

Using common property resource approaches to achieve systematic landscape change

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Abstract

As the only first-world country to be classified as megadiverse, Australia has a unique opportunity to lead the world in the development of conservation through sustainable use (CSU) strategies. These strategies could utilise our unique biota, 80% of which is endemic to Australia. The FATE program aims to incorporate forms of land-use that combine conservation with commercial return into the landscape mosaic to drive systematic landscape change. Part of this challenge is to pursue opportunities for investment in conservation-orientated landscape change that is driven initially by a reduction in the risk of income loss associated with regeneration of targeted land in the short term; and by the reduction of risk in the long term if landscape change is achieved. The significant challenge of achieving systematic landscape change across property boundaries is central to this research which will seek to establish common property arrangements for areas managed for conservation. It is through these arrangements that:

- economies of scale can be achieved for forms of land-use that provide commercial returns while achieving regional natural resource management targets.
- opportunities can be created for investment in public-good conservation combined with commercial enterprise.

This paper outlines the theoretical and practical foundations of this approach and describes the activities that are being undertaken to develop it further. An example of a strategy is:

1. Design insertions in the landscape across property boundaries in sub-catchment through which regional NRM targets can be achieved.
2. Create a common property entity that can attract sponsorship and investment.
3. *Greenlease* land from landholders so they receive some return for loss of productive area.
4. Utilise local and external knowledge to regenerate and manage the area.
5. Develop sustainable use systems on *Greenleased* areas that achieve commercial and conservation objectives.

1. Introduction

As a result of its peculiar geological and climatic history, Australia has a large number of unique species and environments. Since European settlement, widespread landscape change has taken place as a result largely of agricultural land-use. This has resulted in significant losses of species and ecosystems and widespread land degradation. Many Australians have recognised this environmental impact and there have been various responses attempting to slow or reverse the destructive trend while maintaining productivity and livelihoods. At the front line of this effort are Australia's farmers: a very diverse group ranging from highly capital and technology intensive irrigators producing 80% of our gross value of production from 2% of the land area, to managers of vast semi-arid properties running 1 sheep to several hectares and relying heavily on off-farm income to survive.

This paper is an attempt to describe some realistic pathways to systematic landscape change through common property resource approaches. We begin with a description of the biophysical, social and institutional context of natural resource management in Australia, review common property approaches already in place then describe a rangeland project already underway. Finally we propose a model for a conservation commons and describe how we see it working in a severely modified environment.

1.1. Australia's biodiversity

It is estimated that there are 13.6 million species of plants, animals and micro-organisms on earth. Australia has about one million of these, which represents more than 7% of the world's total and is more than twice the number of species in Europe and North America combined. Megadiversity describes countries with very high levels of biodiversity. The twelve most megadiverse countries, including Australia, contain about 75% of Earth's total biodiversity. Other megadiverse countries include Brazil, Colombia, Ecuador, Peru, Mexico, Democratic Republic of the Congo, Madagascar, China, India, Indonesia and Malaysia (Australian Museum Online 2005a).

Approximately 80% of Australia's species are endemic, meaning they occur nowhere else in the world. This high level of endemism is largely due to Australia's unique geological and climatic history. The key events in that history are:

- Until about 50 million years ago the land that is now Australia was part of Gondwana, the ancient super-continent that also contained Antarctica, South America, Africa and India). Gondwana began to break up around 140 million years ago.
- Australia left what remained of Gondwana 50 million years ago and its inhabitants remained largely isolated from the rest of the world until its northward movement brought it into contact with south-east Asia.

- As it moved northwards Australia went through dramatic climatic changes of hot, cold, wet and dry. The general trend was to become progressively hotter and drier.

As a result, the species that live on Australia today are those that have survived and adapted to dramatic environmental changes without the influence of other species (Australian Museum Online 2005a).

1.2. Impacts of European Settlement and Agriculture on Australia's biodiversity and landscapes

At the time of European settlement Indigenous Australian's lived in complex societies utilising Australia's unique biodiversity for survival and weaving it into their belief systems. For them the concept of a wilderness devoid of people is nonsense. Evidence and knowledge of their use of and impact on the landscape has been largely lost since European settlement, and many ecosystems have been lost or depleted during the past 200 years.

Timber getters moved up the coast felling coastal forests, opening up the land for grazing, cropping and urban development. Squatters moved across the eastern coastal range, clearing extensive areas of native woodlands for grazing and cropping. Introduced herbivores such as rabbits and goats and predators such as cats and foxes followed the pattern of settlement.

The vast semi-arid scrublands and grasslands of inland Australia were taken up by huge herds of sheep. Without appreciating Australia's highly variable climatic patterns, sheep were grazed at unsustainable levels, leading to massive destruction of native vegetation and loss of soil when cycles of drought inevitably hit. This destruction of habitat, combined with predation by cats and foxes, led to the loss of small mammal species from most areas.

In higher rainfall areas closer to the eastern seaboard and in the southwest of Western Australia, extensive clearing for grazing and cropping lead to widespread erosion and salinity. Australian soils are mostly very old, shallow and low in fertility by world standards. Many have dispersive lower layers, enhancing erosion and allowing fertile valley floors to be drained by erosion-cut channels.

