

A National Ecosystem Services Strategy for Australia

Concept proposal

*Our land abounds in nature's gifts
Of beauty rich and rare*

June 2008

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An Ecosystem Services Strategy for Australia

Executive Summary

Our national wellbeing depends on the services provided by complex ecosystems, yet our actions are putting them under extreme pressure. The problem is epitomised by the disastrously declining ecosystems of the Murray-Darling Basin.

Ecosystem services are provided by both 'natural' and modified ecosystems and only some are incorporated into markets. They include:

- provision of food, fresh water, wood, fibre and fuel;
- nutrient cycling, pollination and soil formation which support primary production;
- regulation of climate, floods, disease and water purity;
- aesthetic, spiritual, educational recreational and cultural aspects.

The Australian research and agricultural communities have been working on these matters for some years and the Rudd government has acknowledged the importance of ecosystem services in the "Caring for our Country" program. The recommendations of the 2020 summit in April 2008 highlight the urgency and the complexity of the challenge.

The 2005 report by 1400 leading scientists of the Millennium Ecosystem Assessment (MA) highlighted the global decline in ecosystem services while expanding populations are placing new demands on them.

Many ecosystem services are neither priced nor valued in the economy and they have been exploited and ignored. We urgently need to bring these services into the mainstream economy. The problem is linked to, but distinct from climate change. For example, payments for sequestration of carbon from a carbon emissions trading scheme could be formulated in a way that assists in reviving ecosystems and increasing other ecosystem services.

Australia 21 Activity

Australia 21 seeks to bridge the gap between research and policy to create new 'frameworks of understanding' that can be applied to the development of public, corporate and community policy outcomes - www.australia21.org.au

With the support of three State governments Australia 21 held a series of expert roundtables and developed a national ecosystem services strategy. The aim of the strategy is to weave ecosystem services into our social, cultural and economic life by 2020.

The strategy can rebuild the nation's environmental infrastructure, a task just as important to Australia's future as national defence or climate change. Work has begun on many ecosystem services projects but the effort is fragmented. The benefits of national coordination through a world leading ecosystem services framework would be immense. It has the potential to provide for ecological sustainability, future direction to rural industries and communities and new options for indigenous Australia.

Part 1 - Context

What Are Ecosystem Services?

According to the Millennium Ecosystem Assessment (MA 2005), ecosystem services are

“the benefits people obtain from ecosystems”.

These benefits include food, fuel and fibre as well as the vital services such as water flows, nutrient cycling and biomass production that underpin all our production systems and lifestyles. The Millennium Ecosystem Assessment, a concerted effort by over 1360 experts from 95 countries, identified four categories - provisioning, regulating, cultural and supporting ecosystem services and linked them to human well-being (see Figure 1).

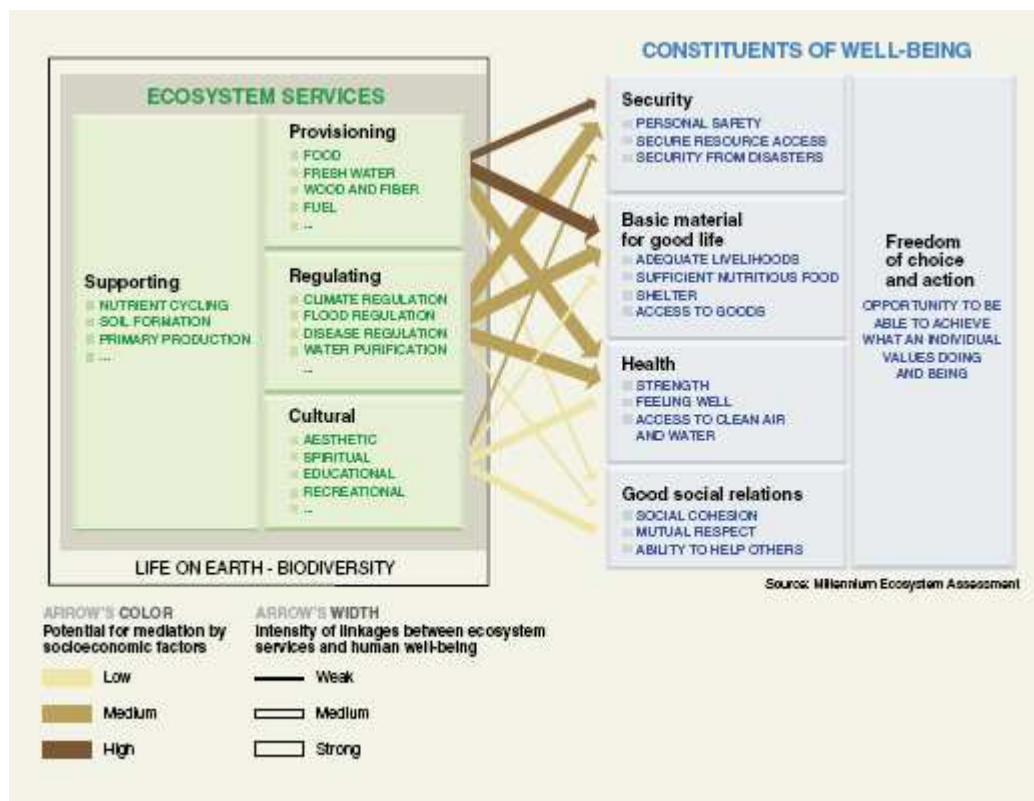


Figure 1: Links between ecosystem services and constituents of well-being (MA 2005)

Benefits arise from ecosystems of all types, not just from those that some may consider 'natural' ecosystems. However, the more complex an ecosystem the more likely it is to be resilient in the long term and to provide a wider range of services than a simpler ecosystem.

