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Livelihoods inLand™: promoting health and wellbeing outcomes from desert Aboriginal land management

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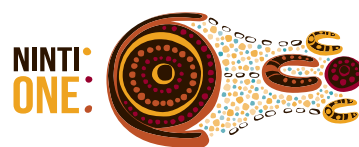
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Abbreviations/Acronyms

ALEP	Aboriginal Landcare Education Program
ALM	Aboriginal land management
APY	Anangu Pitjantjatjara Yankunytjatjara
AQIS	Australian Quarantine Inspection Service
ARRI	Aboriginal Rural Resources Initiative
ASDP	Alice Springs Desert Park
BAC	Bawinanga Aboriginal Corporation
CCBA	Climate, Community and Biodiversity Alliance
CDEP	Community Development Employment Program
CEP	Contract Employment Program
CEPANCRM	Contract Employment Program for Aborigines in Natural and Cultural Resource Management
CLC	Central Land Council
DEWHA	Australian Government Department of the Environment, Water, Heritage and the Arts (since September 2010, the Department of Sustainability, Environment, Water, Population and Communities)
ILC	Indigenous Language and Culture (Programs in NT schools)
IPA	Indigenous Protected Area
NAILSMA	Northern Australia Indigenous Land and Sea Management Alliance
NATSISS	National Aboriginal and Torres Strait Islander Social Survey
NGO	Non-government organisation
NLC	Northern Land Council
NRM	Natural resource management
NRS	National Reserve (i.e. protected area) system
NT	Northern Territory
PAW Media	Pintubi, Anmatjerre, Warlpiri Media
PES	Payment for environmental services
RIRDC	Rural Industries Research and Development Corporation
SA	South Australia
STEP	Structured Training and Employment Program
TEALMES	Top End Aboriginal Land Management and Employment Strategy
TEK	Traditional ecological knowledge
WA	Western Australia
WALFA	West Arnhem Land Fire Agreement/Abatement

Author roles and acknowledgements

Jocelyn Davies wrote most of the text of the report and edited Sections 3 and 4 from material prepared by Hannah Huenke. She also commissioned the boxed contributions from co-authors and edited them. Other co-authors contributed the boxed contributions, read the draft report and made comments and edits that were addressed by Jocelyn Davies in finalising the report. All authors participated in identifying the principles presented in Section 7.

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Summary

We propose a set of four principles that will improve health and wellbeing outcomes for Aboriginal people from their engagement in Aboriginal land management (ALM). ALM has a wide scope. Hence these are general principles rather than specific prescriptions or standards for best practice.

These Livelihoods inLand™ principles were developed inductively, synthesised from findings of various studies conducted in the Desert Knowledge CRC's Livelihoods inLand™ project (Core Project 1), from literature and from other experiences of members of the research group with ALM in desert Australia and in similar contexts internationally. The principles focus only on health and wellbeing outcomes from ALM. Integrated approaches to ALM also need to consider the interface and tradeoffs between health and wellbeing outcomes from ALM and other potential public and private benefits such as biodiversity conservation, economic development and social equity.

We define ALM as comprising the activities that Aboriginal people undertake to maintain or enhance the flow of ecosystem services. ALM activities take place in a number of domains: customary or cultural resource management, natural resource management, services that support settlement living, and land-based enterprise. In general, desert Aboriginal people are most strongly motivated by customary or cultural resource management.

Aboriginal people commonly say that their health and wellbeing is positively impacted by a strong relationship with their traditional lands and culture. International and Australian literature offers an array of evidence that supports this. People's 'sense of control' or capacity to 'cope' and the health impacts of sustained stress are powerful factors explaining this relationship. Empowerment strategies are critically important to managing the impact of stress on health. Empowerment increases the probability that people will be able to influence the outcome of the situations they experience and also builds people's self-image and beliefs about their capacity to influence outcomes.

Involvement in ALM can support better health of Aboriginal people through empowerment. The Livelihoods inLand™ principles do not address many other important factors that impact on health, such as diet, exercise and smoking. However, they do provide that, all other factors being equal, ALM systems will have the best prospect of promoting health and wellbeing outcomes where the social and governance factors covered in the principles are well addressed. The Livelihoods inLand™ principles are:

- ALM governance recognises and respects Aboriginal custom and tradition and is adaptive
- Learning is embraced as a life-long process
- Relationships are recognised as very important
- Partnerships give priority to doing things that all parties agree are important.

Recognition and respect of Aboriginal custom and tradition provides the foundation from which the actions that Aboriginal people exercise in ALM can have coherence with their own world views and belief systems. This promotes their 'sense of control', coping or capability which is fundamental to health and wellbeing outcomes. ALM governance also needs to be adaptive to operate effectively in conditions of social and ecological change, to actively transform social-ecological systems to a more desirable state as necessary, and to avoid unintended and potentially less resilient transformations.

ALM is fostering intergenerational transmission of Aboriginal ecological and other knowledge and also provides pathways for Aboriginal people to learn about science. Learning is also central to adaptive management of wildlife and ecosystems and to people's capacity to cope with and adapt to change in their environments. This provides a key link to health and wellbeing outcomes. Hence learning needs to be embraced as a life-long process for which all ALM projects and activities provide opportunities.

Kinship relationships and the reciprocity and exchanges that they involve provide the basis for trust within Aboriginal groups. Approaches to ALM that recognise the importance of relationships support health and wellbeing outcomes from ALM by promoting flows of information and management resources through pathways that are accessible and familiar to Aboriginal land managers. Relationships are also important for learning. The social learning that occurs when experiences and ideas are shared with others builds mutual understanding and cooperation and is the foundation for collaborative adaptive management.