Much of Australia is built on marine sediments with high salt content. This and other factors lead to saline groundwater which is rising to the surface in many places causing land degradation due to dryland salinity.

In addition to these problems of land degradation, Australia's rivers are becoming more saline and are being degraded due to agricultural activities. It has been estimated that the average salinity of the

lower River Murray (monitored at Morgan) will exceed the 800 EC units threshold for desirable drinking water quality in the next 50-100 years (Murray Darling Basin Commission 1999). National programs to fight this problem are being funded although improved outcomes are slow in coming.

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) has estimated the cost of land and water degradation to the rural sector alone at over \$1 billion per year. In addition, the prevention and repair of environmental damage costs Australian agriculture \$285 million, mining \$152 million, and tourism over \$200 million a year (CSIRO 1998).

Apart from the economic costs of land and water degradation, impacts can be measured in terms of loss of ecosystems and species. In the past 200 or so years, Australia has lost:

- 75% of rainforests and nearly 50% of all forests;
- over 60% of coastal wetlands in southern and eastern Australia;
- nearly 90% of temperate woodlands and mallee;
- more than 99% of south-eastern Australia's temperate lowland grasslands;
- over 83% of Tasmania's lowland grasslands and grassy woodlands;
- about 95% of brigalow scrub that originally grew in Queensland;
- over 90% of Victoria's grasslands.

(Australian Museum Online 2005b)

These changes have also lead to significant extinctions of animal and plant species, with many others considered endangered and vulnerable as summarised in Table 1 (vertebrate fauna) and Table 2 (flora) below. In addition to those listed in the Tables below, Australia also has a megadiverse invertebrate fauna and very little is known about their status.

Table 1: Australia's Threatened Vertebrate Fauna (Department of the Environment and Heritage 2006a)

Extinct or extinct in the wild	Critically Endangered	Endangered	Vulnerable or conservation dependent
birds (23)	birds (5)	birds (38)	birds (64)
fishes (1)	fishes (2)	fishes (16)	fishes (20)
frogs (4)	mammals (2)	frogs (15)	frogs (12)
mammals (27)	reptiles (1)	mammals (34)	mammals (53)
		reptiles (11)	reptiles (38)

Table 2: Threatened Australian Flora (Department of the Environment and Heritage 2006b)

Extinct	Critically Endangered	Endangered	Vulnerable
61	57	507	675

1.3. Describe national, state and local initiatives to reverse rate of landscape change and loss of biodiversity

As a wealthy nation, many Australians believe we have a special responsibility for biodiversity conservation and Natural Resource Management (NRM). This sense of responsibility is reflected in legislation and government policy, government-funded NRM initiatives and the actions of individuals, community groups and non-government organisations (NGOs).

National Parks and other protected areas, which cover around 10% of Australia’s land area, represent an important part of this collective responsibility towards conservation. However, the greatest issues lie in the management of private land in Australia, particularly land used for agriculture. This is because the landscapes best suited to agriculture are generally under-represented in the reserve system, habitat connectivity across private land is needed for biodiversity conservation (particularly in the presence of climate change) and issues of soil erosion, salinity and water quality are most severe on private lands.

Australia has been divided into 85 bioregions according to the Interim Biogeographic Regionalisation for Australia (IBRA) and each of these has been given a priority in terms of conservation (see Figure 1). The bioregions subject to the greatest loss of native vegetation are in the major agricultural areas, and these also correspond to the areas in which salinity and declining water quality are the key issues. Thus the areas subject to the greatest landscape change in the past are now the areas for which systematic landscape change is needed in future to address land degradation and resilience issues.

Much legislation exists at both State and Federal level dealing with NRM on private lands, covering native vegetation, threatened species, planning and development, water management and other areas of activity. This legislation provides the framework for natural resource management to take place, as well as important safeguards against continuing uncontrolled degradation of Australia’s natural resource base, such as broad-scale land clearing and over-extraction of water resources.