The ecosystem services approach views our manipulation of the environment for human benefit through the lens of the full range of services provided by ecosystems. The approach offers a powerful tool for discussing human dependencies on ecosystems¹ and whether there are potential trade-offs for the services they generate. One of its strengths

¹ An ecosystem is a dynamic complex of plant, animal and micro-organism communities and the nonliving environment interacting as a functional unit.

is the requirement to simultaneously consider multiple (bundled) services, and whether it is really feasible to replace these with technological solutions.

While other definitions exist, the simple definition for ecosystem services above provides broad scope for interpretation by local communities to devise measurement systems (metrics) that are meaningful to them and best suit their needs.

International Sense of Urgency

Environmental degradation will increasingly affect not only biodiversity but also our economic growth and well-being. This has been highlighted by the Millennium Ecosystem Assessment, the Intergovernmental Panel on Climate Change and Stern reports on climate change and the IUCN Statement to United Nations General Assembly 30th October 2007 (IUCN 2007). Some view global ecosystems as reaching tipping points, beyond which we may collectively face major risks from rapid and surprising change (see Cork *et al.* 2007).

The **Millennium Ecosystem Assessment** summarized global trends for 16 ecosystem services and reported that two-thirds of those services are currently declining. A recent summary of the current state of global ecosystems (Kareiva *et al.* 2007) reported that:

- By 1995, only 17% of the world's land area had escaped direct influence by humans; with roughly 50% of the world's surface area converted to grazed land or cultivated crops, and over half of the world's forests lost in that land conversion;
- To control rivers for irrigation, hydropower, and flood mitigation, humans have built so many dams that nearly six times as much water is held in storage as occurs in free-flowing rivers;
- 22,000 km of the European coastline is now artificially stabilized with concrete or asphalt jetties and sea walls to reduce storm surges, and where the coasts are severely retreating or eroding, over half are fortified by these or other structures;
- By 2006, over 14% of Earth's land area was designated as a natural protected area, but most of this landscape is under human influence and use. Land set aside as 'wilderness areas' represents only 1% of Earth's land surface.

A sobering finding in 2007 was that relatively intact ecosystems are losing their capacity to absorb CO₂. Human activities are releasing carbon dioxide faster than ever, while the natural processes that normally slow its build up in the atmosphere are faltering in the face of these massive anthropogenic emissions (Canadell *et al.*, 2007). This decline in the efficiency of natural land and ocean CO₂ sinks is a warning that the longer we delay reducing emissions and introducing mitigation measures such as revegetation, the more restorative capacity will be lost.

International Trends/Activity on Ecosystem Services

In the 1970s leading scientists began linking global population growth and consumption with pressure on natural resources and ecosystems. With a strong emphasis on recognising the interdependences between human economies and healthy functioning ecosystems, in 1997 Robert Costanza and colleagues spectacularly claimed that the economic value of ecosystems exceeded the value of the global formal economy (Costanza 2007).

Australia is a party to the **UN Convention on Biological Diversity (CBD)**, an international legal convention with three core objectives:

- conservation of biological diversity;
- sustainable use of its components; and
- fair and equitable sharing of the benefits arising from the utilization of genetic resources.

The ecosystem services approach is thus part of Australia's obligations under international law. At the seventh Conference of Parties to the CBD held in Kuala Lumpur, Malaysia in February 2004, signatories agreed

“that the priority at this time should be on facilitating the implementation of the ecosystem approach as the primary framework for addressing the three objectives of the Convention in a balanced way”.

Subsequently, at the eighth COP held in Brazil in March 2006, members decided “to consider the findings of the Millennium Ecosystem Assessment in the implementation and the future review of [CBD] programmes...” and encouraged

“parties, other Governments and relevant organizations to make use, as appropriate, of the methodologies and conceptual framework of the Millennium Ecosystem Assessment”.

Since the late 1980s, the **United Nations Environment Program (UNEP)** has promoted the use of economic incentives for sound environmental management. Most of the measures to date have been based on the “polluter pays principle”, as in the case of environmental taxation. More recently, following the Millennium Ecosystem Assessment (MA), there has been an increased interest in the “beneficiary-pays principle”.

Environmental ministers at UNEP's 24th Session of the Governing Council/Global Ministerial Environment Forum (Oct 2007), called on UNEP to provide

“guidance and support to governments on the payment for and valuation of ecosystem services.”

The MA found about 60% of the world's ecosystem services are being degraded or used unsustainably. It identified positive incentives such as **Payment for Ecosystem Services (PES)** as promising tools to motivate communities to restore damaged ecosystems and sustain the supply of critical services. In September 2006, experts from UNEP, the German Government, the World Conservation Union (IUCN) and the CBD Secretariat agreed on the need to scale up PES with a sharpened focus on biodiversity conservation. Since October 2006 efforts have been underway to scale up payments for ecosystem services (PES) to the international level (IPES).

The goal is to take a first step towards an international payments system, comparable or linked to carbon trading, but with a clear focus on the conservation of terrestrial and marine ecosystems that host significant biodiversity and related services. Developing the IPES concept for greater applicability as a policy tool contributes to UNEP-wide efforts to achieve sustainable ecosystem management (<http://www.unep.ch/etb/areas/ipes.php>).