Partnerships and networks are important for effective community-based efforts in conservation. They provide ways for Aboriginal land managers to influence institutions at higher levels that impact on their opportunities and strategies. Often, all parties to a partnership agree that realising the aspirations that Aboriginal people have for management of their land is important. These aspirations are typically linked to livelihood outcomes. However, power imbalances can readily lead to Aboriginal landowners' aspirations being a secondary consideration in practice, compared to the goals of funders. This contributes to stress and consequent adverse impacts on Aboriginal health and wellbeing. Hence, giving priority to doing things that all parties agree as important is critical. This can also be a strategy to ensure that management is being clear and specific about priorities. It can encourage attention to monitoring, since clear management priorities also lead to questions such as 'How do we know how well we are doing?' and 'Have we achieved what we set out to do?'. Over time, as partners build relationships and awareness of achievements and barriers, other areas of emphasis in management are likely to emerge, addressing issues that may be very important to some partners although not an initial priority for all partners.

Health outcomes and environmental outcomes generated by ALM comprise an integrated mix of public and private goods; that is, goods that benefit the individuals and families involved in ALM, and goods that benefit the broader Australian public. ALM provides the conditions for scoping economies in which the same set of inputs (being the knowledge and time of Aboriginal people together with other resources, including information and expertise) produces more than one set of products (being better health and also better environmental condition). This scoping relationship is particularly important in the design of development strategies in desert regions because resources (including people, money, etc) are very limited in deserts compared to the size of the areas of land being managed by Aboriginal people. Partial indications of the value of health outcomes from ALM have been derived from cost savings for primary health care of individuals who are engaged in ALM. These are substantial. Use of the sustainable livelihoods framework indicates how interrelationships between human capital, social capital, institutions at various levels, and the linkages between these through brokers, partnerships and bridging organisations, dynamically influence health and wellbeing outcomes from ALM.

The Livelihoods inLand™ principles offer a starting point for cooperative efforts by Aboriginal land managers, their representative organisations and other partners, to further develop criteria and standards for good practice in ALM. They contribute to developing integrated ways of thinking about ALM and its outcomes. These are important for understanding and promoting resilience, adaptive capacity and healthy transformations in the social-ecological systems of desert Australia. The principles are also a starting point for Aboriginal land managers to engage with international efforts for environmental certification of goods and services that have integrated benefits. Such approaches have become increasingly possible in this era of globalised flows of knowledge and finances. They are important in promoting access to new and diverse sources of investment to support ALM.

1. Introduction

Desert Aboriginal land management (ALM) is important to Australia because of the extent of Aboriginal land ownership; the significance, for various reasons and at various scales, of the ecosystem services from these lands; and because sustaining the flow of ecosystem services requires management inputs. Our research has been particularly concerned with understanding how ALM can sustain or improve the health and wellbeing of desert Aboriginal people as it engages with conservation and other natural resource management objectives that are important to broader Australian society. While we use the term ‘health and wellbeing’ for clarity, we understand ‘health’, as defined by the World Health Organization, to be ‘a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity’ (WHO 1948). We understand ‘wellbeing’ to be more than material prosperity, encompassing happiness or satisfaction with life, having meaning in life, fulfilling our potential and feeling that our lives are worthwhile (Eckersley n.d.). Consistent with Aboriginal holistic conceptions of health (Lutschini 2005), we understand this to be important for communities, not only individuals and families.

Health and wellbeing outcomes are part of the flow of cultural ecosystem services (see Box 1 and Table 1) that may be generated from Aboriginal lands. In this report we propose a set of principles to promote health and wellbeing outcomes through ALM systems in desert Australia: the Livelihoods inLand™ principles. These draw on lessons from literature and from our research on livelihoods and governance in conservation of natural and cultural resources in arid and semi-arid regions of Australia, particularly through the Desert Knowledge CRC Livelihoods inLand™ project.

Desert ALM is most vibrant on lands where strong Aboriginal property rights have been recognised. These rights typically encompass rights to use land and wildlife and to exclude many other users and, in some cases, the right to lease land to other parties. As a result of statutory land claim processes and recent large native title determinations, Aboriginal lands encompass 32% of the land area of arid Australia and 8% of the land area of semi-arid Australia, as shown on Figure 1 and Figure 2. In the arid zone Aboriginal people are the majority population outside a handful of major towns and Aboriginal populations are growing (Brown et al. 2008). The areas where strong Aboriginal property rights are now recognised are typically marginal for agricultural production, including pastoralism, though mineral and petroleum industries may have a strong footprint, generally at discrete localities.

Over the past three decades, biodiversity conservation has been an important driver for engagement in desert ALM by non-Aboriginal people from government, non-government and research organisations. Aboriginal people have a comparative advantage for biodiversity conservation in remote desert regions because the extensive tracts of land that they own have been comparatively little impacted by vegetation clearance or urbanisation. Conversely, one significant reason why biodiversity conservation has become prominent in the directions for management of desert Aboriginal lands is that there are few other options for land use that might generate income and partnerships for ALM in these regions. There is sufficient commonality between the interest of government conservation managers and Aboriginal traditional owners in ‘looking after country’ that the opportunity to secure government funding to manage land for conservation is appealing to many traditional owners.

By 2009, 15% of the Aboriginal estate in arid and semi-arid Australia was formally managed by Aboriginal people for conservation as Indigenous Protected Areas (IPAs). These lands comprise 24% of the total area of Australia’s National Reserve (protected area) System (see Figure 3). Aboriginal people were partners in a further 8% of the arid and semi-arid lands that are included in Australia’s National Reserve System – jointly managed national parks and nature reserves that are owned by Aboriginal people and other cooperatively managed protected areas where there are formal arrangements in place for Aboriginal involvement in governance and day-to-day management. Through these mechanisms the future of more than 30% of the land in Australia that is designated as being managed for biodiversity

conservation and associated objectives is directly dependent on the goals and capabilities of Aboriginal land managers. The areas of land involved continue to increase, with establishment of new IPAs in desert regions in 2010 and several consultation projects about IPA establishment underway.

