lead in developing and integrating biodiversity policy at the regional scale. In a comprehensive review of the role of local government in managing biodiversity in Australia Binning, Young and Cripps (1999) identify the following factors to guide who should drive the development of integrated approaches to biodiversity management.

- the processes that threaten biodiversity in different regions and how these relate to the **core functions and responsibilities** of different tiers of government;
- the **capacity** of local institutions, as determined by population size and the rate base; and
- the **coincidence** between **local, regional and national** priorities for the conservation of biodiversity.

In addressing the first of these factors, for example, a distinction could be drawn between responsibilities of Regional and District Councils in New Zealand. Regional Councils would have more responsibility in rural regions where the main pressures arise from agricultural activity that threatens the natural resources for which they have responsibility for: air, water, soil, the coast, pollution and discharges. One the other hand, District Councils may have relatively more responsibility in urban and peri-urban regions where subdivision is the main pressure on biodiversity.

Drawing on these factors,variations in the overall ability of local institutions to take the lead in developing responses to biodiversity can be readily identified. This is done in figure 3 that outlines key strategies for developing regional partnerships for biodiversity management.

Build Capacity →

	Low capacity and responsibilities for vegetation management	**High capacity and responsibilities for vegetation management**
Coincidence of local, State and nation-wide priorities	• Build capacity by providing information and expertise • Encourage regional/local planning for natural resource management • Fund and resource with technical skills	• Use regional/local structures to develop and implement strategies for natural resource management • Focus on monitoring outcomes and maintaining minimum standards
Conflict between local, State and nation-wide priorities	• Build capacity through education and awareness programs • Manage change through structural adjustment and incentives	• Develop communication, education and awareness strategies • Maintain minimum standards by formalising regional strategies and applying conflict resolution

Build Consensus ↑

Figure 3: Framework for developing partnerships

It is clearly desirable to facilitate transition of local institutions to the top right corner over time. This could be described as the central challenge for the New Zealand government in developing approaches to implementing the biodiversity Strategy. That is, developing policies and programs that build consensus and the capacity of local institutions to independently manage biodiversity.

Role of the non-government sector

Up until this point the role of non-government organisations, the private sector and landholders has largely been ignored, other than to note that these organisations will play a critical role in the delivery of conservation programs at a local scale.

In addition to this driver, there are also a number of important characteristics of the non-government sector that highlight the importance of more active engagement of this sector in developing new approaches to nature conservation.

- The perceived independence of the non-government sector means that it can engage many private landholders that will not deal with government. The experience of Trust for Nature in Victoria, Australia, would suggest this is indeed the case (Binning and Young, 1997).
- Non-government organisations are often less constrained than government agencies and, hence, are better able to gauge community needs and to develop entrepreneurial solutions. Global experience suggests they are often the source of innovation (Walker and Daily, 2000).
- Free of bureaucratic processes non-government organisations are often able to deliver on-ground outcomes more efficiently than government organisations. This is particularly true at local and regional scales where individual knowledge and networks are often critical (Lambert and Elix, 1998).

These points are critical when considering the role of partnerships with private landholders in securing conservation outcomes. Ultimately landholders must be active stewards of the biodiversity that occurs on their properties. The private sector, at arms length to government, has a critical role in facilitating this outcome (Binning and Feilman, 2000). Key issues in developing approaches to working with the private sector include the following.

Developing partnerships - a review of non-government activity in Australia revealed that individual organisations will rarely act in isolation, but rather must be engaged to work in partnership. There is an urgent need to "mainstream" biodiversity as an issue that is relevant to businesses, governments and the community sector. This will involve developing strategies that break down the myth that biodiversity is an exclusively public issue.

Recognising non-government activities for biodiversity conservation - a key issue for engaging the non-government will be the capacity to monitor, account and quantify the contribution of government and non-government activities outside of the formal reserve system. Lack of institutional recognition of off reserve conservation is important for two reasons. First, it means that the role of private conservation is often neglected in the development of government policy at national, state, regional and local scales. Second, the poor public profile of private conservation impedes its future growth. The concept of a Conservation Management Network has been developed to address this concern, see Box 1.

Removing legal impediments to non-government sector activity - because conservation policy and legislative structures have not been developed with active involvement of the private sector in mind, significant impediments to the non-government sector accessing the full range of conservation tools may exist. Key examples include: legislative barriers to the establishment of independent conservation Trusts that are able to negotiate conservation covenants, access to tax deductions for the management costs associated with private conservation reserves, and the inability to separate the ownership of environmental assets, from title to land, for example carbon in order to facilitate the creation of markets for environmental services.

Box 1 – Community Conservation Network

The concept of a Community Conservation Network has been developed to integrate on- and off -reserve conservation (Prober and Thiele, 1996, 2000; Binning and Young 1997). The objective is to develop management strategies that maximise the contribution each tenure of land can make to the achievement of conservation outcomes. No tenure is considered "superior" to another. Rather management strategies that maximise opportunities for integrating conservation objectives with other land-uses are actively pursued on all land tenures.