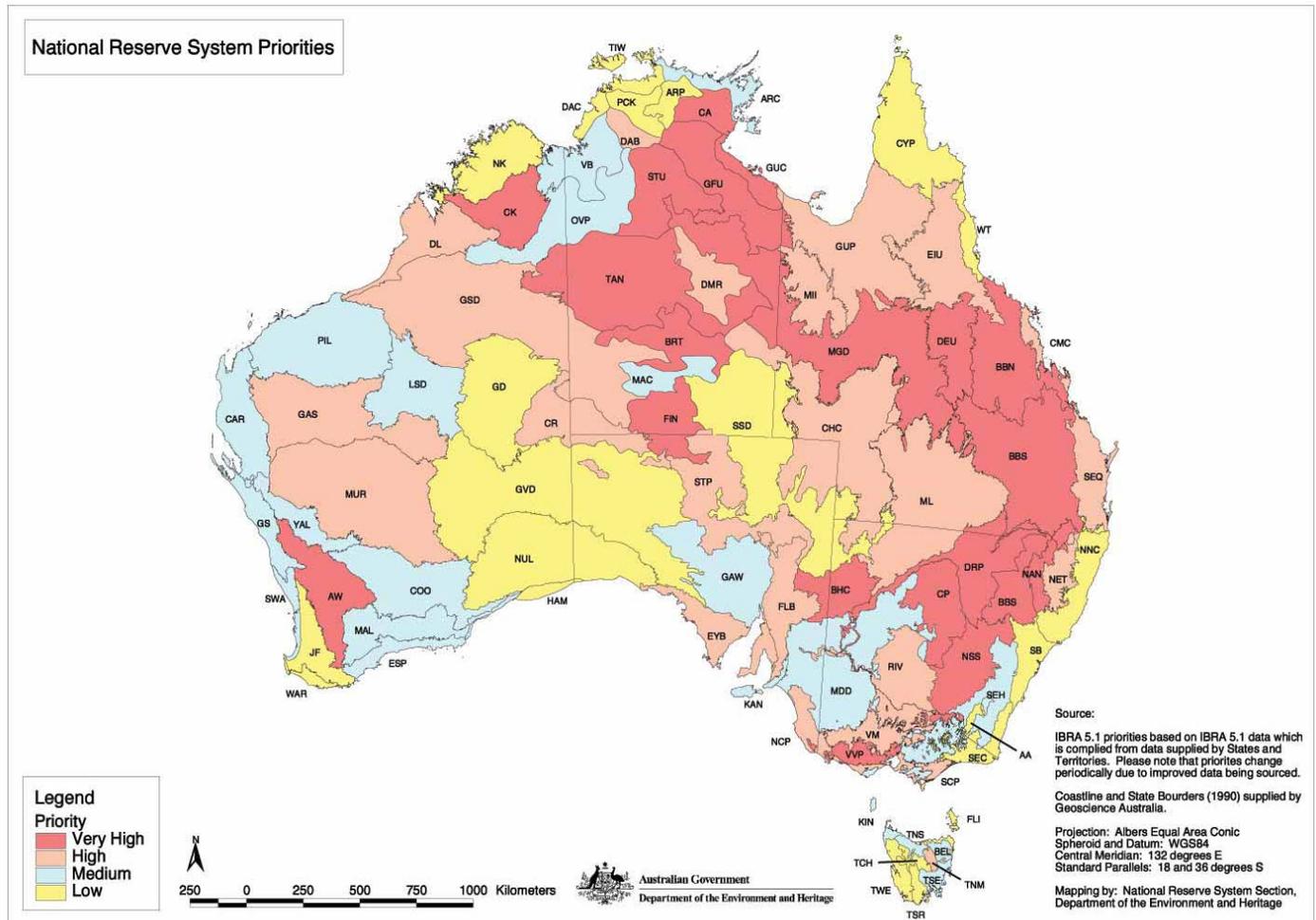
However, these regulatory approaches face serious limitations in terms of how well they can prevent and reverse environmental damage. These regulatory challenges include;

- balancing environmental, social and economic values that differ hugely between stakeholders;
- creating equitable and flexible frameworks that don’t punish good land managers or stifle innovative solutions yet also aren’t full of loopholes that allow destructive actions to continue;

- generating confidence and stability despite continual changes to legislation; and
- creating incentives to undertake actions that contribute to public good environmental outcomes

An over-reliance on regulatory solutions to NRM problems can also have a tendency to erode goodwill and volunteerism as those having regulations imposed upon them (ie landholders) may feel they are being unfairly branded as 'environmental vandals' whereas they view themselves as 'environmental stewards'. Thus, governments in Australia have recognised the importance of 'beyond compliance' solutions that create incentives for achieving NRM outcomes, through programs such as the Australian Federal Government's Natural Heritage Trust (NHT) and National Action Plan for Salinity and Water Quality (NAP).

Figure 1: Priority bioregions for establishing protected areas (Department of the Environment and Heritage 2005).



The NHT and NAP represent the 'carrot' to complement the 'stick' of legislation and aim to improve management of Australia's natural resources through the provision of \$4.4 billion worth of funding between 1996 and 2008 (Commonwealth of Australia 2005a), with further extensions possible. Over this time, a number of shifts have taken place in the way this incentive funding is distributed. Some of the most important shifts have been towards regional delivery of funds through 56 regional bodies across the country and a national pilot program for the development and trialling of market-based instruments (National Market-based Instrument Working Group 2005) to maximise NRM outcomes from a limited pool of money. Landholder groups have also been pro-active with initiatives aimed at demonstrating their environmental stewardship through the development of environmental management systems with the assistance of another national pilot program (Commonwealth of Australia 2005b).

Whilst government has provided regulatory frameworks and a substantial amount of funding for NRM actions to take place in Australia, much of the labour, planning, in-kind support and funding have come from landholders and other members of the community. This work has often been undertaken by the more than 4000 Landcare and other similar volunteer groups around Australia (Landcare Australia 2006). More than 40% of Australian farmers are involved in Landcare and, along with support from other members of the local community as well as funding and in-kind support from business, government and non-these groups provide an effective vehicle for the delivery of NRM actions.