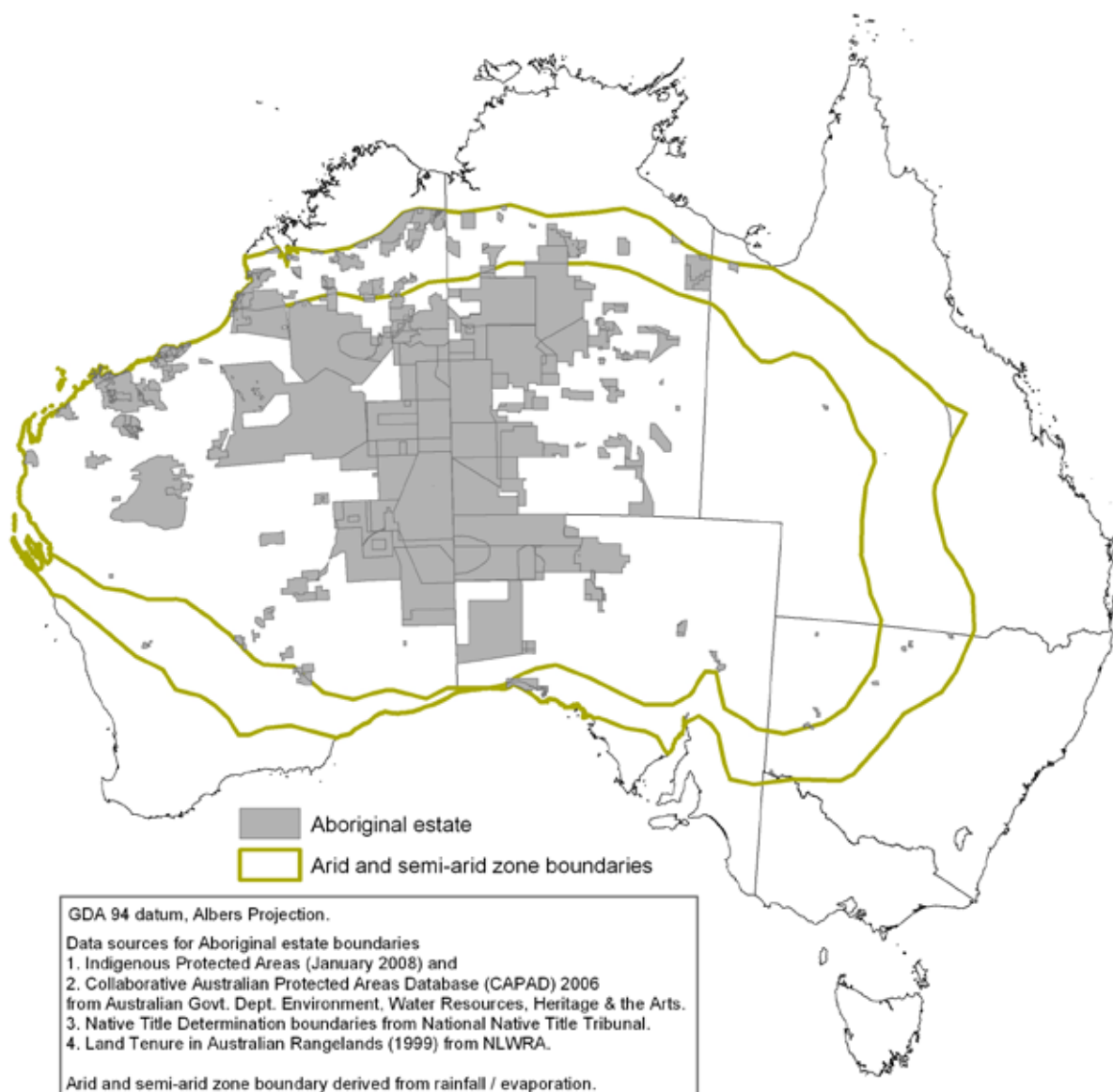


Figure 1: Aboriginal estate in arid and semi-arid zones of Australia

For the purposes of this figure, the 'Aboriginal estate' includes freehold title, Aboriginal-owned pastoral leases, and native title determinations where Aboriginal property rights have been established, but does not include jointly managed national parks, even where these are Aboriginal-owned freehold lands. The Aboriginal estate comprises 32% of the land in the arid zone and 8% of the land in the semi-arid zone.

Boundaries for the arid zone (inner boundary on map) and semi-arid zone (outer boundary on map) are defined on climatic criteria, being annual mean of the monthly moisture index (= rainfall/evaporation). The arid/semi-arid (inner) boundary is at moisture index of 0.2 and the semi-arid/sub-humid (outer) boundary is at moisture index of 0.3. Monthly rainfall and evaporation surfaces were from the ESOCIM module of ANUCLIM 1.8, cell size 0.08 degrees. Analysis by Vanessa Chewings, CSIRO Ecosystem Sciences.

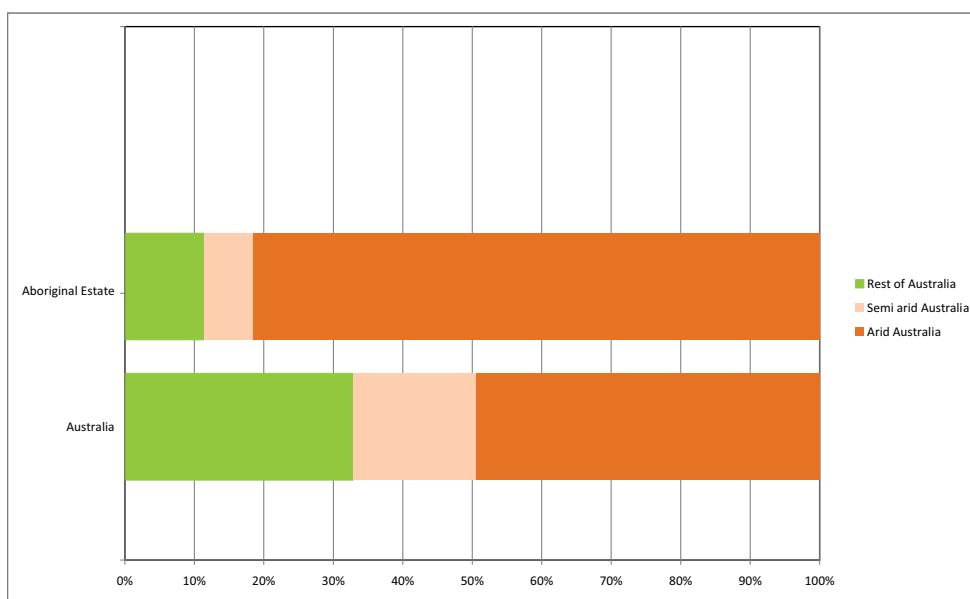


Figure 2: Proportions of Australia and of the Aboriginal estate that are within arid and semi-arid zones
Definitions of Aboriginal estate, arid and semi-arid zones, and data sources are as per Figure 1.

