

Innovation in public policy for conservation of biodiversity

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This chapter looks at possible areas of innovation in public policy for biodiversity conservation over the next ten years. Innovation in public policy is strongly determined by the political and community climate in which the policy operates. It also draws on the generation of new knowledge through research and initial testing in the community.

Experience over the past decades shows the influence of ideas first generated from research in ecology and other sciences, including the social and economic sciences, which are then integrated into public policy. Many of the new ideas and approaches that shape public policy are generated outside of government. Change in public policy is often slow, since it usually requires sufficiently broad agreement in the community over the need for and directions of change. New approaches to public policy over the coming decade are therefore likely to be based on ideas that are already being debated or experimented within the community.

Possible areas of innovation include more use of ideas based in systems theory (non-linear interactions, complexity, resilience), greater recognition of the need for policy and management actions to operate simultaneously at multiple scales (ecosystem and landscape-scale management), increased use of experimental approaches to policy and management (adaptive management, monitoring, acceptance of risk, and recognition of failure), better integration of new knowledge into policy development (science-policy linkages, monitoring) and increased partnerships with the community (experiments in governance and structure). Tools to assist policy innovation are likely to include scenario-building, modelling, foresighting techniques, and interactive planning using scenarios and modelling. All of these depend on having improved monitoring across a range of biophysical and socio-economic indicators and sufficient capability among a broader group of actors to intelligently interpret more complex analytical tools in the public interest.



River Red Gums in Yanga National Park. In 2008, the New South Wales Government assisted by National Reserve System funding purchased the property 'Yanga', fronting 170 kilometres of the Murrumbidgee River in south-west New South Wales. ©Photo: D. Finnegan OEH NSW

Introduction

Knowledge of Australia's environment has changed greatly over the last 50 years. In the early 1960s understanding of the continent and its Gondwanan origins was limited, the evolutionary history of Australia's plants was unclear, the horizon of human occupation of the continent was less than 10,000 years BP (Jones 1979) and there was little appreciation of the extent of Aboriginal modification of the landscape through use of fire. Management approaches were also much more restricted, being limited mainly to setting up national parks, the protection of endangered species by legislation, and reducing soil erosion or impacts of invasive species.

Since that time we have come a long way in our understanding of the scope and complexity of Australia's natural systems, and their social and economic context. Over the same time, the scope and scale of the environmental problems that public policy needs to address also shifted substantially and in the direction of more threats, more urgency and more complexity in dealing with them.

If we now look forward 50 years, what changes in understanding might we anticipate? Forecasting is a risky activity, but in considering innovation for public policy for biodiversity conservation over the next few decades, it is reasonable to assume that there will be changes of similar magnitude and importance to those we have seen over the last 50 years in our understanding of the linked natural and social/economic systems for which we are developing policy.

The scope of this chapter is limited to thinking about possible changes or trends in conservation policy over the next decade, but it is useful to start by recognising the great influence of innovative ideas and concepts and their impact on even the most practical of activities.

What is innovation in public policy for biodiversity conservation, and why do we need it?

Innovation has many definitions but the core of them all is the introduction of new ideas, goods, services, or practices into practical use. Innovation in public policy has many similarities to innovation in other sectors, such as manufacturing and services, but it also has some important differences. While there is a wide range of research and scholarship on innovation, until recently it has tended to focus on innovation in the private sector. Now a broader recognition that innovation is essential to a productive public sector is prompting new research and literature focusing on public sector innovation.

Why do we need innovation in policy for conservation? The most obvious reason is that biodiversity is in decline and there is clear evidence that current approaches are not stopping that decline (State of Environment 2011 Committee 2011). The extent and rapidity of environmental change is unprecedented and almost all indicators point to profound pressures on biodiversity – to the extent that there is strong evidence that the Earth is entering the sixth great wave of extinction in the geological record.

To respond to the major pressures on biodiversity and conservation it is therefore essential that we develop innovative policy responses. We need innovation in ideas and tools to support better knowledge of systems, improved analysis of past practices, and development of new policy and management approaches.

Many environmental policy problems involve 'public goods' (biodiversity, clean air and water, etc) and governments have a responsibility to act in the public interest to protect those goods – whether as regulator, manager, partner, provider of incentives and information, or as market shaper or participant. There is therefore a particular need for governments to be effective innovators in environmental policy.

According to Eggers and Singh (2009, p. 5), innovation in government typically happens in one of two ways: "Either innovation intrudes itself on a public sector organization in response to a crisis, or some individual (or small group of individuals) champions a specific innovation. In either instance, the benefits of the innovation are limited. Once the crisis has passed or certain individuals responsible for the innovation have moved on, the organization is left with no lasting capacity for ongoing innovation."