For example, in the case of rural lands, conservation actions would need to be integrated with agricultural practices and the protection of corridors of native vegetation. The framework is inclusive and acknowledges that in many regions conservation objectives will not be met exclusively through formal reserves and thus requires greater integration between on- and off-reserve conservation.

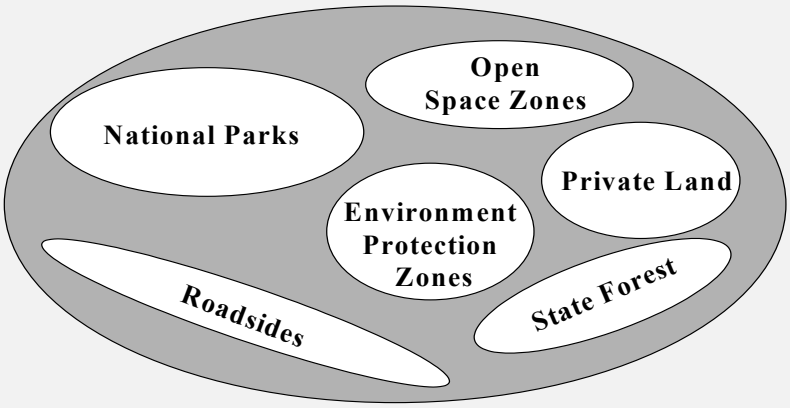

Figure 4: The concept of a conservation management network

It is noted that such a framework is not new and is consistent with the approach used in the United Nations Environment Program's Biosphere Reserve model initiated in 1972. It also has similarities to the definition of protected area networks in the New Zealand Biodiversity Strategy. Although this concept is not new there remain significant impediments to its application. Perhaps the most significant of these is the pervasive culture that nature conservation is a public responsibility with little or no role for private individuals.

This culture is changing, both in Australia and New Zealand, as evidenced by the development of Biodiversity Strategies and associated policies. However application of the concept requires that currently fragmented approaches to conservation policy be more effectively coordinated across all government agencies. A starting point is to develop a spatial data base that records conservation activities by ecological communities across all land tenures.

An important challenge is to engage public authorities that manage land but do not have conservation as a primary management objectives. For example, in Australia many of the most valuable remnants of temperate woodlands and grasslands are found on vacant crown land, rail easements, travelling stock routes and cemeteries (Prober and Theile, 1996).

Principles for successful regional biodiversity planing

Six key principles for successful regional biodiversity planning are identified here to conclude the discussion of institutional frameworks, (Binning, Young and Cripps, 1999).

> **Principle 1: Clear definition of roles and responsibilities** – the development of regional strategies requires clear distinction to be maintained between the following roles and responsibilities:
>
> - decision-making associated with the performance of statutory functions including land-use approvals;
> - the provision of expertise, advice and stakeholder input to the development of programs, policies and regulations developed under the statutory process; and
> - the delivery of natural resource management programs a through diverse range of structures, including partnerships with the non-government sector.
>
> **Principle 2: Maintenance of outcome-based legislative framework –** a legislative framework that takes account of biodiversity and facilitates regional planning should be in place. This framework should establish clear minimum standards for the maintenance of biodiversity, e.g. through requirements to conserve a comprehensive and adequate range of different ecological communities.
>
> **Principle 3: Delegation and development of action based regional strategies –** regional strategies that meet minimum standards should be accredited and management responsibility devolved. Core elements of a regional strategy are described on the following page (Box 2).
>
> **Principle 4: Flexible Delivery –** regional plans should involve diverse partnerships with both government and non-government organisations for delivery polices and programs across all land tenures. Implementation programs include the full suite of policy tools ranging through education and motivational tools, regulations and property right based instruments, and financial incentives (see discussion of model toolkit in the next section).
>
> **Principle 5: Adequate resources** – funding information and expertise required to meet required minimum standards should be secured for the region.
>
> **Principle 6**: **Monitoring and review** - performance indicators and accountability measures should be in place and include provision for regular review of outcomes and the appropriateness of existing standards.

In addition to these principles biodiversity conservation will need to be integrated with other natural resource management strategies, including land-use planning, water quality and pest control strategies. Indeed the management of biodiversity is often integral to the achievement of these objectives.

It is perhaps useful to briefly reflect on Australia and New Zealand's performance in relation to these principles.

With the exception of Victoria, Australia has poorly defined regional structures for natural resource management. Regional structures are characterised by fragmented responsibilities between economic and social development and natural resource management. Decision making structures are confused with a numerous separate committees being established at a regional scale to advise governments on different natural resource management issues. Catchment management structures are generally constituted of community based volunteers who are poorly resourced to provide advice to government and often conflict with elected local government representatives. Regional approaches to managing biodiversity are only just

emerging with assessment of conservation values being patchy. Monitoring and accountability structures are yet to emerge. (Dore, Binning and Hayes, 1999).