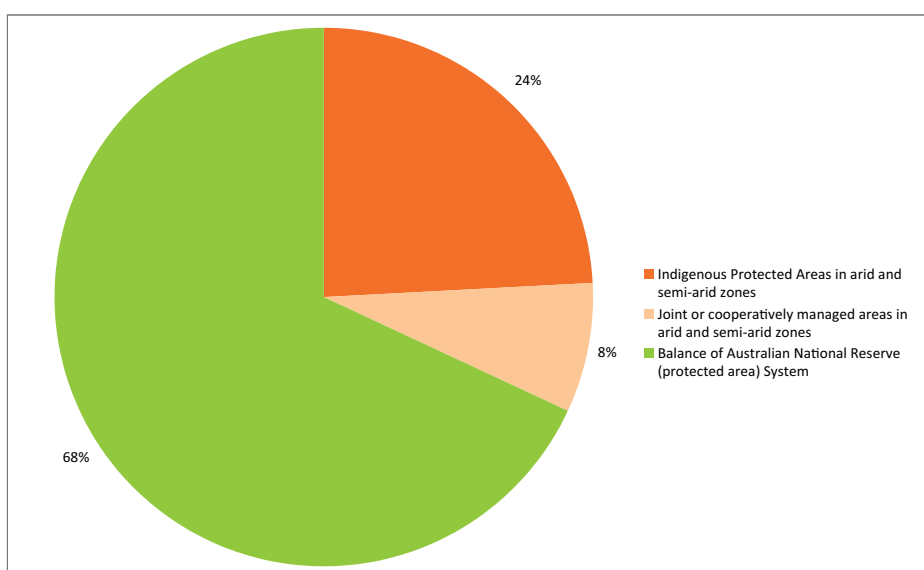


Figure 3: Proportions of Australian National Reserve (protected area) System that is comprised of Indigenous Protected Areas and jointly or cooperatively managed parks in arid and semi-arid zones

Data sources: Collaborative Australian Protected Areas Database (CAPAD) 2006 data from State and Territory conservation agencies current for various dates between July 2006 and January 2007; IPA areas from DEWHA current Jan 2009; Jointly managed (Aboriginal-owned freehold) and cooperatively managed (not Aboriginal-owned freehold) protected areas identified from knowledge of the authors, current January 2010. Analysis by Vanessa Chewings CSIRO Ecosystem Sciences.

Desert Aboriginal people commonly testify that their health and wellbeing is tied to the land. Indeed, such testimony has been an important driver for recognition of Aboriginal property rights, through the land rights movement from the 1970s. There is evidence in the literature, systematically reviewed in Section 3, of a positive relationship between Aboriginal people's engagement in land management and their health and wellbeing. Nevertheless, the health status of Aboriginal people in remote desert Australia, where land rights gains have been greatest and where engagement in land management could also be expected to be greatest, is poor. As this indicates, the pathways from land management to Aboriginal health and wellbeing are complex. Lack of clarity about what 'Aboriginal land management' actually comprises contributes to this complexity.

Ecosystem services are defined as ‘the benefits people obtain from ecosystems’ (Millennium Ecosystem Assessment 2003, p. 49). The term ‘environmental services’ is also in common usage as a synonym for ‘ecosystem services’ internationally (e.g. OECD 2005) as well as in Australian literature on ALM (Altman 2006, Campbell et al. 2008a, Muller 2008a). We also use it in some cases in this report.

Ecosystem services include both tangible and intangible benefits, that is, both goods and services. The Millennium Ecosystem Assessment categorised ecosystem services along functional lines: provisioning services, regulating services, cultural services and supporting services (see Table 1). While biodiversity is not an ecosystem service as such, biodiversity underpins the capacity of ecosystems to produce many of these benefits to humans (Millennium Ecosystem Assessment 2003). Depending on the purpose of the analysis, ecosystem services may also be usefully classified on spatial grounds, considering the spatial distribution of beneficiaries and their proximity to the ecosystems that provide the services or in terms of whether the services are intermediate services (‘supporting services’ in the Millennium Ecosystem Assessment categorisation) or final services (Costanza 2008).

Alternatively, ecosystem services may be classified in terms of the economic properties of the goods and services they comprise. The latter classification draws attention to the ‘non exclusive’ properties of many ecosystem services. ‘Non-exclusive’ means that it is difficult to exclude people from enjoying a benefit from ecosystems even if they have not contributed to the cost of providing that benefit. Thus, all Australians may benefit from ecosystem services that are maintained or enhanced by a landowner, such as climate regulation services, but may not contribute to the cost of maintaining that service. Such situations lead to ‘market failure’ and provide good reason for regulatory action or incentives to be applied to capture these costs from beneficiaries.