The environment ministers of G8 plus 5 major newly industrializing countries endorsing the '**Potsdam Initiative – Biological Diversity 2010**' on 17 March 2007, concluded that

it was essential to have an objective assessment of the economic arguments, specifically stating they will “approach the financial sector to effectively integrate biodiversity into decision making”. Key actions include an evaluation of the costs of biodiversity loss and the associated decline in ecosystem services worldwide. This **Review on the Economics of Biodiversity Loss** will consider failure to take protective measures versus the costs of effective conservation and sustainable use, aiming to improve understanding of why action to halt the loss of biodiversity makes economic sense (G8 2007).

The **European Commission** is supporting work to improve links between climate and biodiversity policies and specifically, to examine the concept and viability of payments for ecosystem services. A Eurobarometer survey (2007) of over 25,000 EU citizens, showed biodiversity loss is seen by most respondents as a global issue. A large majority agreed that Europe had a moral obligation to stop it, and that there would be economic consequences if current trends continued.

The **UK Environment ministry** just published a guide for valuing ecosystem services, setting out practical steps to incorporate more environmental impacts in policy appraisals. (ENDS Europe DAILY ISSUE 2459 - Thursday 10 January 2008). The UK ecosystem service valuation guide builds on previous work, using the case study of the contribution made by ecosystems to reducing flood and coastal erosion risks to illustrate its recommended approach. An action plan describing a more general shift to ecosystem-focused policymaking has also been developed (DEFRA 2007).

Environmental Risk/Financial Risk

There has been a rapid rise in the level of awareness of the links between environmental risk and financial risk. The majority of financial institutions still do not yet give environmental risk a high priority in their daily calculations and decision-making, but the issue is evidently on the radar. A recent report (CERES 2008) on corporate governance and climate change revealed that 25 of the major banks analyzed had established general environmental/ sustainability executive committees or working groups – and 13 of these had working groups specifically focused on climate change.

Mulder (2007) coined the terms ‘biodiversity business risk’ and ‘biodiversity business opportunity’, pointing out that financial institutions that don’t understand the links between risk and the environment may be at risk themselves when providing money, advice, loans or insurance products. On the other hand, they can capture the business opportunities by increasing their investment in companies dealing with environmentally sustainable and clean energy business activities (Mulder, 2007).

The quantification of ecosystem services (whether in economic, ecological or social terms), will facilitate widespread adoption of the concept. It will engender widespread investment in maintaining the value of ecosystem services and the capacity of our ecosystems to provide them. This task opens many opportunities to develop assessment tools and quantification methods to assist prioritising decision making and resource investments.

With the nexus between environmental and financial risk more recognized, the next step is to engage the commitment of the Australian business community to ecosystem services. This will be facilitated by clear local examples of links between degradation of ecosystem services and business risks and related impacts on the triple bottom line.

Ecosystem Services – A National Imperative

Evidence of the diminishing health of Australian ecosystems is unfortunately not hard to find, with evident decline in soil fertility, fisheries stocks, water quality and quantity (related in some cases to the loss of wetlands) and loss of carbon sinks that help local/regional climate regulation (Beeton *et al.* 2006).

There clearly needs to be increasing recognition of the role of ecosystems in decision making. To quote the World Resources Institute (WRI 2007):

“We can no longer take nature's benefits for granted. Individuals, local and national governments, businesses, and international institutions need to consider ecosystem goods and services in their decisions”.

The recent 2020 Summit brought many of issues into sharp focus that can be addressed systematically through an ecosystem services approach (Part 3).

Conclusions

The recent Prime Ministerial 2020 summit has identified the urgent need for action on sustainability and on the restoration and preservation of the nation's ecosystems. Considerable background work has been carried out in recent years on the need for a national ecosystem services policy and ways in which it could be developed. Australia 21 has been involved in these discussions in association with government and industry stakeholders.

For strategic use of natural resources Australia needs a framework within which the impacts of multiple interventions on multiple ecological, social and economic processes can be considered. The ecosystem services concept provides this at a high level. Below this level, a range of approaches developed in the physical and social sciences are needed to measure and monitor outcomes of interventions. These methods are not perfect and many of the data required are not yet available, but an ecosystem services approach defines a set of questions that need to be asked to improve Australia's ability to make the necessary measurements.

These issues are vital regardless of whether an ecosystem services approach is taken – Australia 21 argues, however, that an ES approach focuses the dialogue around the issues and allows a wider range of people to be engaged. It is our strong view that the responsibilities and actions for this go well beyond Governments and include civil society, research communities, corporations and the private sector. The farming sector, the financial sector, catchment authorities, indigenous communities, conservation agencies, NGO's and the whole Australia community need to be actively involved and participate both in the challenges of restoring, and in reaping the benefits of healthy and sustainable ecosystems.

In summary this document argues the case for a national approach to ecosystem services and proposes the development of a National Ecosystem Services Network to spearhead this initiative, recognizing that essential leadership for an ecosystem services strategy is not just a government responsibility but must come from many stakeholder groups as well.

The approach outlined here could form the basis for a central plank in the proposed National Sustainability, Population and Climate Change Agenda that was advocated by participants in the 2020 summit. The Strategy requires leadership from the very top of the Australian Government.

Recommendations

We urge the development of a National Ecosystem Services Strategy (NESS) as a major component of the post 2020 summit response to the national sustainability challenge, with leadership from the Prime Minister and Federal Government. A NESS for Australia can realise key ambitions from the PM's 2020 Summit by acting as a key organising principle for natural resource management into the future (see p10).