However, despite all of this action amongst Government, business, community groups and NGOs, NRM actions in general have been fragmentary and not geared towards achieving systematic landscape change. Some Landcare and other groups have begun to explore cross-property, landscape-scale planning initiatives and others have also explored collaborative business ventures involving common property resources, such as kangaroo harvesting. There is strong potential for these existing NRM frameworks in Australia to further explore common property arrangements that may contribute to improved NRM outcomes as well as improved economic outcomes.

2. The case for systematic landscape change

2.1. What change is presently occurring?

To date, Australian landholders have been urged to adopt practices to make existing land-use more sustainable. Examples of these practices include:

- Monitor and maintain ground cover
- Encourage deep rooted perennials in pastures
- Strategic tree planting (farm forestry)
- Preserve and enhance areas of conservation value
- Protect sensitive and strategic areas from stock
- Pest, weed and pasture disease management
- Reduced tillage and stubble retention when cropping
- Carefully manage grazing pressure
- Control water for stock and for irrigation

While these practices are becoming more widely accepted as necessary, their adoption has been patchy. Reasons for non-adoption have been explored (Cary, Webb *et al.* 2002) and include:

- A landholder's assessment of the value of the practice;

- The level of perceived risk to the landholder of adopting the practice;
- Landholders are more likely to adopt practices that are observable, able to be trialed and less complex;
- The degree of local applicability of the practice;
- Pro-environmental stewardship values are less influential than socio-economic factors such as farm income, age, training, having a farm plan, perception of financial security and community landcare membership.

Non-adoption or low adoption of a number of sustainable practices can generally be explained by the relative economic advantage they provide and how difficult it is for landholders to trial them (Pannell, Marshall *et al.* 2006). Efforts to overcome these barriers are costly, and one of the key requirements is increased effort to identify locally applicable sustainable practices (Cary, Webb *et al.* 2002).

All of these efforts are costly and whilst some support is available for protection of high conservation value and sensitive areas (such as fencing and some revegetation), there is no immediate prospect of meeting the ongoing cost of managing these areas. Many landholders hold the view that the 'lock up and protect' approach is fundamentally flawed. Fully functional ecosystems may be expected to be self regulating, however smaller fragments of native vegetation and areas that have previously been grazed, logged or cleared generally require ongoing management. Regrowth can be heavily dominated by one species and weed and pest animal control is usually necessary. In fact, many schemes involve conservation covenants, which ensure that the land set aside will remain non-commercial in perpetuity. The prospect of meeting the ongoing cost of managing conservation areas without any income being gained from them is a severe disincentive to undertaking conservation works.

A single property emphasis is also clearly limiting. Regeneration efforts that encompass riparian zones across several properties are much more likely to achieve target outcomes but are rarely implemented on this scale. Revegetation of groundwater recharge zones to mitigate dryland salinity will often affect multiple properties and generally benefit farms further down the slope more than it will the owners of the land actually being revegetated. Connectivity of vegetation across the landscape to provide for movement of species is another activity that clearly must be done with across-property collaboration.

However, despite the clear need for landscape-scale planning and action, NRM activities generally take place in an ad-hoc basis across the landscape. Landholders are generally fiercely independent and traditionally do not work closely with neighbours. This has changed significantly with Landcare, although it can be argued that most Landcare actions are on 'uncontested' land and collaboration is voluntary. Clearly there are significant challenges to achieving widespread collaboration in implementing conservation orientated action across the landscape.

Thus, with these barriers to collaboration and lack of ongoing funding of conservation management actions, any increase in the uptake of the types of sustainable land management practices listed above faces serious challenges and, at any rate, will only represent small incremental change of an existing system. In many areas the resilience of the system is severely compromised, and as greenhouse-induced climate change continues to impacts on biodiversity, ecosystem function and hydrological cycles, the risks of continued degradation to land and water resources and declining productivity will become more acute (Australian Greenhouse Office 2003). Is more revolutionary change possible? If so what vision of the landscape is desirable and how might it be achieved?

2.2. A vision for future landscapes

Here the vision is to create more of a mosaic of land-uses across the landscape, strategically located to support local enterprise and maximise resilience (Walcott 2004). This would, in most areas, involve the consolidation of conventional cropping and grazing to areas where they are most productive, profitable and ecological sustainable. Existing areas of native vegetation should be linked across the landscape and actively managed for regeneration aimed at achieving a level of landscape function that is largely self-regulating.

Between these two ends of the production/ conservation spectrum we should strive to create conservation commons that are managed for both conservation and for commercial returns. This commons could include existing reserves, national parks and private land and be managed by a local management group comprising interested and skilled land holders and other land managers as well as scientific, legal and management support.

The aim would be for the commons to attract investment to fund initial revegetation, with commons enterprises then continuing to support the conservation efforts while achieving landscape change. The commons should aim to achieve some of the functional attributes of perennial dominated native vegetation but incorporate conservation through sustainable use strategies and be structured to take advantage of opportunities for investment in ecosystem services such as carbon sequestration.