The task for innovation in public policy for conservation is not only to generate new ideas and approaches and to bring them into practice; it is also to establish lasting processes and structures which continue to support innovation through design, delivery, monitoring, and review.

Sources of innovation for public policy

Innovation is a continuous process that can lead to new concepts, new policy or administrative approaches, and new systems. Innovation is commonly viewed as a cycle with five stages: idea generation, idea selection, idea implementation, sustaining new approaches, and diffusing new approaches.

It is important to recognise that each of these five stages interact at various times; it is rare that there is a simple linear progression from new idea to application. Ideas often need to be tested through feedback cycles with potential users, refined, practical examples tested, language and concepts developed for effective communication and marketing, and commitment, agreement and support developed with key groups.

Innovation draws new ideas and perspectives from a wide range of sources. The general public, technical experts, the business sector, community and non-government organisations, and the research community can provide new perspectives and new approaches that government could never generate on its own.

In considering innovation in public policy it is important to understand that under the Westminster system of government, Ministers are accountable to Parliament for policies and programs; the role of departments and officials is to advise on and follow those policies. Of course in practice there is an interactive relationship between Ministers and officials, and officials are able to help shape and develop policy. Ministers have a great strength in their direct representation of and connections to the community and stakeholders while officials can be constrained in such relationships. Development of public policy therefore requires a combination of internal policy analysis and thinking, coupled to considered and managed relationships with external sources of ideas and innovation. Broad sources of innovation within government are shown in Figure 1.

Employees of government can be a direct and internal source of new ideas for government policy. Two examples of innovation in conservation ideas are the development in the late 1980s of the Interim Biogeographic Regionalisation of Australia (IBRA) classification system (Thackway and Cresswell 1995) and the scientific framework for systematic conservation planning (Margules and Pressey 2000). Some government conservation agencies have their own research arms or agencies to support such innovation. More generally, the Australian Public Sector Innovation Toolkit is evidence of the commitment by the Australian Public Service to support innovation within its activities. The Toolkit has been developed to help individual public servants, work teams and agencies to increase their innovation efforts by providing tools and practical advice on fostering innovation.

However, while individual officials have been originators of new ideas and innovations in biodiversity conservation, most of the new approaches which shape public policy are generated outside of government. The most fertile sources of new ideas have been researchers, non-government organisations, and individuals. This is to be expected because research groups have innovation as the focus of their work and non-government bodies or individuals have fewer constraints on their experiments or actions and fewer requirements of accountability. Innovation in public policy therefore requires a flow of new ideas and methods already developed or tested in other settings.

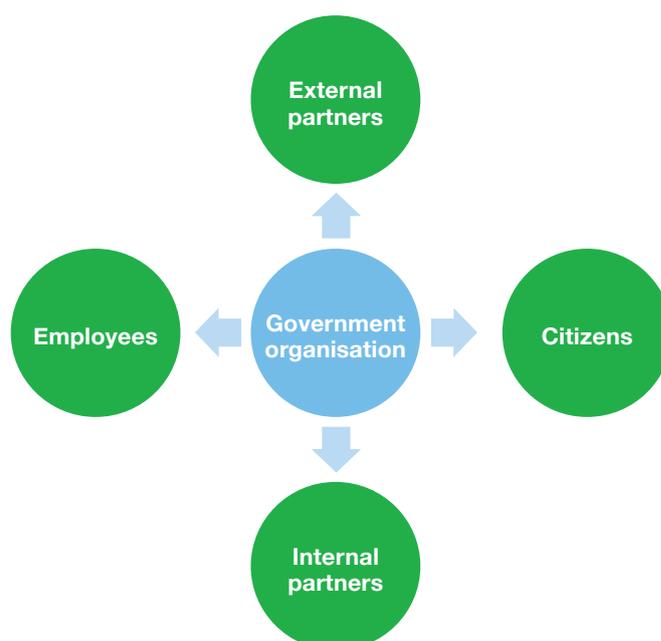


Figure 1: Sources of innovation in government (modified from Eggers and Singh 2009).



Neds Corner Station, a 30,000 hectare private protected area purchased by the Trust for Nature (Victoria) with assistance from the Australian Government's National Reserve System Program and The Nature Conservancy, adjoins the recently-expanded Murray-Sunset National Park on the banks of the Murray River in north-west Victoria. ©Photo: James Fitzsimons

Partnerships – whether across departments or agencies (internal partners) and with external non-government partners – are a source of new ideas and can help to overcome resource constraints, make conservation management arrangements more effective, and help to manage risk.

Effective relationships by government and government agencies with the community are particularly vital to innovation in public conservation policy. Individual citizens have had a powerful influence on the shape of conservation policy in Australia and community-based organisations continue to be influential (Mulligan and Hill 2001). Non-government organisations are often able to explore techniques (e.g. Conservation Action Planning) and management methods which would be difficult for government agencies to implement before they had been tested and proven.