A National Ecosystem Services Network (NESN) should spearhead this initiative, bringing together innovative inputs from Federal and State governments, the corporate sector, the finance and insurance sectors, scientists, catchment authorities, landholders, conservation groups, indigenous people and the wider community.

Key activities within the national ecosystem service strategy will be:

1. Developing and using information about ecosystem services;
2. Strengthening the rights of local people to use and manage ecosystem services;
3. Managing ecosystem services across multiple levels and timeframes;
4. Improving the evaluation, accreditation and monitoring of ecosystem services using the work that has been extensively developed in Australia on Environmental Management Systems within the agricultural industry;
5. Aligning economic and financial incentives with ecosystem stewardship and sustainable management.

We propose also that this new strategy should build from the extensive research into the economic value of ecosystem services that has been carried out by CSIRO and that ecosystem services thinking be incorporated into the current system of regional delivery of natural resource management and be at the heart of the policies of regional NRM bodies.

Once the network is established, an immediate approach should be a region by region analysis of the ecosystem services that catchments provide, the state of their environmental infrastructure and, after taking into account activities already under way, prioritisation of the most urgent ecosystem services for repair.

Part 2 - Proposal for a National Ecosystem Services Strategy (NESS)

Preamble

Australia's ecosystems are unique, having developed over at least 40 million years in an ancient landscape relatively isolated from the rest of the world and influenced by wildly varying climatic conditions. They are complex, mega diverse and resilient and have been providing services to people since we first arrived in the continent 30-65,000 years ago. They belong to all of us collectively and no interest group can claim exclusive right to them or to the services they provide.

These unique characteristics give national and international value (including, but not only, in financial terms) to Australia's ecosystems. But there is a range of other benefits that come from Australia's ecosystems that, similar to ecosystems elsewhere in the world, support human life and well being.

Human activities have been causing increasing impacts on our ecosystems, significantly reducing the services that they can provide now and into the future. We have exploited the capacity of ecosystems to provide recognized services such as plant and animal products while remaining blind to their other vital services. In our rush to supply markets for products, we are simplifying our ecosystems and have begun to erode their resilience.

It is clear that we need to value the full range of services provided by ecosystems to ensure that our use of them does not destroy their capacity to continue to provide for us. We also need to recognize that we humans are now an integral and dominant part of our ecosystems and our actions are increasingly critical to their ability to function.

If we continue to act in ways that simplify or exploit ecosystems, they reach thresholds beyond which they function at a significantly reduced level. This has already occurred in many locations. However, if we are able to act in ways that maintain and improve our ecosystems, they will continue to provide services to us and to our children and grandchildren. If we embrace and enhance the complexity of ecosystems, we will restore and maintain the ability of ecosystems to be resilient in the face of future uncertainty. This will not only benefit us but all life.

In Australia, we are still dealing with this very pressing and important issue in a fragmentary fashion. In the absence of an agreed national strategy, progress on ecosystem services has to date been sporadic and piecemeal. There is a real threat to Australia's continued prosperity and productivity if the significance of ecosystem health continues to be ignored. A recent report in the British Medical Journal (Canberra Times 26 Jan 2008) identified serious threats to human health arising from unchecked climate change and disruption of the planet's life support systems, with rural communities likely to "bear the brunt" of extreme weather, infectious diseases and shrinking supplies of water and food.

We have an opportunity here to develop a platform for policies and programs that can focus efforts on managing our ecosystems in a way that increases their resilience in the face of increased pressures.

Core Principles

The underlying core principles of this national strategy are that:

- Ecosystems provide the vital life support systems people need to survive and prosper. Programs and policies need to be strengthened to maintain these life supports in the face of global changes that include increasing population pressures, climate change, energy security and emerging market opportunities.
- Ecosystem services should be a primary consideration of decision making at all levels of civil society, private enterprise and government.

Aims of the Strategy

1. Develop and communicate key messages and frameworks for improving understanding of the importance of ecosystem services and of what we need to do to maintain and enhance the ecosystems that generate them. Key messages include:
 - Ecosystem services are essential to human well-being and recognition of this can generate greater connection to nature and sense of place;
 - Ecosystem services provide the bridge between economy and environment and can provide appropriate ethical rules for the economy for the generation of environmental wealth;
 - Understanding of ecosystem services can support decision-making, providing a strong, objective foundation at all levels.

Outcomes – by 2020:

- 90% of people recognise that ecosystem services are important to them;
 - Ecosystem service concepts are frequently part of public debate and dialogue about policy directions and feature in decision making at multiple levels;
 - Cultural values shift to reflect understanding and awareness of the importance ES;
 - Complexities of ES are embraced and simplistic linear solutions are subject to suspicion.
2. Build links between the maintenance of ecosystems and commerce so that we can build the value of ecosystem services into the Australian economy to promote wise use of these precious limited resources. Key links include:
 - Support and extend Corporate Social Responsibility processes to include maintaining and enhancing provision of ecosystem services;
 - Support development of mechanisms (such as environmental management systems) that enable individuals and companies to be recognised for their role in maintaining and enhancing provision of ecosystem services beyond a duty of care;
 - Leverage the power of private sector investment for the long term future of Australians and Australian ecosystems.