Commons enterprises may include multi-species plantations which could earn carbon credits as well as provide commercial harvests. Across the commons would range populations of existing native fauna, predominantly large kangaroo species, providing another source of income through sustainable harvesting. The increase in area and quantity and quality of native vegetation and compatible habitat would also make the reintroduction of locally extinct small mammals and other fauna possible. These species played a significant role as ecosystem engineers prior to the widespread landscape change that

lead to their extinction. This vision has been endorsed by Australia 21 in its Productive and Resilient Ecosystems Program (<http://www.australia21.org.au/ecosystems.htm>).

3. Investing in systematic landscape change

3.1. Current public investment in systematic landscape change in Australia

Recently the Natural Resources Commission (NRC), the NSW Government body that oversees the Catchment Management Authorities (CMAs) across the state, released an issues paper calling for submissions on multi-farm or landscape native vegetation plans (Natural Resources Commission 2005). Some sub-catchments and communities are collaborating to generate landscape plans in which they balance local needs and individual objectives with natural resource management targets. In a submission to the NRC, the FATE Program described a collaborative planning and monitoring scenario that would create the following opportunities for the sub-catchment community:

- Sufficient economies of scale to consider conservation compatible commercial activity on native vegetation and revegetation sites within the sub-catchment, such as forestry, recreational and tourist enterprises, wild harvest of native plant products, multi-species native plantations with potential commercial harvest possibilities and participation in future environmental markets such as carbon, salinity and biodiversity trading.
- Structural arrangements that could position the sub-catchment community to take advantage of potential payments for ecosystem services in the future.
- Increased ability to bid for CMA or other incentive funding, particularly where Market-Based Instruments such as auctions are employed that favour activities that promote connectivity (also benefits CMAs by creating better outcomes per dollar spent).
- The potential to attract green investment in a sub-catchment 'corporation' or 'co-operative' engaged in the above conservation compatible commercial activities.
- The income generated from these activities could support the ongoing management of the conservation areas and ultimately provide some returns to landholders.
- Increased investment in conventional agricultural activities within the sub-catchment driven by the landholders' pro-active response to the management of long term environment risk.
- Marketing of sub-catchment products as having land-stewardship attributes which provide greater access to specific markets.

This submission received strong support from NSW Farmers Association. The FATE Program has also submitted an expression of interest to the National Market-based Instruments Pilot Program for a project looking at incentives for collaboration with support from two CMAs. It is still not a mainstream practice.

3.2. Conservation through sustainable use (CSU) initiatives

There are increasing calls for more revolutionary change. One such call is for greater sustainable commercial use of Australian native species. While there are existing industries for some unique Australian species (for example macadamia nuts and kangaroos) the challenge is still to make those industries good examples of conservation through sustainable use. Due to Australia's megadiversity, there are a large number of potential products that would be unique to Australia through commercialization of our native species. These have been readably summarized in the recent book 'Going Native' (Archer and Beale 2004). The FATE program is pursuing the potential of generating conservation benefits through the harvest of large wild kangaroo species across Australia's rangelands (Ampt and Baumber 2006).

Whilst unusual in Australia, CSU is widely accepted across the developing world and by international agencies such as IUCN and the UN Convention on Biodiversity. Guidelines, known as the Addis Ababa Principles for CSU (<http://www.biodiv.org/programmes/socio-eco/use/addis-principles.asp>) have developed and endorsed by the UN in the recent eighth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 8) in Curitiba Brazil. The Australian Senate has also endorsed CSU approaches (Rural and Regional Affairs and Transport References Committee 1998).

A key problem is scale. Individual landholders will rarely have the scale necessary to generate enough critical mass to develop markets and generate income.

3.3. International environmental markets - carbon and biodiversity

Whilst there are clear issues at present preventing global carbon and biodiversity markets from making a significant difference, it is reasonable to assume that, like the global shift leading to the phase out of CFCs, a tipping point leading to a significant expansion of these markets is possible soon.

For example, organisations such as the Business Biodiversity Offsets Program (BBOP) are working hard to have protection of biodiversity mainstreamed. Their website (<http://www.forest-trends.org/biodiversityoffsetprogram/>) defines offsets as:

'conservation actions designed to compensate for the unavoidable impact on biodiversity caused by infrastructure projects, to ensure "no net loss," and, preferably, a net gain of biodiversity. Offsets are only appropriate in the context of developments that are legal and appropriate, and when the developer has first used best practice to avoid and minimize harm to biodiversity.'

Their vision and expectation is that:

'biodiversity offsets will become a standard part of business practice for those companies with a significant impact on biodiversity. The routine mainstreaming of biodiversity offsets into development practice will result in long-term and globally significant conservation outcomes.'

Global re-insurers are also potential and emerging agents for landscape change leading to carbon sequestration and the resilience generated by well-managed biodiverse areas. Recent Australian representation on a UNESCO Forum reported a growing potential for global investment in developing and enhancing biodiverse environments as part of carbon and biodiversity markets.

Some Australian regional natural resource management bodies have already been approached. Their role could be brokers and institutional supporters of local investment to add momentum to the present public support. However, they will have to demonstrate how the desired actions can be implemented at sufficient scale to generate the biodiversity and carbon credits that may drive the investment.