On a more optimistic note there are some outstanding examples of regional approaches to biodiversity, the Brisbane region and the Goulburn-Broken catchment are notable. Genuine efforts are being made to demonstrate the role of biodiversity in production landscapes, and conservation values are increasingly being taken into account in catchment planning. Implementation programs are increasingly focused on engaging landholders and achieving a balance between policy instruments.

Box 2 – Key elements of a regional biodiversity strategy

Establishment of a coordinating body: A local or regionally based body is given responsibility for overall coordination and strategic development of the regional strategy. This body will require a balance of expertise and skills. It is important to note that the coordinating body need not be a part of government or perform statutory functions, it may for example be an advisory board of relevant experts and stakeholders. Its role is to bring the various interests together at an appropriate scale for natural resource management planning. It should have defined relationships to other regional agencies.

Memorandum of Understanding on statutory processes: A formal Memorandum of Understanding will be required between the agencies with statutory responsibilities and other parties with a role in delivering the regional action plan. The purpose of the memorandum of understanding is to outline how each agency or organisation with statutory responsibilities will interpret and apply the legislation under their control within the region. A key objective is to streamline existing approval processes and the delivery of on-ground programs.

Integrated land use plans: All statutory land use planning should be integrated into a single coordinated land use planning framework that forms the basis of regional natural resource, economic and social planning. For the purposes of biodiversity planning mapping of the distribution of indigenous biodiversity with in the region on the basis of agreed ecological communities across all land tenures is a critical step. Key threats to biodiversity and appropriate management responses will also need to be identified. Any tensions in the land use planning responsibilities of statutory agencies will be resolved through the Memorandum of Understanding.

Implementation program: An implementation program drawing on the full range of policy tools will be developed that is consistent with priorities identified in the planning phase.

Funding and resourcing partnership agreement: All tiers of government will agree resources for the strategy with a minimum 5 year commitment to the implementation program.

Accountability criteria: As regions are given greater flexibility in achieving defined outcomes, these must be measured and accountability procedures put in place.

In comparison to Australia, New Zealand has a clear model for developing regional responses to natural resource management through the *Resource Management Act 1991*. The Act, however, does not specifically provide for the management of biodiversity and responsibilities are often confused, particularly between Regional and District Councils. It is unclear to what extent private landholders have been engaged in dialogue about their role in conserving biodiversity. Funding arrangements for biodiversity related programs are unclear and further integration with other natural resource management strategies is required.

The Bio-What report (Ministerial Council on Biodiversity, 2000) proposes the development of a national policy statement complemented by national and local biodiversity accords that could potentially play the role of coordination emphasised in Box 2. The report notes, however, the challenge of developing and funding incentive, education and voluntary property right mechanisms at a local scale. As in Australia, it is suspected that effective engagement of the non-government sector in on ground conservation will remain an ongoing challenge. In summary the institutional settings are broadly moving in the right direction. The challenge is to move on to develop strong on-ground implementation programs using the full suite of policy tools.

MODEL TOOLKIT – ACHIEVING ON-GROUND CONSERVATION

Introducing the toolkit - The need for a broad suite of policy tools

Figure 5 provides and overview of the range of instruments that can be used to implement policies for the conservation and sustainable use of biodiversity.

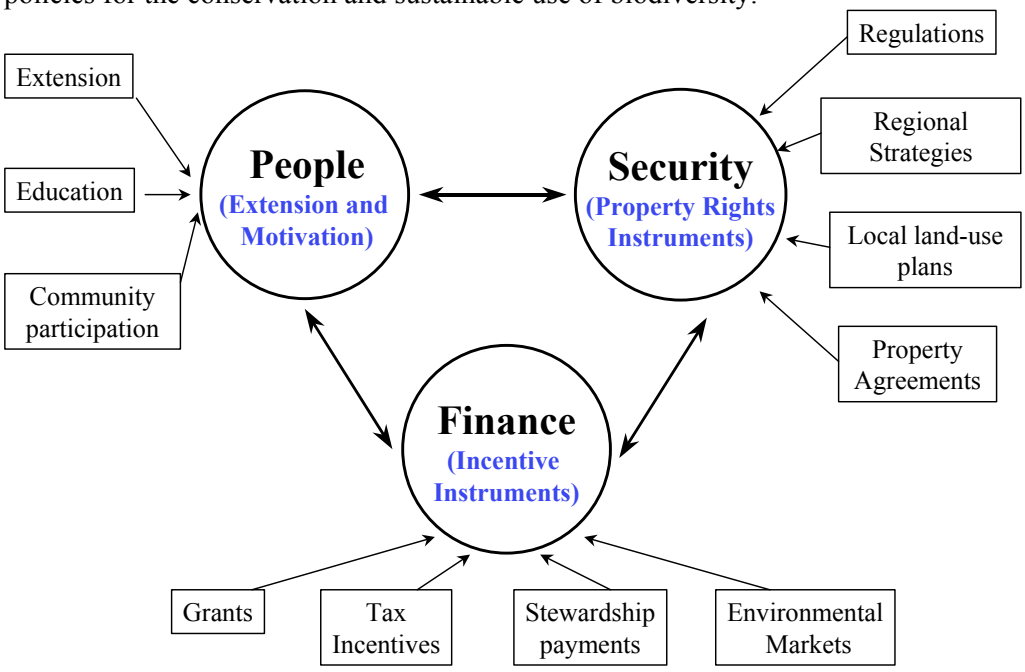

Figure 5: The policy mix

The tool box is divided into the following broad categories (Binning and Young, 1997).