Outcomes by 2020:

- Statement of the risk of ecosystem failure included on corporate balance sheets;
- Processes designed to manage the risk of ecosystem failure (eg taxes, offsets, mitigate against perverse outcomes) are part of normal business practice;
- Values/assets and their inter-connectedness communicated and acted upon by recognising multiple and integrated services;
- Champions in business/philanthropy emerge to influence others;

- National set of accounts of ecosystem services such as a report card similar to a balance sheet to incorporate ecosystem services into the Australian economy, and link with other accounting systems such as the biodiversity strategy.
3. Develop structures, mechanisms, institutions that are capable of generating and maintaining a coordinated and cohesive set of strategies for the preservation and enhancement of ecosystem services within the Australian economy, including:
- building a new working partnership across government, research and private sectors;
 - galvanise ecosystem-level actions in the face of global changes;
 - provide a focal point for ecosystem level research and the creation of new institutions needed to meet the global challenge ahead.

Outcomes by 2020:

- Taskforce from the Prime Minister's department to set up a network of key stakeholders. including chairs of regional NRM bodies, with the endorsement of COAG;
 - Australia will be a world leader in markets for ecosystem services by building on the momentum of carbon trading and carbon markets to plan and develop markets for other ecosystem services based on good understanding of what Australians' needs from the environment now and in the future. Clear definition of roles and responsibilities in meeting these needs;
 - Australian people derive the services they need from Australian ecosystems without diminishing ecosystem capacity to provide services for the next generations. The human footprint on ecosystem services declines.
4. Acknowledge International obligations and generate opportunities from addressing them, including:
- Provide an overarching framework at the ecosystem level consistent with rapidly evolving international frameworks and the Convention on Biological Diversity;
 - Provide a framework for Australia's international aid efforts aimed at improving ecosystem security for neighbours in return for global benefits.

Outcomes by 2020:

- Contribute to worldwide sustainability leadership;
- New markets recognised as valid and desirable;
- We will have a more coherent view of what needs to be done to integrate across ecosystem services.

Ownership/Management/Governance

Adopting an ecosystem services approach will not happen without leadership and strong community dialogue: Australia's current institutions and policies provide neither. Financial rewards are divorced from, rather than linked to enhancing and maintaining ecosystems. Markets do not currently exist for most of the ecosystem services that are critical for long-term sustainability. It is possible that new markets, such carbon trading, may generate a monetary value for services that are at present outside the market system, but this will take time and won't happen without coordinated and strategic planning. In the meanwhile special interests can dominate the development of new policies and markets.

Governance arrangements for the Indigenous estate need to be a key component of a national strategy for sound environmental management. This is because:

- the Indigenous estate is at least 1.5million square kilometres or 20% of Australia's land area;
- 98.6% of the estate is located in very remote areas, in which Indigenous people comprise 45.4% of the population;
- It contains some of the highest conservation priority lands in Australia which are under threat, including many of the most important intact and nationally important wetlands, riparian zones, forests and rivers;
- The estate has a significant 'investment deficit'.

There is presently unprecedented national awareness and interest in the poverty and marginality of remote-living Indigenous Australians. Recognition of the existing and potential environmental management role of Indigenous people living on country is essential, and could provide a culturally appropriate and practically beneficial way of bringing meaningful activities and a source of income for remote communities. Research strongly suggests that 'there may be alternative development opportunities in the provision of environmental services that Indigenous people as owners and residents of the Indigenous estate may be uniquely positioned to provide' (Altman *et al.* 2007).

All Australians have a responsibility to place a high priority on enhancing and maintaining the ecosystems on which we rely. For example:

- Consumers can reduce unnecessary consumption and demand products and services from production systems that at minimum do not damage the health of ecosystems;
- Manufacturers can demand raw materials and can implement processes that have a neutral or positive impact on ecosystems;
- Land managers can follow the lead of innovators who, for example, change their businesses to make it possible to enhance their environment by regenerating diverse native grasslands and woodlands and rehabilitating riparian areas;
- Politicians and other decision-makers can develop and implement policies which generate incentives for all sectors to enhance and maintain ecosystems.

Partnerships - Who contributes, what and how?

Following the Global Action Agenda model recently released by the World Resources Institute (2007), implementation of the strategy will crucially depend on harnessing the support of all five sectors: non-government organisations, the private sector, research communities, community groups and regional bodies, and all three tiers of government.

Not only are ecosystems affected by all these sectors, these sectors stand to benefit by ensuring the services derived from ecosystems are maintained into the future. Financial institutions in particular can benefit from rapidly growing market opportunities that allow for enhancing ecosystem resilience and sustainable lifestyles.

Drivers for business include profit, rules/compliance, community pressure/risk, good citizenship, threat of regulation, marketing advantages and market access (such as through certification). There is a variety of businesses whose experiences can be drawn on; some degrade ecosystem services, some are exposed to ecosystem service loss and some are working to enhance ecosystem services. To become engaged in a NESS, a company will need commitment from the CEO, will require ease of entry and practical examples of best practice and how it works (such as from Tesco, Sainsbury, Elders/ALMS).

Linkages - Adding value to existing work

An ecosystem services strategy needs to be seen within the context of adding value to existing programs and institutional arrangements. Some program initiatives will overlap strongly with related but separate policies and programs. For example, ecosystems have a major role to play in sequestering carbon to address climate change, yet climate change mitigation programs employing solar, wind and other technologically based solutions would not be included within the ecosystem approach. Likewise, many of the principles and concepts contained in environmental management and land management systems also overlap with the ecosystem services approach.

Such programs need to be reinforced through an enhanced recognition of the crucial role ecosystems play in maintaining human wellbeing. The aim is to enhance the integration of policies which involve governments, industries, consumers and civil society as a whole, across a wide range of measures such as:

- Regulation and legislation;
- Market incentives (signals) and access;
- Codes of conduct, best management practice/current recommended practice, EMS;
- Certification and recognition of sustainable land management;
- Environmental impact assessments.