3.4. Barriers to investing in systematic landscape change

The dot points below summarise some of the barriers that are preventing investment in systematic, conservation related landscape change:

- Resistance from many landholders to apply for financial support that results in loss of productive land area due to their rejection of the 'lock-up for conservation' mentality and covenanting;
- Environmental markets remain immature and experimental, with Australia still resisting Kyoto;
- It requires a high degree of collaboration and has potentially high transaction costs;
- Under-investment and failure to attract philanthropy and corporate investment;
- Difficulties with native vegetation legislation and resistance to it;
- Lack of recognition of the provision or diminution of ecosystem services as a result of land-use - difficulty in identifying whose actions contribute to enhancing provision of ecosystem services and who gains and the measurable extent of the costs and benefit of stakeholders;
- Pioneering spirit/ individual focus of landholders and many programs aimed at providing incentives - this leads to externalities that need to be internalised;
- Formal rules made centrally with lack of congruence with informal rules.

Concentrating on localised, well-designed common property institutions can reduce many of these barriers.

4. Common property resource approaches to achieving systematic landscape change

4.1. Reasons for taking a common property resource approach

We believe that there is considerable potential in taking a common property resource approach.

Drivers for the development of such approaches include:

- Access to currently available funding for implementing NRM actions in catchments such as protecting existing areas of native vegetation and linking them to provide connectivity, revegetating recharge areas to help mitigate downstream salinity, protecting and revegetating riparian areas. Groups of landholders who collaborate to achieve landscape scale outcomes in a local area can achieve far more than the current fragmented effort.
- Achieving economies of scale for conservation through sustainable use enterprises that can support conservation activities could be facilitated by a CPR approach. The aim would be to establish localised common-property institutions that can provide appropriate local governance to achieve a negotiated framework for the reinvestment of returns or their distribution according to the contribution of different landholders. Careful attention to the establishment of formal agreements can encourage compatible informal governance attitudes and behaviours in participants (Marshall 2000).
- Local commons-based corporations that can demonstrate carbon and biodiversity gains at a suitable scale and have a suitable institution structure will be in a position to attract investment via carbon and biodiversity markets. (Matching the management approach closer to the ecosystem's size for better environmental outcomes).
- Connect people, as well as land (social capital building) for longer term resilience/support. A local development model that strives for a critical mass of activities to generate local wealth and employment could be built around sustainable use and commons approaches.

The issues leading to the conclusion that common property resource approaches are appropriate are summarised in Figure 2 and some examples of some existing and proposed conservation commons are summarised in Figure 3.