- **People** - the tools that can be used to motivate and retain landholders support for vegetation programs;
- **Finance** - the incentives that can be provided to share the costs of managing vegetation.
- **Security** - the regulatory, legal and voluntary property right instruments that can be used to provide secure adaptive management of vegetation; and

These categories provide a powerful framework for the development of implementation programs for biodiversity strategies. The concept of sustainable development highlights the point that policy approaches to natural resource management will be more effective if strong linkages are drawn between social, economic and environmental drivers. This process is mirrored in policy design where there is considerable evidence that policies that harness the synergies between: educational (people), regulatory (security) and economic incentives (finance) are likely to be more effective both in terms of cost and environmental outcomes (Farrier, 1995; Young et.al, 1996; OECD, 1996, Binning and Young, 1997).

This insight is critical because policy makers are generally biased towards one type of instrument based on their disciplinary training and professional experience. For example, lawyers and planners tend to prefer regulation and land-use planning, economists incentive instruments and social scientists education and participatory processes. A critical management issue in developing successful implementation strategies is to bring these differing perspectives together and to seek out complementarities.

A key challenge for governments is to facilitate understanding of the range of tools available, remove impediments to their use, and actively promote their adoption by providing incentives for the adoption of new policies by local and regional organisations (Cripps et.al., 1999).

In the remainder of this section examples of the tools available within each of these categories are discussed. The list is not comprehensive but gives an indication of the scope of policy instruments required.

People – Education and motivational tools

Education and motivational tools are required to develop understanding and the willingness of local communities and landholders to adopt new management practices for the conservation of biodiversity. These tools are designed to raise awareness and shift the willingness of the community to take action to conserve areas of indigenous vegetation and promote active conservation stewardship (Farrier 1995, Crompton, 1990). Whilst a necessary component of any policy mix, it is important to recognise that education programs are often insufficient to secure behavioural change (Brasden, 1991).

Community extension - In Australia community based extension for sustainable land management was pioneered by the Landcare movement (Campbell, 1994). The model is based on small groups of landholders meeting to develop joint projects to address natural resource management issues. This movement has been credited with raising the awareness of landholders of sustainability issues and has been the major driver of political responses to natural resource management in the last 10 years. A major challenge is to fully integrate biodiversity conservation into the more production oriented objectives of Landcare at a grass roots level.

Individual extension – A recent review of community based programs in Australia has reaffirmed that little if anything can replace the need for face to face contact with trained extension officers on site. Individual extension is the most effective educative tool in delivering both attitudinal and behavioural change in landholders, particularly when combined with catalytic or cost sharing incentives (Williams, 2000). Another insight is that conservation extension is likely to be more effective if delivered by local landholders employed by non-partisan non-government organisations (Lambert and Elix, 1998). A major challenge, however is how to resource individual extension.

Education programs - There is great ignorance of the value of biodiversity within the community, particularly of its functional role in delivering environmental services such as pollination and the assimilation of wastes (Daily, 1999). Education programs are essential to address this gap, although the pay-off is neither immediate or direct. Key targets include decision makers and community leaders, schools, and landholders through property planning courses.

Community and voluntary involvement - One view is that communication and learning about biodiversity values is most effectively achieved through direct involvement with the management of biodiversity and natural areas. Examples of programs in Australia include national monitoring programs (eg Water Watch), voluntary management of bushland areas, and voluntary and compulsory labour force training programs.

Awards – Awards that recognise outstanding conservation management can be an effective way of promoting successes and leaders in the community.

Finance – Incentives for managing biodiversity

Financial incentives play a critical role in securing voluntary uptake of conservation programs. They can also assist landholders in meeting the costs of transition to a new regulatory standard.

There is much debate over when and how much landholders should be paid to take action to conserve biodiversity or address natural resource management issues. A distinction can be drawn between:

- The **Duty of Care** for sustainable land management faced by a landholder; and
- The provision of non-marketable "**Public Conservation Service**" by landholders managing vegetation to meet conservation objectives.

Determining where "duty of care" stops and "public conservation service" begins is a difficult issue. It is suggested that the dividing line should be drawn between those management practices required to achieve land-use objectives at a landscape or regional scale and any additional practices required to sustain sites of unique conservation value. Hence, a public conservation service is provided when the community's interest lies in securing active and ongoing management of a particular site (Binning and Young, 1997).