It will be essential to assess how far along the path to our goals we are at the moment and start with indicators available now, but recognize change might be needed in future. A strong well-designed framework will be needed to involve people in making these linkages.

A National Ecosystem Services Network (NESN)

We are proposing here the formation of a National Ecosystem Services Network with representation and involvement from government, industry, NGO and landholder groups across the nation to take national leadership for this initiative. The Network would have a rotating Chair from among the five stakeholder groups and a permanent secretariat and would have responsibility for overseeing the data needs, the research activity and the implementation of the National Ecosystem Services Strategy. The Network would work closely with federal and state government agencies and would also administer a National Ecosystem Services Trust.

The Network would progressively build a picture of ecosystem health from the ground up (and feedback for adaptive management). It would work towards effective recognition and reward systems for actions taken by conservation agencies, landholders and businesses to promote the health of the nation's ecosystems and it would carry responsibility for publicising the ecosystem services approach across the Australian Community. A network approach of this kind has been highly effective in the co-ordination of Australia's data systems and approach to the control of Communicable Diseases in the health sector.

Part 3 - How a National Ecosystem Services Strategy will deliver the 2020 Summit goals

PM's 2020 Summit Stream - Sustainability	How a National Ecosystem Services System can help
Through our creativity and skills, we will have harnessed the full potential of our natural assets and human resources to turn the challenge of climate change to our advantage.	An ecosystem services approach links ecosystems with human benefits and can ensure climate change adaptations have multiple benefits.
Environmental considerations will be fully integrated into economic decision making in Australia, at the household, business and government levels.	An ecosystem services approach provides the framework to ensure decisions are made by all sectors and levels that are compatible with healthy and resilient ecosystems.
Australia's globally outstanding ecosystems and species are managed to reduce threats and build resilience to promote adaptation to climate change. By 2020 the health of Australia's ecological systems will be improved. The health of our river and groundwater systems will be managed to achieve ecological sustainability, supporting food and fibre production and resilient communities.	This can only be achieved with national leadership and strong connections that can be provided by a NESS and NESN. Through a NESS we can support rural communities for their role in maintaining ecosystems that provide services to the broader community, rather than expecting them to support themselves solely through the commodities they produce.
An integrated, whole-of-government approach underpinned by clear targets and measurement with independent reporting is fundamental.	The NESS as described in this document is designed to achieve this.
We could adopt a National Sustainability, Population and Climate Change Agenda and develop robust institutions to support it. Australia would have a whole-of-government approach to climate change and sustainability policy, encompassing government expenditure, taxation, regulation and investment.	Bringing the value that ecosystem services provide into this agenda is essential if we are to provide clear incentives to maintain and improve ecosystems and the services they provide. ANESN would bring all sectors, not just government, to the process.
We could implement a set of national environmental accounts, including carbon and water accounts, to inform government, business and community decision-making. These could be linked with the current national economic accounts.	An ecosystem services approach involves being explicit about what ecosystems supply. Rather than limit environmental accounts to carbon and water, other natural resource accounts such as biodiversity and resource condition could be developed through NESN interaction.

PM's Summit Stream - Future Directions for Rural Industries and Communities	How a National Ecosystem Services System can help
The development of strategies for fostering food security and the future sustainability and productivity of remote, rural and regional Australia has been the focus of summit discussions.	The benefits that good land stewardship provides all Australian's is rarely acknowledged and those that do it are rarely rewarded. The NESS aims to do this.
The challenges posed by climate change with particular emphasis on its impacts on the food, fibre and forestry value chains.	These value chains do not presently recognise the true cost of production and do not incorporate the cost of carbon, water and biodiversity loss, nor do they recognise contribution to the provision of these services by strong stewardship.
Development of appropriate incentive schemes to promote environmentally sustainable behaviour and strategies	The NESN could develop, through broad consultative processes, the right mix of incentives and regulations to maintain and improve ecosystem services across the landscape.
The government should investigate and develop a holistic sustainable farm operational plan strategy, including an integrated carbon strategy. Research effort needs to be expanded and there needs to be a clear connection between the latest research and farm adaptation, particularly as it relates to improving productivity.	The impact of farm operations on the provision of the full range of ecosystem services can be incorporated through a NESS. The NESN could provide focus and coordination to the research and development effort.
Nationwide harmonisation and standardisation is urgent. This includes uniform regulation, licensing, standards and enforcement for transport (both road and rail) and agriculture. State and local government regulatory reforms would be encouraged through Federal Government incentives and penalties, linked to the rate of progressive reform.	A NESN as part of a NESS can bring the maintenance and improvement of ecosystems into the frame by setting standards through negotiation across sectors under national leadership.
Future infrastructure investment decisions should be approached from a national perspective.	A NESN as part of a NESS can bring the maintenance and improvement of ecosystems into the frame by advising infrastructure investment decisions.

Part 4 - Priority List for Actions/ Action agenda

The actions below are proposed as a draft set of discrete initiatives and approaches for discussion among stakeholders. They should not be seen to be comprehensive and some may not be relevant to all community settings and business environments. However, they are promoted here to galvanise action and provide an overarching framework for broad debate and consolidated action.