Table 1: Categories of ecosystem services

Provisioning services	Regulating services	Cultural services
Products obtained from ecosystem	Benefits obtained from regulation of ecosystem processes	Non-material benefits obtained from ecosystems
Food	Climate regulation	Spiritual and religious
Fresh water	Disease regulation	Recreation and ecotourism
Fuelwood	Water regulation	Aesthetic
Fibre	Water purification	Inspirational
Biochemicals	Pollination	Educational
Genetic resources		Sense of place
		Cultural heritage
Supporting services		
Services necessary for the production of all other ecosystem services		
Soil formation	Nutrient cycling	Primary production

Source: after Millennium Ecosystem Assessment (2003 p. 57)

‘Land management’ is a term adopted by Aboriginal people from the non-Aboriginal lexicon. Bradley (2001) identifies a fundamental difference between Aboriginal and non-Aboriginal approaches to land management in pointing out that for non-Aboriginal people in Australia land management is ‘a one-way process where people do things to country, to look after it and make it productive’ (Bradley 2001, p. 297). Even though that ‘productivity’ may be related to conservation goals rather than exploitation of natural resources, the sense of management as a process that people do *to* land, habitats or wildlife is pervasive. However, for Aboriginal people operating under traditional norms, land management involves a ‘two-way interaction between people and country’ (Bradley 2001, p. 297).

Notwithstanding such important distinctions, a very wide variety of motivations, practices, activities, knowledge sources and governance structures are applied in contemporary ALM. There are also a large number of different terms in use for these processes, such as ‘caring for country’, ‘natural resource management’ and ‘cultural natural resource management’ (see Section 2). Such diversity presents difficulties for identifying the characteristics or features of ALM that might account for a positive relationship between engagement in land management and Aboriginal health and wellbeing.

We might readily appreciate that health and wellbeing outcomes are due to the impact that Aboriginal engagement in land management has on social, psychological and biophysical determinants of health. But what pathways and relationships are operating? Are relatively better health and wellbeing outcomes due to the role of land management engagement in maintaining customary cultural, spiritual and economic relationships to land? Are they due to a sense of recognition and self-worth that Aboriginal people engaged in land management might gain from appreciating that the outcomes of their actions, in terms of conservation or creative expression, are valued by others in their community or by non-Aboriginal Australians? Alternatively, are they due to Aboriginal land managers’ engagement in a regular structured pattern of work, notably as community-based rangers, and to relatively higher income and wider opportunities for education and building social capital than are readily available to many other remote Aboriginal people?

All such positions are recognisable in recent and current debates about the form of development most suited to addressing disadvantage among remote Aboriginal people or ‘closing the gap’ between the health and living conditions of Aboriginal and non-Aboriginal Australians. Teasing apart the impact of land management engagement on each of the many variables that may impact on Aboriginal health and wellbeing is a mammoth task, beyond the scope of this research. Rather, we focus here on putting forward principles that, if applied in design and practice of land management systems, seem to have the best prospects of sustaining or building health and wellbeing among Aboriginal people.

1.1 Aims

As noted above, our aim is to propose a credible set of principles that, if applied in ALM, will promote the prospects of health and wellbeing outcomes for Aboriginal people.

Given the wide scope of the field of ALM, as discussed in Section 2, we have aimed for general principles rather than specific prescriptions or standards for best practice. We focus particularly on desert Australia, drawing on primary research in that region that has involved close engagement with Aboriginal land managers in several settings. The principles we develop are grounded in broader theoretical frameworks for the interrelationship between human health and ecosystem health and as such are likely to have wider applicability.

1.2 Relationship of Livelihoods inLand™ principles to payment for environmental services (PES) schemes

The Livelihoods inLand™ principles that are developed in this synthesis report (see particularly Section 7) may be considered as an early stage in the development of a certification scheme for ALM. Certification is a market friction approach to payment for environmental services (PES), as outlined below.

Many PES schemes have been developed internationally in recent decades by governments and non-government organisations (see Box 2). In general terms they all aim to overcome market failure in the provision of ecosystem services, that is, situations where the full cost of maintaining healthy

functioning ecosystems is not captured in the price that consumers pay for goods and services (see Box 1). PES schemes aim to do this by providing incentives for changes in behaviour among people who benefit from ecosystem services, including payments for the cost of provision of those services.

Government grants and employment schemes that support management of Aboriginal lands, typically with the prime purpose of biodiversity conservation (see Section 4.5.1), can be loosely considered to be a form of PES, since they represent subsidies for landowners to direct their management activities to maintaining or generating environmental outcomes. However, the ecosystem services outcomes are rarely clearly defined by governments as would be required for these approaches to meet strict definitions of PES. Nor is payment generally conditional on targets for ecosystem service outcomes being achieved. For example, the rationale for the Australian government IPA program is biodiversity conservation, but there is little monitoring or evaluation of the biodiversity benefits that may be being achieved. Further, assessments of compliance by landowners with grant conditions, and payment schedules, are typically linked to monitoring of inputs (e.g. how many people were employed, for how long, gender balance, etc) and outputs (achievement of planned activities such as fences constructed, rock holes cleaned, size and distribution of areas of country burnt). This weak relationship with conditionality is similar to PES schemes among rural landowners in other countries that we reviewed from literature, as summarised in Box 2.

In Australia there has been particular emphasis in the PES arena on the design and implementation of ‘price-based’ and ‘quantity-based cap and trade’ market-based instruments such as for water allocation or carbon pollution reduction. Issues specific to the design of market-based approaches to changing landholder behaviour in relation to biodiversity conservation in the arid regions of Australia were examined by Smyth et al. (2007). The study found that a market-based approach to securing biodiversity benefits would be a feasible and valuable policy option for pastoral lands. It found that a price-based approach, where government acts as a purchaser of biodiversity benefits at a price determined by competing bids from landowners, would be most likely to be successful. The study also drew attention to the very different ecological, social and economic context on Aboriginal lands compared to pastoral lands.

For Aboriginal lands in spinifex desert biomes, which includes more than 60% of the Aboriginal land in Australia, PES approaches need to aim for integrated environmental, social and economic benefits, rather than focusing solely on biodiversity outcomes (Smyth et al. 2007). Significant reasons are that desert Aboriginal landowners are little engaged in markets of any kind and so are not well attuned to price signals, rarely have robust structures for contracting, and have limited appreciation of the conservation science concept of biodiversity. Further, motivations for Aboriginal landowner engagement in the various activities involved in ALM are diverse (see Table 8) but mostly related to social and cultural goals, rather than income or other financial outcomes. Hence the prospects of Aboriginal landowners responding to price signals for biodiversity benefits are limited, though some do exist (Smyth et al. 2007). Evolving a certification approach offers an alternative pathway to promoting payment for environmental services.