The design of effective financial incentives depends on their relationship to regulatory and motivation programs. Different models of financial incentives are outlined below although many others exist. Ultimately it is the imagination of policy makers that determines how far a given dollar goes in providing incentive to landholders.

Community grants – These are grants provided to community/landcare groups to undertake conservation works. They are the foundation of the $1.3 billion Natural Heritage Trust in Australia. Whilst undoubtedly successful, care needs to be taken to ensure proposed works are targeted at priority natural resource management actions.

Catalytic incentives and grants – Catalytic incentives are used to reinforce the existing motivation of landholders and to secure behavioural change. Catalytic incentives are characterised by being small payments that meet a proportion of the costs of on-ground works. They typically require a substantial landholder contribution, at least 50% in the case of the Natural Heritage Trust. They are highly effective in regions where landholder awareness and participation in conservation programs is high. An excellent example of a catalytic incentive is the Greening Australia Fencing Assistance program described in third case study in the final section of this paper.

Cost sharing incentives – Cost sharing incentives provide funding for on-ground works on the basis of a calculation of the relative proportion of public and private benefits associated with that work (MDBC, 1996). These payments are typically larger than catalytic incentives, but have the advantage that payment can be more effectively targeted at strategic priorities. A good example of this approach is the Coorong Salinity Action plan that provides funding for on-ground works on the basis of the contribution made to meeting strategic objects for both salinity control and biodiversity conservation. Payments vary from $40 ha for establishment of lucerne pasture to control ground water levels to $1500 ha plus fencing costs for natural habitat of high conservation value (Coorong District Committee, 1997).

Stewardship payments - Stewardship payments can be defined as ongoing annual payments for conservation management of natural areas. They are typically paid at a rate near the full opportunity cost of conservation management. Payments of this kind are typically restricted to areas of outstanding conservation value that are protected by a binding conservation covenant. They can be argued to represent a cost effective alternative to public acquisition and management, particularly for ecological

communities that are highly fragmented. Experience with the use of stewardship payments is limited in Australia to the $30 million private forest reserves program that resulted from the Tasmanian Regional Forest Agreement. This program identified in excess of 90 000ha of private forest that is required to be management for conservation. However, the use of stewardship payments is widespread in the United States and Europe, where subsidies for environmental management are increasing substituting for production based agricultural subsidises.

Tax Incentives – Conservation is one of the most highly taxed land-uses in Australia, particularly on private land that is not used for primary production and therefore cannot access business related tax deductions. Binning and Young (1999a, 1999b and 1999c) have identified a wide range of impediments created by the taxation system and identified a range of opportunities to provide incentives for private investment in nature conservation. Examples are set out below.

- Allowing tax deductions for property gifted to environmental organisations including, land, conservation covenants (loss in land value), bargain sales of land (differential in sale price and market value), and land donated with a retained right of occupation.
- Allowing private conservation reserves to deduct management costs and access business tax concessions, for example negative gearing.
- Providing exemptions from land tax and local government rates to properties covered by a conservation covenant.
- Ensuring non-government organisations undertaking on-ground conservation works can achieve tax deductible status for donations in an administratively efficient manner.
- Exempting non-government organisations from stamp duty in the operation of a revolving fund.

Transition Incentives – these incentives are paid to encourage compliance and transition to a new regulatory standard, such as restrictions on the right to clear and/or sub-divide land. Transition payments can be granted on the basis of compensation for foregone land-use opportunities or on the basis of assisting compliance. The latter approach is generally associated with smaller payments targeted at on-ground management. Examples in Australia cover this full range from compensation requirements for involuntary re-zoning by local government to the modest $15 million incentives fund associated with the introduction of broad-scale clearing controls in NSW in 1997 (Cripps et.al, 1999).

Environmental Markets – An alternative approach to direct payments is to create markets for environmental services. Revolving funds that purchase land rezone/covenant and resell are one example. Tradeable water rights are an example of an environmental market that is of some relevance to biodiversity. Other emerging markets include credit and auction schemes for carbon sequestration, biodiversity conservation, and water purification. A primary motivation for these markets is to broaden the funding base for natural resource management by connecting the consumers of environmental services that are based in cities with the landholders in rural regions that supply these services.

Security – Property right and land use planning tools

Property right measures have the potential to provide security for both environmental and development objectives. Responsibilities for land management at any point in time are defined through the policies and legal institutions that regulate land management practices. Land ownership can be described in terms of a series of entitlements and obligations, such as the right to graze and the obligation to protect areas of significant indigenous vegetation (as required under the *Resource Management Act 1991*). Property rights are not only defined by legislation but also by the implementation and enforcement programs associated with legislation. It is not uncommon for regulations and land-use plans to fail because they were never implemented or enforced (Brasden, 1991).

It is important to note that property rights can be defined at any scale ranging from national legislation to individual property agreements that may only effect a small portion of a block of land. Further, property right mechanisms are not always regulatory in nature and may be entered into willingly, as is the case with voluntary conservation covenants. However, as has been noted, regulatory structures have a fundamental role in the policy mix in terms of establishing minimum standards for environmental management.