There are also some powerful barriers which have a specific impact on public sector innovation, in particular political risk and public accountability and scrutiny. Governments and ministers are judged on their success and, in seeking to avoid criticism or failure, they can sometimes be cautious about innovative approaches with high uncertainty and risk. Political risk also contributes to risk-averse attitudes among public servants, and innovation is inherently risky.

Change in public policy is therefore often slow, since it usually requires broad agreement in the community over the need for and directions of change. New approaches to conservation policy over the coming decade are therefore likely to be based on ideas which are already being debated or experimented within the community. It is useful therefore to consider the sorts of changes which have occurred in public conservation policy before looking at what the future might bring.

Experience with public policy for conservation over recent decades

The decline in biodiversity and the causes of this decline are generally well understood. Public policy has tended to take the form of reducing those drivers or pressures or preserving samples of 'undisturbed' species, habitats, or landscapes.

The first public policy responses to conservation concerns in the 1960s and 1970s were in the form of direct actions, primarily through the creation of publicly-owned protected areas, and legislation to protect endangered species or communities. Over time, the scale and complexity of the problem of biodiversity decline has meant that policy has increasingly recognised the important roles played by private landholders and the community (through actions to support information and awareness raising, covenants on private land title, stewardship payments, and other incentives).

Conventional economics sees loss of biodiversity occurring as a result of a market failure through failures in information, valuation, and property rights. Environmental accounts, ecosystem services credits, and pseudo-markets are attempts to correct these market failings and have emerged as complementary approaches to regulation and direct intervention (Costanza et al. 1997).

Government conservation policy is now emphasising the system aspects of biodiversity even more through landscape-scale and ecosystem-based management, partnerships with non-government organisations, regional planning and action, and devolved administration.

Concepts such as resilience, connectivity, ecosystem services, and valuation through market-based mechanisms are influencing public policy as part of a whole-of-landscape approach to conservation. These concepts are discussed below.

Resilience. Resilience refers to the capacity of a system to withstand shocks and to rebuild itself if damaged or disturbed. So far, resilience approaches have mainly been used in planning (for example in regional planning by catchment planning authorities). Resilience is helping to provide a new perspective in which conservation policy and planning can be viewed as part of one social-economic-biophysical system. While resilience thinking offers opportunities, particularly for cooperative approaches, it also carries complexities and sometimes difficult implications.

Connected landscapes. Connectivity approaches emphasise a particular set of ecosystem attributes (system linkages, particularly for vegetation and water). Maintaining connectivity is part of a landscape-scale approach and is used widely, for example in wildlife corridors, government biodiversity strategies and non-government and community corridors such as Gondwana Link (see chapter by Bradby in this publication). Connectivity actions are central to all adaptation strategies for climate change. Building corridors in highly modified landscapes will require large-scale restoration and revegetation, but planning such actions raises difficult questions about the reference states for restoration, desired goals and indicators of achievement.

Valuing biodiversity. Biodiversity policy has been expanding to include non-regulatory approaches. Many policy issues are linked to problems of valuation – or a lack of it. Market-based approaches are non-regulatory and may offer efficiencies and greater effectiveness for policy under certain conditions. Markets require valuation and trading mechanisms. Ecosystem services provide one approach; national environmental accounts reinforce valuation. Coherent markets for biodiversity-related services or credits will help to drive innovation.

These changes in policy approaches are summarised in **Table 1**, which characterises more recent approaches through greater emphasis on system features (resilience, tipping points) and linked multiple spatial scales (landscapes).

Focus	Existing or past approaches	Landscape- and resilience-based approaches
Biodiversity conservation	<ul style="list-style-type: none"> • threatened species and habitats • protected areas considered the highest priority • limited private land involvement 	<ul style="list-style-type: none"> • ecosystem functions • critical/keystone species • linked whole-of-system • species distribution and abundance management across whole of landscape regardless of tenure or land use
Science input	<ul style="list-style-type: none"> • static ecosystem structures • models of predictable change • optimization and economic tools 	<ul style="list-style-type: none"> • non-linear dynamics and complex systems • shocks, feedbacks, thresholds • cross-scale interactions • complex social-ecological systems
Policy tools	<ul style="list-style-type: none"> • mix of approaches • short-term objectives • fixed reference states and targets 	<ul style="list-style-type: none"> • changed mix of approaches • longer term objectives • adaptive/flexible targets • managing multiple temporal and spatial scales
Management models	<ul style="list-style-type: none"> • rigid institutional structures • whole-of-government coordination • managed community engagement 	<ul style="list-style-type: none"> • integration across institutions • integrated planning across multiple scales • adaptive governance structures • devolved/shared decision-making

Table 1. Changing focus of themes in conservation policy.