Certification works as a market mechanism on the assumption that consumers will seek out goods and services that reflect values and goals that they share. Branding of certified goods and services promotes customer awareness of these values and goals. The certification standards that underlie the branding provide a quality assurance system to assure customers that the goods and services they are buying do actually advance these values and goals.

Box 2: Behaviour changes achieved through PES schemes internationally: a gap in knowledge

Prepared by Jocelyn Davies from Brannigan (2008) and Brannigan (pers. comm. 2009/10)

We reviewed literature for insights and examples of how payment for environmental services (PES) schemes have engaged rural landholders outside Australia in a way that has changed landholders' values and behaviour towards the environment in arid regions. Understanding such changes is important to promoting a sustained flow of environmental services beyond the time frame of particular projects. We undertook the review to identify any lessons that can be applied to designing incentives for biodiversity conservation in central Australia. Our interest was related to consideration of such issues in spinifex deserts (Smyth et al. 2007), and to the introduction in 2007–08 of price-based incentive approaches to biodiversity at waterholes in the MacDonnell Ranges implemented by Greening Australia under the Commonwealth Government's *Maintaining Australia's Biodiversity Hotspots Program*. Our search of literature from 2000 to 2007 in journals indexed in Current Contents and other databases, and in the websites of international organisations active in conservation and development in rural regions revealed a great diversity in application of the PES concept. It was also clear that PES schemes are only one element among many social, cultural, environmental, historical, economic and institutional factors that contribute to motivating conservation behaviour.

We found that there had been very little attention internationally to PES in arid regions. The most useful accessible literature about PES in other biomes was compendiums reviewing aggregated data from the Philippines (Arocena-Francisco 2002), Bolivia (Robertson & Wunder 2005) and Mexico (Alix-Garcia et al. 2005), and from PES schemes targeting outcomes for water quality or quantity (Perrot-Maitre & Davis 2001) and biodiversity (Noah & Zhang 2001). However, these reports and other accessible literature on PES schemes in other biomes provided little information on behaviour changes actually achieved among landowners or whether changes were sustained beyond the life of a PES project. One reason is that many of the initiatives were new. However, it also appeared that in most schemes little funding was directed to monitoring behavioural changes or ecosystem service outcomes. Measures of success of PES schemes were often restricted to input measures, notably the number of participants and areas of land enrolled in the program.

We also observed that a number of the cases reported were watershed services where payments were made to upstream or rural land users. These aimed to change land users' behaviour and thereby deliver improvements in the quality or quantity of water to buyers who were in relatively close proximity, often operating in the same social, cultural or political realms. This proximity suggests there would be some degree of commonality between the values and social networks of buyers and sellers of ecosystem services. Such a commonality would help generate information exchange and trust between buyers and sellers and thereby facilitate development of an effective market. In one case, a networking approach to developing this social infrastructure, including through establishment of community information centres, led to an increase in voluntary watershed protection (Arocena-Francisco 2002).

These examples of close relationships between land users and beneficiaries of ecosystem services present a very different context to the purchase of biodiversity outcomes by governments from remote desert landowners. In the latter case, information exchange is limited and trust may be quite compromised. Consistent with this observation Wunder et al. (2008) found that user-financed PES programs, where government is not involved as an intermediary between providers and purchasers of ecosystem services, are more likely to be efficient than government-financed programs. They tended to be 'better targeted, more closely tailored to local conditions and needs, had better monitoring and a greater willingness to enforce conditionality, and had far fewer confounding side objectives ... Time and again, the design and operation of government-financed programs was found to be hijacked for many alternative purposes.' (Wunder et al. 2008, p. 851).

In the case of ALM, the primary goods and services being produced are ecosystem services (Table 1). Production involves various people working together in environmental management: Aboriginal landowners and other Aboriginal people; Aboriginal organisations, their staff and consultants; and people from other agencies. As well as maintaining or enhancing ecosystem services, ALM may produce improved health and wellbeing among Aboriginal landowners as part of an integrated set of outcomes (see Section 5). The ‘customers’ for these products (‘integrated outcomes’) are those people who benefit from them, including Aboriginal landowners themselves. Importantly, they also include broader society: members of the broader Australian (and global) society benefit directly or indirectly from the ecosystem services and from the enhanced health and wellbeing generated through ALM, even when they do not live on or visit Aboriginal lands (Luckert et al. 2007).

Broader society makes most of its investment or consumer decisions indirectly through government expenditure programs and expenditure by NGOs and corporates. A certification scheme for ALM would thus aim to influence these investors, to assure them that the certified ALM projects and activities are effective in generating outcomes for ecosystem services and for health and wellbeing of Aboriginal people. The latter is the particular focus in this report.

A certification approach may be better suited than price-based market instruments to the circumstances of Aboriginal landowners. This is because the community-based management regimes that are the foundation of much ALM practice have different characteristics to situations where price-based market-based instruments have been effective, as Rose (2002) analyses. Community-based approaches are comparatively better suited to complex mixes of resources and values and close-knit social structures, whereas price-based instruments tend to work better where social relations are more open and the scale of application and impact is larger. Community-based management regimes also show comparatively greater flexibility and responsiveness to dynamic natural change. In contrast, price-based instruments tend to have comparative advantages for simple, single-focus resources or resource condition targets (Rose 2002), though it does need to be recognised that multi-criteria approaches can also perform well in accounting for multiple outcomes, even when these are quite intangible (e.g. see Hajkowicz et al. 2008).

Community-based management regimes are often ill-equipped to deal with commercial pressures. These can result in failure of the regimes and increased exploitation pressure on the environment. On the other hand, inhibited market engagement, as a result of the customary norms that underpin community-based management regimes, sometimes brings benefits for the environmental condition of the resources being used and managed (Rose 2002). These characteristics add to more immediate issues of human resources and governance capacity (Smyth et al. 2007) to help explain why the capacity of desert Aboriginal landowners to manage ecosystem service market engagement is currently limited. Certification approaches can be expected to help support market engagement by Aboriginal land managers by encouraging them to give attention to standards of the goods and services they produce, notably the integrated outcomes for ecosystem services and health and wellbeing that are discussed in Section 5.