Key examples of regulatory, land use planning and property right-based instruments at different scales are outlined below. The potential for complementarity between these tools in appropriately defining property rights at different scales should be noted.

National legislation – National legislation establishes the framework for biodiversity management. Key Acts in New Zealand include the *Resource Management Act 1991*, *Conservation Act 1987*, *Biosecurity Act 1993*, *Fisheries Act 1996* and *Hazardous Substances and New Organisms Act 1996*.

Regional and local scale regulation – A wide range of tools are available to plan for and regulate land-use at local scales. These tools are, of course, familiar and essential to planners. A useful distinction can be drawn between strategic planning, local planning and tools for rezoning land. Table 2 outlines a number of local and regional planning tools used in Australia. Particular challenges lie in the following areas:

- integrating biodiversity values into existing natural resource management and land-use planning processes that have traditionally focused on development, infrastructure, recreation and land management issues;
- ensuring biodiversity on public land is appropriately managed;
- developing land-use plans that effectively conserve sites of significant biodiversity through appropriate zoning ahead of development pressures; and
- developing mechanisms to cost effectively rezone land whilst ensuring landholders are treated equitably and fairly.

Table 2: Examples of regional and local planning tools

Strategic Planning	Local Planning	Re-zoning
• Development and settlement planning • Regional policy statements • Pest and fire management • Off-sets policies	• Tree and vegetation protection By-laws • Open space, local reserve and recreation management • Development incentives	• Voluntary • Back-zoning • Acquisition • Revolving funds

(Binning and Thorman, 1999)

Management agreements and covenants: Property agreements, management agreements and conservation covenants are all terms for formal agreement between a landholder and a third party, usually government, to manage an area of privately owned land for conservation. An agreement secures conservation outcomes by defining management objectives for the land and sets out those land-uses that are permitted or excluded, in much the same way as is done through land-use zoning. Provision may also be made for the development of a management plan (Binning and Young, 1997).

Management agreements can be distinguished from local planning instruments because they are generally entered into voluntarily.

Management agreements can be of varying levels of security ranging from non-binding, as is the case with the Land for Wildlife program in Austalia, through to covenants that are binding in perpetuity. The Queen Elizabeth II Trust allows for the negotiation of in perpetuity conservation covenants in New Zealand.
An interesting application of management agreements in Australia has been their increasing use by local governments who encourage voluntary rezoning by landholders committed to conservation through incentives such as rate rebates. This option is often taken up by landholders who fear rising rates or other pressures will ultimately force sub-division of their land.

APPLYING THE TOOLBOX – CASE STUDIES FROM AUSTRALIA

The previous section of the paper introduced a wide range of policies and programs for delivering on-ground conservation actions. In this final section a number of case studies from Australia are used to demonstrate how these tools can be mixed and applied at different scales.

In doing this it is important to draw attention to a number of key design principles.

First, as noted, there is a need to ensure that a mix of educational, incentive and regulatory based mechanisms are used;

Second, there is the issue of the order of policy implementation. Awareness raising through education is a critical first step but is demonstrated to have little influence on behavioural change. Likewise financial incentives are likely to be ineffective until awareness is raised and landholder attitudes shifted toward positive management of biodiversity. Regulations have also been demonstrated to fail in the absence of strong community support (Brasden, 1991). This suggests that an ideal policy approach involves: awareness raising to shift attitudes, financial incentives to assist in meeting the transition to more sustainable management, and regulations to secure the community's investment in improved management.

Of course this policy ordering can be changed in certain circumstances. For example, when seeking to quickly achieve significant changes behaviour it may be more effective to regulate than educate. A celebrated case is that of imposing regulations requiring seat belts in cars or, perhaps less famously, the introduction land clearing controls. The process creates debate and may succeed in shifting community preferences. Whilst undoubtedly successful in some circumstances, such approaches are riskier and require greater political capital.

Third, related to policy ordering are principles that guide the emphasis placed on each of the different categories of instrument. If dramatic structural change is required in a short time frame regulatory changes imposed by central government coupled with incentive payments that facilitate transition by compensating landholders may be preferred. However, strategies for achieving incremental change ideally place greater emphasis on education backed by incentives to achieve greater awareness and uptake.

Fourth, successful approaches to biodiversity management are complex and hence require time to develop, secure resources, implement and gain community acceptance and uptake. The most successful regional approaches we are aware of have taken in excess of 10 year to develop and are characterised by strong leadership and continuity in key staff (Binning, Cripps and Young , 1999).

Fifth, an adaptive approach to biodiversity planning and implementation policies is required. Action should be taken whenever there is confidence that a substantial contribution to regional conservation objectives can be achieved. However, improvements to the information base and feedback from ongoing monitoring are essential elements of any successful approach (Holling, 1978; International Standards Organisation, 1996a, 1996b).