Examples of innovations in biodiversity conservation policy over the last two decades include:

- Establishment of a bioregional approach (IBRA) to support the concepts of comprehensiveness, adequacy, and representativeness in reserve system design
- Systematic conservation planning and associated tools (e.g. Marxan)
- Resilience framework for strategies and regional planning
- Market-related concepts for valuation and grant allocation
- Captive breeding programs and species reintroductions
- Landscape and ecosystem based approaches
- IT and GIS based data analysis, modelling and scenario building tools
- Foresighting techniques
- Links and sources in social sciences and humanities (understanding landholder motivations, communication techniques, ecological economics, history).

Areas of possible change in conservation policy over the next ten years

New approaches to conservation policy and management will require greater recognition of the need for policy and management actions to operate simultaneously at multiple scales (species, habitat, ecosystem and landscape-scale management). Possible areas of innovation for the next decade include:

- New and emerging concepts – more use of ideas based in complex system theory (non-linear interactions, thresholds, resilience)
- Better integration of new knowledge into policy development (science-policy linkages, greater contribution from social sciences, monitoring)
- Development of new technologies, offering both benefits and risks (genome techniques for managing invasive species, novel life forms, advances in non-linear mathematics and modelling, remote sensing)
- New or updated goals to deal with change, particularly climate change

- Increased use of experimental approaches to policy and management (adaptive management, monitoring, acceptance of risk and recognition of possible failure)
- Greater use of policy approaches based on valuation of ecosystem services
- Increased partnerships with the community (experiments in governance and structure)
- Tools to assist policy innovation such as scenario-building, modelling, improved foresighting techniques (e.g. Sutherland et al. 2008) and interactive planning using scenarios and modelling.

For changes in policy and management to be effective, it will be necessary to improve information management and systematic monitoring across a range of biophysical and social or economic indicators. The consequences of not having adequate biodiversity baseline data and trend information for policies and programs are well understood (e.g. State of the Environment 2006 Committee 2006). They include: weaknesses in policy development and program planning; slowness in responding through adaptive management (since response information is lacking); inability to monitor and evaluate program outcomes adequately; and reduced ability to meet reporting requirements. Lack of the most basic tool in dealing with a complex system – information about its key features – severely reduces the capacity of managers to understand and deal with the system.

Private and not-for-profit groups have recognised the importance of biodiversity monitoring as an essential part of adaptive management and for wider purposes, including demonstrating the achievement of desired outcomes for management. These groups value monitoring and have been willing to invest their own money into gathering data and monitoring biodiversity (Bush Heritage Australia 2011).

The greatest potential for major environmental policy change is a correspondingly major environmental shock, such as a rapid acceleration in climate change or the risks of irreversibly crossing important environmental thresholds. Remarkable conceptual developments – such as plate tectonic theory in geology – can also lead to major rethinking of policy. However, revolutions in ideas are often slow to be adopted within the research world and even slower to be translated into policy or management changes. As an example, ‘resilience’ emerged as a scientific concept in the 1970s but took 30 years to achieve some policy influence, but often in competition with

other paradigms. Unexpected shocks are by their nature difficult to plan for, but resilience thinking tells us that major shocks also create great opportunities.

Between shocks it is likely that policy development will continue essentially on the basis of existing practice, through a process known as ‘disjointed incrementalism’ or ‘muddling through’, a term first used by Charles Lindblom in 1959 (Lindblom 1980). The best that can usually be done when trying to anticipate policy change is to scan the research horizon for new ideas and understanding, and to extrapolate trends in policy change based on leading-edge practices, whether inside government or outside.

Looking ahead for the next decade, and extrapolating from trends, most concepts likely to be used in new conservation policy are probably already with us. A major requirement therefore is to maintain and build relationships between various fields of research and policy developers. Initiatives such as the National Environmental Research Program and the International Platform for Biodiversity and Ecosystem Services are important mechanisms, but there is room for further action within government such as increased use of foresighting techniques (as recommended in the review by Alan Hawke of the *Environment Protection and Biodiversity Conservation Act 1999* (Hawke 2009) and supported in principle by the Australian Government).

Major policy changes require matching efforts to find the right ideas and language to motivate such change. One of the most difficult tasks for achieving and implementing change is to communicate across sectors and interests to find common interests in conserving biodiversity. This ‘mainstreaming’ of biodiversity conservation is likely to remain central to biodiversity policy over the next decade – and also one of the most likely sources of innovation through partnerships.

Disclaimer

The views and opinions expressed in this paper are those of the authors and do not necessarily reflect those of the Australian Government.

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Family involved in the Environmental Stewardship Program protecting Box-gum Grassy Woodland on private land. Yeoval, New South Wales. ©Photo: Andrew Tatnell

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