Some recently developed international certification schemes are designed to address complex mixes of benefits such as are commonly derived from community-based management regimes. The REDD+ draft guidelines (Climate Community and Biodiversity Alliance & CARE International 2010) and Ethical Biotrade guidelines (United Nations Conference on Trade and Development 2007) are aimed at validating land management products, projects and activities that have integrated social and ecosystem service benefits. Each is founded on a set of principles for good practice (see Box 3). The Livelihoods inLand™ principles presented in this report (Section 7) begin to apply the concept of a set of principles for good practice that achieves integrated outcomes to the specific situation of desert Aboriginal land managers.

Certification has provided a mechanism to better identify the social and ecological value of many goods and services. Established examples of certification include Ecocertification of tourism operators by Ecotourism Australia (2010), and Fairtrade labelling for a wide range of products that use inputs from producers in developing countries (Fairtrade Labelling Organizations International 2009).

Certification schemes for integrated ecosystem services benefits are relatively new and evolving. They face challenges in that markets for ecosystem services are generally distant from the regions where ecosystem services benefits are being generated, typically involving producers in developing countries and consumers/ investors from developed countries. Hence it is difficult to establish investor/consumer trust in the validity or value of the ecosystem service benefits produced. Further, many producers are small-scale and cannot bear high costs of certification. Two schemes that attempt to address these challenges are outlined here. Each has developed principles for trade as a foundation for improvements in practice by producers and by distributors of goods and services.

Principles and criteria for Ethical Biotrade developed by the United Nations are an effort to adapt certification schemes in ways that promote access by small-scale producers and build the credibility of products that incorporate native natural ingredients (United Nations Conference on Trade and Development 2007, Welford & Le Breton 2008). People along the value chain of these products are required to give attention to social and economic sustainability, equitable benefit sharing, respect for the rights of indigenous communities and maintenance and revival of traditional knowledge, as well as to conservation and sustainable use of biodiversity. The principles and criteria provide a basis for organisations involved in trade in native natural ingredients to embark on a path of continual improvement. The Union for Ethical Biotrade, which promotes these principles and criteria, is membership based. Members are entitled to use the Union's logo on their products and communications subject to developing and implementing a work plan to address gaps between their practices and the principles and criteria. Ongoing membership after five years is subject to independent verification of the standards being achieved by member organisations, assessed against a framework based on the Union's principles and criteria (United Nations Conference on Trade and Development 2007).

The Climate, Community and Biodiversity Alliance (CCBA) has developed voluntary standards for land management activities that simultaneously minimise climate change, support sustainable development and conserve biodiversity (Climate Community and Biodiversity Alliance 2008). These standards aim to promote good design, through guidance and validation processes in early stages of a project with verification after five years to establish that projects are delivering to these standards. The standards specify the documentation that is required to substantiate claims of the social and environmental benefits from projects. Certification through an established carbon accounting standard proceeds in parallel with validation by CCBA that social and environmental benefit standards are being met in projects. Auditing and transparent publication of all project documentation on the CCBA website and opportunity for public comment are mechanisms to promote trust by investors in the veracity of these projects. Reeson's (2009) review of carbon markets and their implications for natural resource management in Australia concludes that combining CCBA accreditation with the Voluntary Carbon Standard may offer a pathway for Australian land managers to generate income by providing high quality carbon offsets combined with biodiversity and community benefits. Indeed, the first Australian project to follow this path was accredited against CCBA standards in 2009 (REDD Forests Pty Ltd 2009).

A further development from the CCBA standards is the REDD+ standard which is designed to promote social and environmental benefits from activities that reduce emissions from deforestation and forest degradation and that contribute to conservation, sustainable management of forests and enhancement of forest carbon stocks. The REDD+ standard comprises (draft) principles and criteria that aim to be universally applicable, and a process for developing locally meaningful indicators (Climate Community and Biodiversity Alliance & CARE International 2010). It pays particular attention to benefits and risks to indigenous peoples and other forest-dependent communities.

In each case these standards are intended to promote trust between consumers and investors and distant producers of goods and services that have integrated social, economic and environmental benefits. The trust-building process engages cooperation among producers and others involved in market chains and potential investors. It builds collective reputation through common branding, principles that underpin certification standards, and progressive transparent processes of validation and verification of benefits.

In this report, we do not attempt to cover the same ground as the internationally applicable principles discussed in Box 3. These generally derive from international covenants and frameworks for human rights, poverty alleviation and conservation of biodiversity and hence do have general applicability to ALM. In contrast, the Livelihoods inLand™ principles take the particularities of desert Australia into account as well as theoretical considerations for governance, adaptive capacity and sustainable livelihoods. However, they focus only on health and wellbeing outcomes from ALM rather than also considering biodiversity, landscape conservation, economic development or social equity. Further development of any certification approach needs to consider the interface between principles for health and wellbeing outcomes from ALM, as developed in this report, and these other potential public and private benefits from ALM.

International experience is also pertinent to considering whether the Livelihoods inLand™ principles presented in Section 7 might usefully be evolved into a certification scheme for ALM. It shows that development of appropriate certification pathways is complicated and costly. There can be a high cost burden on producers to attain and maintain certification and a high level of organisation is required for monitoring and marketing (Ervin & Mallet 2002, Welford & Le Breton 2008). Some of the promised benefits of certification, in terms of appealing to customers or raising standards among producers, are being questioned given its costs (Mader 2010). Hence the benefits of developing a formalised certification approach specifically for ALM would need to be very clear and compelling. At this time they are not. Nevertheless, the Livelihoods inLand™ principles developed here have application in their own right, as discussed below.