1. Develop and use information about ecosystem services	
Civil society (eg. NGOs)	<ul style="list-style-type: none"> • Create a national ecosystem services network to facilitate information and data exchange • Develop and promote tools that identify and help manage/understand trade-offs. • Disseminate information in ways that make it useable by policymakers and citizens. • Tailor information on ecosystem service risk and opportunities for investors, producers and purchasers.
Business (the private sector)	<ul style="list-style-type: none"> • Join and support a national ecosystem services network. • Assess risks and opportunities on the dependence or impact on ecosystem services • Assess the dependence and impact of business operations on ecosystem services.
Research communities (universities, CRCs, CSIRO etc)	<ul style="list-style-type: none"> • Promote a national platform for research bringing together the best national and international research on this issue of valuing and sustaining ecosystem services through involvement in a national ecosystem services network. • National Land and Water Audit to coordinate data collection across the nation to develop ongoing estimates of the value of Ecosystem Services to the national economy. • Establish a national CRC for ecosystem carbon offsets. • Explore how indigenous peoples and other landholders can be rewarded for managing their lands for carbon sequestration and natural resource management. • Develop tools that help identify and manage trade-offs among services. • Disseminate information on ecosystem services in ways that make it useable by the public.
Local communities/ regional bodies	<ul style="list-style-type: none"> • Use local knowledge to value and improve ecosystem management. • Participate in the development of and use tools that identify and help manage tradeoffs. • Disseminate information in ways that make it useable by local people, making use of the ecosystem services network.
Governments (national, state and local)	<ul style="list-style-type: none"> • Support creation of a national ecosystem services network to facilitate information and data exchange • Establish regular monitoring systems to track the state of ecosystem services. • Use tools that identify and help manage tradeoffs among services. • Raise awareness by promoting a national action agenda. • Update websites so that the ecosystems approach becomes the key organising paradigm for biodiversity conservation.

2. Strengthen the rights of local people to use and manage ecosystem services	
Civil society (NGOs);	<ul style="list-style-type: none"> • Public advocacy for decentralizing decision-making to local communities. • Strengthen the ability of local communities to influence development projects.
Business (the private sector);	<ul style="list-style-type: none"> • Support local participation in business decisions affecting natural resources. For example, allow local communities to benefit from carbon bio-sequestration projects. • Recognise the rights of local communities to engage in and influence proposed development projects in corporate policies.
Research communities (universities, CRCs, CSIRO)	<ul style="list-style-type: none"> • Explore relationships between participation and social, environmental and economic outcomes. • Assess the effectiveness of local social networks in strengthening the capacity of communities to participate effectively in development decisions. • Help initiate and facilitate participatory research with local people.
Local communities/ Regional bodies	<ul style="list-style-type: none"> • Ensure that individuals have secure rights to the ecosystem services they depend on for their livelihoods, for example, empower indigenous communities in rural Australia. • Build social networks that increase communities' capacity to participate effectively in development decisions. • Build partnerships to build collaborative approaches to local development.
Governments (national, state and local)	<ul style="list-style-type: none"> • Decentralize government decisions by, for example, mainstreaming ecosystem services in Australia's Regional Bodies • Create a national program to stimulate private sector investment in eco-cultural tourism for the elite market. This should be linked to indigenous employment programs, clearing obstacles that frustrate the uptake of such opportunities by indigenous communities. • Strengthen the capacity of local communities to influence proposed development projects

3. Manage ecosystem services across multiple levels and timeframes	
Civil society (NGOs);	<ul style="list-style-type: none"> • Advocate institutional cooperation at local to global scales. • Support the formation of bridging organisations to bring together formal and informal actors to share knowledge and develop collective solutions.
Business (the private sector);	<ul style="list-style-type: none"> • Participate in bridging organisations/processes to engage stakeholders and knowledge across levels to inform and improve decisions. • Engage with groups collaborating across scales and timeframes.
Research communities (universities, CRCs, CSIRO)	<ul style="list-style-type: none"> • Improve understanding of natural resources conflicts, their origins, and strategies for resolution. • Form bridging organisations to bring together formal and informal actors for the purposes of sharing knowledge and developing collective solutions. • Increase research on co-management of natural resources across scales. • Initiate and conduct inter-disciplinary research into and using adaptive management.
Local communities/ Regional bodies	<ul style="list-style-type: none"> • Utilise local ecosystem knowledge to influence/advise co-management arrangements. • Encourage local people and elected leaders to participate in dialogues across levels to address conflicts over natural resources. • Collaborate across property boundaries to develop landscape scale benefits.
Governments (national, state and local)	<ul style="list-style-type: none"> • Build the ecosystem services approach into the 'Caring for our country' program as the lead agency working closely with Treasury and the Productivity Commission and draw money from state and local governments and the private and corporate sector. • Establish a climate change adaptation fund for ecosystem management to be used for addressing land that needs to be converted from food production to other forms of ecosystem service generation. • Enhance funding to support consolidation of the National Reserve System of protected areas. • Require all regional bodies to prepare ecosystem services strategies to guide their investment programs. • Solicit support from State and Local Governments to prepare their own ecosystem service strategies. • Ensure strong regulation to ensure sustainable production of ecosystem services to benefit current and future generations. For example, set a target of protecting at least 10% of all marine bioregions nationally to maintain marine food production services

4. Improve accountability for decisions that affect ecosystem services	
Civil society (NGOs);	<ul style="list-style-type: none"> • Advocate for public processes to track investments in ecosystem services. • Hold elected officials accountable for ecosystem stewardship. • Advocate for greater corporate transparency about the impacts of facilities and products on ecosystems.
Business (the private sector);	<ul style="list-style-type: none"> • Develop new business models that incorporate ecosystem services approach into business planning, investment and decision-making, and performance reporting. • Hold suppliers accountable for their impacts on ecosystem services.
Research communities	<ul style="list-style-type: none"> • Analyse the effectiveness of existing tools such as corporate sustainability reports. • Perform analysis to devise methods to track investments by national governments in ecosystem services to meet development goals.
Local communities/ Regional bodies	<ul style="list-style-type: none"> • Lobby to align taxation policies with ecosystem stewardship. • Develop mechanisms to hold elected officials accountable for ecosystem stewardship and use them.
Governments (national, state and local)	<ul style="list-style-type: none"> • Establish public processes to make and track ecosystem investments such as for the carbon offset market. • Increase corporate disclosure on the use of ecosystem services and the impacts of their operations, suppliers and products/services. • Ensure regional development proposals fully account for trade-offs in ecosystem services, for example, development options under consideration for northern Australia.