Figure 2: Summary of the case for common property approaches

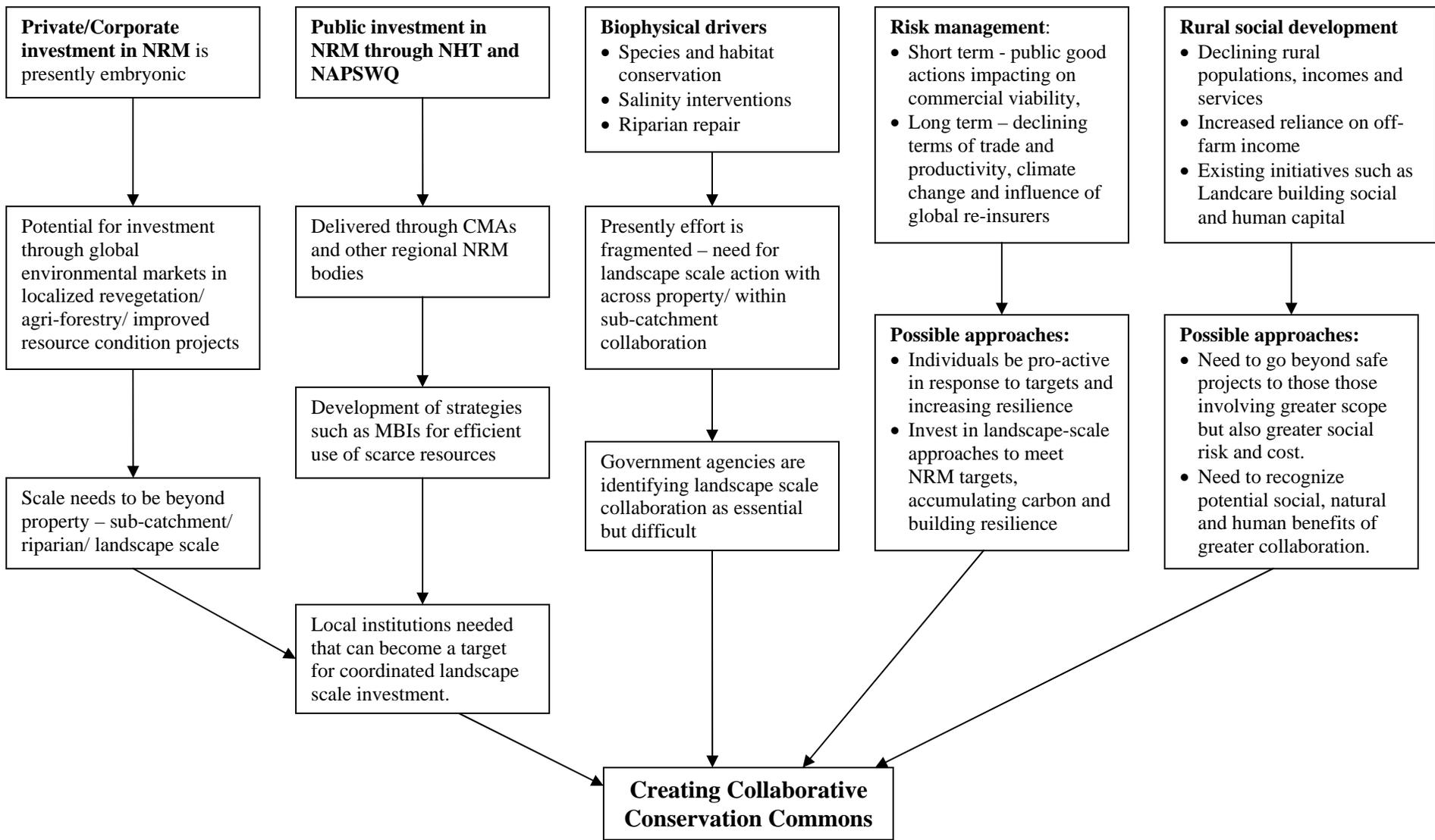
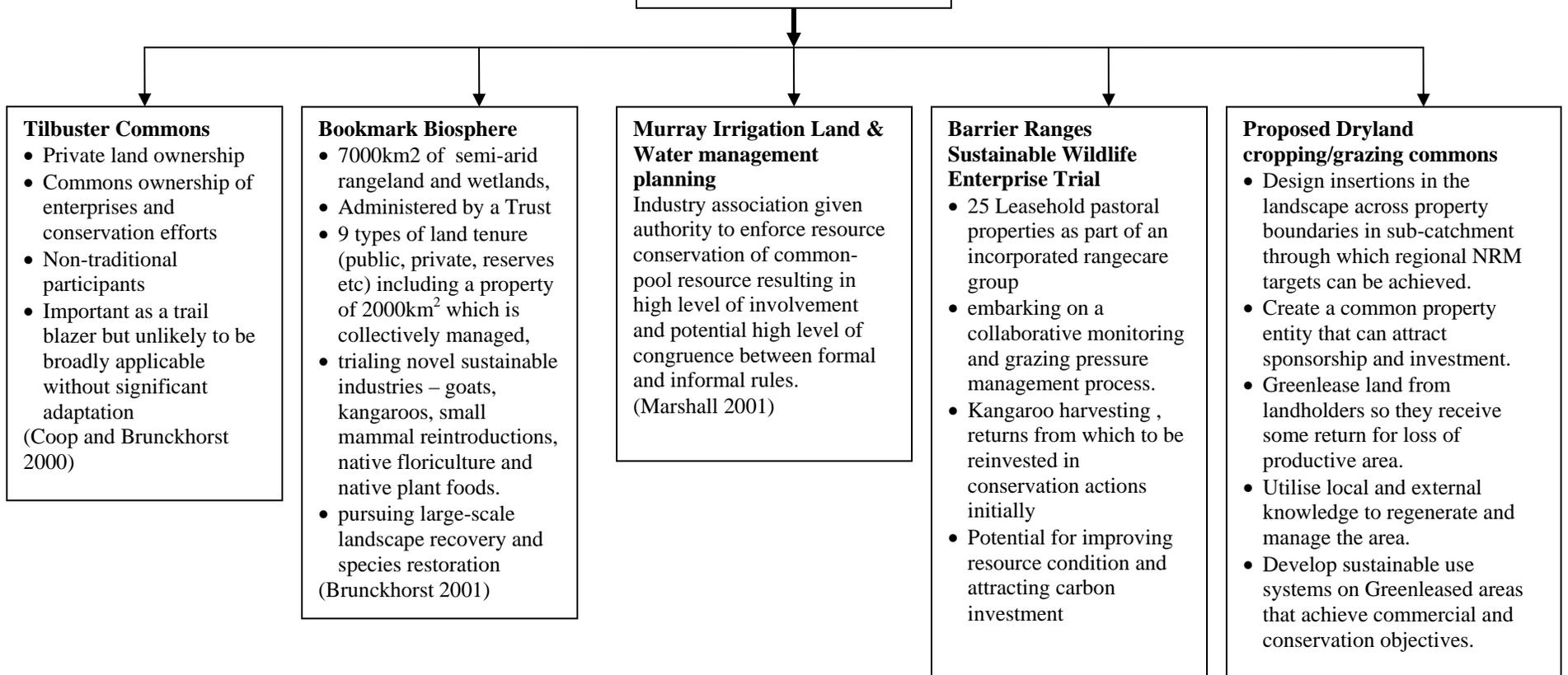


Figure 3: Existing and potential common property approaches in Australia

Creating Collaborative Conservation Commons



4.2. Achieving economies of scale for CSU activities - collaborative kangaroo harvesting project

The Future of Australia's Threatened Ecosystems (FATE) Program (www.fate.unsw.edu.au) has embarked on a project involving approximately 25 large pastoral properties in north-western New South Wales (NSW) which cover over 1 million acres (over 400 000 hectares) in total. These properties, which run sheep and cattle (and also depend on a significant amount of off-farm income) form a local Landcare group, the Barrier Area Rangelcare Group (BARG) and have been collaborating for some time on NRM activities such as feral animal control, weed control and sustainable grazing management. The partnership between BARG and the FATE Program aims to expand this collaboration by managing free-ranging kangaroos as a common property resource, with associated monitoring and management of total grazing pressure across the BARG properties.