Case Study 1 – Australian National Policy Approaches to Vegetation Management

The Federal government is committed to an objective of reversing the long term decline in the quality and extent of Australia's native vegetation by June 2001. This is an ambitious target that is unlikely to be achieved.

A complex range of policies and programs are in place to promote the achievement of this goal including the following (ANZECC, 2000).

- National and State regulations, policies and institutions including land clearing and threatened species legislation in most States.
- Planning and assessment frameworks for inventory, data mapping, assessment and planning for biodiversity conservation
- Creation of a comprehensive, adequate and representative national reserve system that may, where appropriate, include private reserves.
- Communication and capacity building strategies for both planners and landholders to take account of biodiversity values.
- Financial incentives underpinned by grants available through the $1.3 billion Natural Heritage Trust
- Monitoring and evaluation strategies that assess the quality and extent of native vegetation.

Through the Natural Heritage Trust the government has invested in the full range of activities. The increase in investment has yielded many benefits with biodiversity effectively being raised to the profile of other natural resource management issues.

However challenges remain. Clearing of native vegetation still outstrips revegetation and rehabilitation activities, with Queensland a particular hotspot. Regional structures for natural resource management remain poorly resourced and are generally not effectively integrated into other decision-making structures. Impediments to the use of the full suite of policy instruments identified in this report remain, particularly for the non-government sector. Grant programs need to be more effectively targeted to high priority on-ground works and tied to appropriate property right instruments (Dore, Binning and Hayes, 1999).

These challenges highlight the need for central government to achieve balance in the range of activities that they are involved in. It is not effective to simply invest in on-ground works whilst other processes that degrade biodiversity continue. A balanced approach by central government requires investment in the following areas.

- **Institutional reform** – including establishment of minimum standards, clarification of roles and responsibilities funding and removal of impediments to the use of the full suite of policy instruments.
- **Capacity building** – including education, inventory and mapping, and provision of expertise in biodiversity planning, program implementation and monitoring.
- **On-ground works** – provided funding to targeted investment in high priority on-ground conservation works.
- **Monitoring and Adaptive Management** – measuring progress, learning and adapting.

The Federal government has invested in all of these areas but many challenges remain. This emphasises the critical role of national governments in leading the development of effective approaches to biodiversity conservation.

Case Study 2 – Regional Planning – Brisbane City Council

Brisbane City Council has an impressive vegetation management program in place. This is designed around the combined objectives of maintaining open space and hence amenity in the City and conserving biodiversity.

The range of mechanisms used by Brisbane City includes the following.

- **Strategic Town Planning** which includes explicit planning through the development of District Open Space Plans which take account of biodiversity values
- **Vegetation Protection Orders and Non Urban Zoning** are the regulatory and statutory processes used to protect native vegetation within the city. Vegetation Protection Orders (VPOs), that have the effect of making vegetation clearance a development that requires approval by the council, were introduced in 1991 and targeted at key natural areas and sites. In addition, land within the city may be zoned into one of three non-urban conservation zones.
- **Environment Levy** of $30 per rate payer per annum is used to **acquire** key sites within the city. Rate payers subject to a VPO are exempt from the levy. Initially funds were borrowed against the Levy to facilitate the purchase of significant sites. The levy now funds repayments of the loan and purchase of additional sites. The fund is managed in a separate fund and enjoys strong community support.
- **Management of Council Land** is a high priority task within the council. The council is developing management plans for major natural areas within the city, with a commitment to extensive public consultation and ongoing participation.
- **Voluntary Conservation Agreement (VCA)** are used to encourage private landholders to set aside and manage land for nature conservation. Two types of agreement are offered: A General Agreement, which involves entering a Deed of Agreement to manage the land for conservation; and a Higher Agreement which involves both a Deed of Agreement and rezoning the land to a non-urban conservation zone. Land for Wildlife also provides landholders with the option of a non binding way of participating in nature conservation activities within the city.
- **Financial Assistance** is available to landholders entering VCA's. It is calculated as a proportion of the value of the property up to a set maximum of $1000 and $1500 per annum for General and Higher Agreements respectively. Assistance is essentially in the form of a rate rebate**,** however the council has taken the important step of tying assistance with the costs associated with ongoing management.
- C**ommunity grants** are provided to groups to undertake management works.
- **The Council has introduced monitoring of vegetation loss**. In the eight years prior to 1991 when VPOs were introduced the city lost one fifth of its vegetation. Since that time the rate of clearance has been significantly slowed.

Officers at the Council strongly emphasised that a strong mix of instruments is required, as the circumstances where a particular instrument is appropriate will vary. The planning processes identify key habitats, remnants and corridors requiring protection. However, successfully engaging the landholders has required a range of policy options to be developed through which conservation objectives can be satisfactorily met.

Another lesson that can be learnt is the importance of stable institutional structures that allow complex conservation programs to be developed over time. Notably Brisbane City is Australia's only major city to be covered by a single regional Council and this undoubtedly facilitates achievement of special programs. It has resources is excess of $1 billion annually. It has developed its conservation program progressively over 10 years with a small unit of committed staff.