5. Align economic and financial incentives with ecosystem stewardship

Civil society (NGOs);	<ul style="list-style-type: none"> • Build constituencies for markets. • Provide analysis and build constituency for ecosystem-friendly taxes. • Support and raise public awareness on societal benefits of payments for enhancing provision of ecosystem services.
Business (the private sector);	<ul style="list-style-type: none"> • Include ecosystem stewardship goals in managers' performance objectives. • Incorporate maintaining and improving ecosystem services into management systems.
Research communities	<ul style="list-style-type: none"> • Further research into aligning incentives through the taxation system with an eco-systems strategy • To build on the national market based instruments program and other research work to determine an optimum strategies for different eco-system services
Local communities/ Regional bodies	<ul style="list-style-type: none"> • Support and participate in markets and payments for ecosystem services. • Incorporate ecosystem stewardship goals in facility managers' performance objectives.
Governments (national, state and local)	<ul style="list-style-type: none"> • Establish a National Carbon Offsets Authority with a specific mandate to ensure the legitimacy of carbon offsets and to maximise the ecosystem services generated from such programs. • Create a specific funding program to provide incentives to optimise production of ecosystem services under EMS programs. • Create enabling mechanisms to support markets for nature's services currently given no value. • Through the proposed review of Australia's taxation system consider how best to make taxes ecosystem friendly.

References

- Altman JC, Buchanan GJ, Larsen L (2007). *The environmental significance of the Indigenous Estate: natural resource management as economic development in remote Australia*. Centre for Aboriginal Economic Policy Research CAEPR Discussion Paper No. 286/2007.
- Beeton RJS (Bob), Buckley Kristal I, Jones Gary J, Morgan Denise, Reichelt Russell E, Trewin Denis (2006 Australian State of the Environment Committee) 2006. *Australia State of the Environment 2006*, Independent report to the Australian Government Minister for the Environment and Heritage, Department of the Environment and Heritage, Canberra.
- Canadell JG, Corinne Le Quéré, Michael R. Raupach, Christopher B. Field, Erik T. Buitenhuis, Philippe Ciais, Thomas J. Conway, Gillett NP, RA. Houghton, Gregg Marland (2007). *Contributions to accelerating atmospheric CO₂ growth from economic activity, carbon intensity, and efficiency of natural sinks*. PNAS, October Early Edition (open access) Proceedings of the National Academy of Science of the United States
- Cork, S., Eckersley, R. and Walker, B. (2007). *Rapid and Surprising Change in Australia's Future: Anticipating and preparing for future challenges and opportunities on the way to a sustainable Australia*. An Australia 21 Monograph (<http://www.australia21.org.au/pdf/Tipping2007.pdf>)
- CERES (2008). *Corporate Governance and Climate Change: The Banking Sector*. A Ceres Report, lead author Douglas G. Cogan from RiskMetrics Group, January 2008 See <http://www.ceres.org/NETCOMMUNITY/Document.Doc?id=269> (Ceres, Inc. www.ceres.org RiskMetrics Group Inc. www.riskmetrics.com)
- Costanza, R. (1997). *Frontiers in ecological economics: transdisciplinary essays by Robert Costanza*. Edward Elgar Publishing Ltd, Cheltenham, UK
- DEFRA (2007). *An introductory guide to valuing ecosystem services*. PB12852, December 2007, © Crown Copyright 2007 The Department for Environment, Food and Rural Affairs. See http://www.defra.gov.uk/wildlife-countryside/natres/pdf/eco_valuing_exe.pdf
- Eurobarometer survey 2007 See http://ec.europa.eu/public_opinion/index_en.htm
- G8 (2007) Potsdam Initiative – Biological Diversity 2010. G8 Environment Ministers Meeting, Potsdam 15-17 March 2007, see <http://biodiversity-chm.eea.europa.eu/convention/F1125911898/2007-03-18-potsdamer-erklaerung.pdf/download>
- Kareiva, P., Watts, S., McDonald, R. and Boucher, T. 2007. *Domesticated nature: shaping landscapes and ecosystems for human welfare*. Science Vol. 316(5833), pp1866-1869.
- Millennium Ecosystem Assessment (2005): *Ecosystems and human wellbeing: synthesis*. World Resources Institute, Washington DC.
- Mulder, I. (2007). *Biodiversity, the Next Challenge for Financial Institutions?* Gland, Switzerland. World Resources Institute, 101pp
- IUCN (2007). IUCN Statement to United Nations General Assembly 30th October 2007 http://cmsdata.iucn.org/downloads/2007_oct_unga_62_2ndcommittee_sustainable_development.pdf
- World Resources Institute (2007). *Restoring Nature's Capital - A Global Action Agenda*. http://pdf.wri.org/restoring_natures_capital.pdf
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