In New South Wales, kangaroos (and other wildlife) are owned by the Crown (NSW Government), with landholders being entitled to apply to harvest kangaroos commercially on their properties within a regional quota designed to ensure the sustainability of the harvest. This harvesting is usually undertaken by professional shooters with the landholder's permission, with the shooters then selling the kangaroo carcasses to meat and skin processors. Landholders generally do not request any payment from shooters for a number of reasons; because kangaroos are seen as competition for sheep and thus their removal is considered benefit enough, because the value of kangaroo meat and skins has traditionally been low and because supply has rarely outstripped demand, meaning the shooter could simply move their activity to another property.

The aim of the BARG-FATE initiative is to collaboratively manage the landholder's access rights to kangaroos across all participating properties as a common pool resource. This project will explore the potential for economies of scale to operate in the management of harvesting activities, the potential for the group to gain greater bargaining power in its dealings with shooters and processors and the potential for greater flexibility in management of total grazing pressure by targeting areas of highest kangaroo grazing impact across all properties. Further NRM benefits may also result through collaborative monitoring of rangeland condition under different grazing pressures and re-investment of kangaroo income into the group's Landcare activities.

Table 3 below compares the Barrier Ranges Sustainable Wildlife Enterprise (SWE) trial to the list of characteristics (Dolšak and Ostrom 2003) for successful common-pool systems.

Table 3: Comparison of BARG Trial to Dolšak and Ostrom's (2003) characteristics of common-pool resource systems.

Characteristics of common-pool resources that make it conducive to successful governance	Application to the Barrier Ranges SWE Trial
small size	Total potential area is over 400 000 hectares but number of properties is only 25
stable and well delineated resource boundaries	BARG properties are mostly contiguous and members belong to an incorporated body
relatively small externalities resulting from resource use - these need to be moderated by the institution	Key initial common pool resource is the kangaroo population which ranges across properties eg property with abundant visible roos supplied from a number of other properties. Process to negotiate the institutional rules
ability of users to monitor resource stocks and flows	Shooters to record harvest directly on GPS, landholders to record observations of roo populations, web-based GIS management and recording system. Landholders to begin monitoring landscape function and measure it against area benchmarks
moderate level of resource use	Use of kangaroo harvest strictly controlled by government conservation agency through setting harvest quota and issuing licenses to harvest
resource dynamics well-understood by users	Monitoring system will provide the information from which this understanding can develop

4.3. Investment in conservation based enterprises - creating a conservation commons

The FATE program and Australia 21 are working together with a number of government and non-government agencies and regional natural resource management bodies to further develop the concept of a conservation commons and test the concept in a number of locations in the cropping and grazing

zone. This zone is the most severely modified agricultural environment with less than 1% of many native vegetation communities represented and significant dryland salinity problems.

Some local groups have already travelled some distance along the route to integrated planning. We aim to work with these groups and develop the commons institutional framework using guidelines developed by leaders in the common property field. Essentially we will aim to identify the existing and potential common-pool resources which are not central to landholders existing enterprises and are presently not utilised. We will also explore land-use opportunities that are conservation orientated so can generate incomes or attract investors in environmental services as well as provide the basis for local enterprises. We will then work towards the vision described in section 2.2.

Together with the local community we will work towards:

1. Design insertions in the landscape across property boundaries in sub-catchment through which regional NRM targets can be achieved. Attempts would be made to integrate various forms of land tenure into the plan to maximise the scale, the potential for connectivity and amenity.
2. Create a not-for-profit common property entity that can attract sponsorship and investment and provide the governance needed to manage the conservation commons.
3. Develop a community monitoring system that withstands scientific scrutiny to benchmark and measure improvements in landscape function. Aim within the group to improve function on the conservation commons as well as on land used for commercial production and on native vegetation reserves.
4. Negotiate with those landholders who have lost area from conventional production to receive a fair *Greenlease* so they receive some return for loss of income. Also negotiate with those who benefit to contribute to the cost of the commons, for example through upstream revegetation of recharge areas that make downslope areas more productive through reducing the impact of salinity.
5. Utilise local and external knowledge to regenerate and manage the area.
6. Develop sustainable use systems the conservation commons that achieve commercial and conservation objectives.
7. Reinvest returns from the commons into further development of the conservation and commercial potential of the commons.
8. Depending on the ongoing commercial success of the commons it may involve into a community owned corporation that distributes income to its members.

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