Case Study 3 – Property Scale Programs – Greening Australia Fencing Assistance

Greening Australia, a non-government organisation committed to re-establishing native vegetation, administer a program that assists landholders to fence remnant vegetation within several catchments in Australia. Key elements of the program are shown in figure 6.

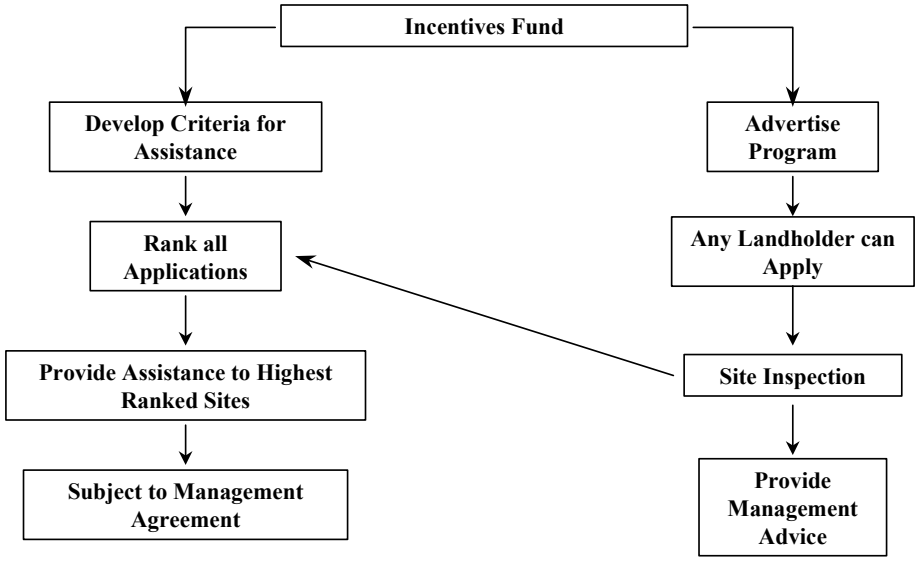

Figure 6 Greening Australia Fencing Assistance: An example of a targeted incentive.

The program is very simply structured and involves the following:

- an incentives fund is created which is available to all landholders in the region;
- access to the incentive fund is broadly advertised promoting its objectives and administrative simplicity;
- landholders apply by simply expressing interest in the program via a phone call or one page form lodged with Greening Australia;
- all landholders who express interest in the program are visited by an extension officer who assesses potential sites on the property, provides free management advice and, if requested develops an application for funding on-site;
- all applications are ranked on the basis to which they contribute to catchment and biodiversity objectives;
- funding is approved to the highest ranked sites and provided by the extension officer at a rate of $1200 per kilometre of fencing; and
- landholders enter a 10 year management agreement to maintain the fences and manage the site for nature conservation.

The attraction of this kind of program is that a relatively small incentive is used as a catalyst to encourage landholders to take conservation activities on their properties. It demonstrates that small, simple and administratively efficient programs can be developed at a property scale that still achieve appropriate mix of policy instruments. This is achieved by combining individual extension, financial incentives and property right instruments, in the form of a management agreement.

Variations of this type of agreement can easily be envisaged. For example, larger cost-sharing or stewardship payments may be coupled to entry into binding conservation covenants. Similarly transition incentives tied to extension services may promote acceptance of changes in land-use regulation.

CONCLUSIONS

This paper has given an Australian perspective on how to develop pragmatic approaches to conserving biodiversity. Ultimately pragmatic approaches will be developed through on-ground programs that target and reward land managers who actively manage biodiversity on their land – be it private or public land.

However, it has been revealed that the pathway to this outcome is rather more complex. Rather than focussing exclusively on land managers, it is necessary to understand the economic and social factors that are driving the land-uses and management practices that are causing the continuing loss of biodiversity. Policy responses to these socio-economic drivers require biodiversity values to be integrated into markets and with government responses to other natural resource management issues.

Institutional reforms are required that clarify roles and responsibilities for biodiversity management and ensure that local and regional institutions have the capacity to assess and develop programs that address biodiversity in ways that are locally relevant. Engagement of the private sector is also required, particularly to develop markets for the services provided by biodiversity. Markets that connect urban and rural communities are an especially urgent need.

Further, a wide range of policies and programs will ultimately be required to effectively engage landholders. A toolkit of education, incentive, and property right based instruments has been outlined. The need to draw on the full range of these instruments has been highlighted as has the need for adaptive development of programs.

The range of case studies presented demonstrates that policy responses are required at all scales – national to local. Evidence suggests that successful programs may take in excess of 10 years to fully develop - but that is no reason not to start.

New Zealand has many of the elements of a successful approach to biodiversity management either in place or under development. The *Resource Management Act 1991* has the potential to provide a robust framework for developing regional policies and programs.

The critical challenge remains however: translating planning into on-ground action that is monitored so that policy can be adapted and improved through time.

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