1.3 Applications of Livelihoods inLand™ principles

The Livelihoods inLand™ principles are a tool that can contribute to promoting the confidence of those people and organisations who invest in ALM that their investments support social development. The need to promote confidence is indicated by the political and economic context. ALM is now attracting investment from remote Aboriginal people, governments, non-government organisations (NGOs), the corporate sector, and a passionate and informed network of facilitators and specialist advisors, often non-Aboriginal people (see Section 4). The extent of government/taxpayer investment, and government policy attention to remote Aboriginal Australia, means that the question of return on investment from ALM is of broad public interest. Yet little effort has actually been put into assessing outcomes from ALM, although inputs (such as grant funding or work hours) and outputs (such as completion of planned works or activities) may be routinely monitored. It is often difficult for investors, and certainly for taxpayers, to have informed views about the value they get from their investment because they have limited direct experience or information about the ALM projects and activities that their investments support. Investors' views may also be readily clouded by the current polarised public debate about the costs and benefits to society of supporting Aboriginal people to continue to live in remote lands (e.g. Altman 2006, Hughes 2007, Johns 2009, Moran 2009).

The principles for Livelihoods inLand™ presented in this report can make an important contribution in this environment. An immediate opportunity is in improving ALM practice through better awareness among investors of elements of good practice that should be addressed in project or program design. In particular, the contribution of the principles presented here to developing a more integrated way of thinking about ALM and assessing outcomes may help to better engage social sectors of government in

ALM, broadening their conception of wellbeing beyond service delivery to encompass aspects of the social-ecological systems that are critical considerations for development. It is our intention that the principles also help to build the awareness among the many non-Aboriginal people with natural resource management expertise who are involved in ALM of important social and cultural considerations for promoting the health and wellbeing of the Aboriginal land managers they work with.

In themselves, the Livelihoods inLand™ principles provide a point of reference for Aboriginal land managers, their representative organisations and partners to reflect on their current structures and practices and how they might be adapted to better address the issues that the principles cover. They also offer a starting point for cooperative efforts by Aboriginal land managers, their representative organisations and partners to further develop criteria and standards for good practice in ALM. This would support Aboriginal land managers in engaging with international efforts for environmental certification of goods and services that have integrated benefits, such as those described in Box 3. Such approaches have become increasingly possible in this era of globalised flows of knowledge and finances and are important to promoting access to new and diverse sources of investment to support ALM. The use of a trademark symbol in association with the Livelihoods inLand™ principles signifies the importance of standards and quality assurance in accessing such investment.

Notwithstanding the value that can be expected from applying the Livelihoods inLand™ principles from this report in the various ways outlined above, the principles should be considered as hypotheses. Testing these hypothesis will proceed best as part of adaptive management processes involving Aboriginal land owners and managers, their representative organisations and their partners.

1.4 Structure of the report

Below, we describe methods that informed the principles presented in this report. We then discuss what ALM is, introducing some of the synonyms or alternate terms that are in use around Australia; outline the scope of ALM, based on the activities it comprises; and draw attention to differences between this scope and the original genesis of the commonly used term ‘caring for country’. We then present systematic reviews of evidence in literature about the relationships of health and wellbeing to engagement in ALM and to adherence to Aboriginal cultural traditions and identity. The latter is an important consideration in remote Australia where many Aboriginal people continue to speak an Aboriginal language. Language and traditional knowledge are strong influences on Aboriginal approaches to land management, at least among older people. The development of the ALM ‘movement’ is then outlined to introduce the key parties who are engaged in it. Elements of the desert environment that have shaped the development of ALM in desert Australia are then discussed.

From this basis we then present two frameworks, for scoping economies and for sustainable livelihoods, as analytical tools that indicate how health and wellbeing outcomes are integrated with other outcomes from ALM. We illustrate aspects of these with summaries of some of the observations and findings from research conducted in the Livelihoods inLand™ project. From this basis we draw out four principles for how ALM systems should be designed and undertaken in order to maximise the prospect of health and wellbeing outcomes for Aboriginal people.

1.5 Methods

This report synthesises lessons from research undertaken between 2005 and 2009 in the Livelihoods inLand™ project of Desert Knowledge CRC. The aim of the overall project has been to promote opportunities for Aboriginal people living in remote desert locations to generate sustainable livelihoods through management of natural and cultural assets in ways that also benefit other Australians.

The project encompassed a number of small, largely qualitative, studies by co-authors of this report and other researchers. Researchers engaged with desert Aboriginal people and practitioners from government, from Aboriginal organisations and from communities involved in customary land management practices. Aspects of the overall project examined land management employment as community rangers, research workers and in the Alice Springs Desert Park; language and culture in education; and Indigenous Protected Area management. Some of the lessons and highlights from this work are presented in this report as summaries in text boxes or else integrated into the report's main text. At a broader scale, the project also examined the application of the sustainable livelihoods framework in desert Aboriginal Australia (Davies et al. 2008), developed an economic framework for valuation of public and private benefits from ALM (Campbell et al. 2007, Campbell et al. 2008a); and explored the use of participatory modelling in planning for land management and other Aboriginal community aspirations (LaFlamme 2007, LaFlamme In press). The studies conducted in the Livelihoods inLand™ project are presented in reports, journal articles and theses, as cited herein; are written up as web pages; or are represented by unpublished reports or works in progress that have been drawn on for this report. Each of these research components involved procedures for community engagement, ethical review and reporting to research participants on results, following protocols and guidelines of Desert Knowledge CRC, the Human Research Ethics Committees of researchers' own universities or the Central Australian Human Research Ethics Committee, and requirements of participating communities and Aboriginal representative bodies, notably Central Land Council.

The researchers involved in these studies collaborated as the research team for the Livelihoods inLand™ project. Stakeholder engagement in the overall project was through several workshops, deliberations of a Steering Committee of government agency and Aboriginal organisation representatives during 2006–08, and more direct research partnerships and collaborations between staff of government agencies and Aboriginal organisations in various of the individual studies.

The principles presented here were developed inductively. They were synthesised from findings of the various studies and literature, together with other experiences of members of the research group, several of whom have worked for many years in facilitating, coordinating and researching ALM in desert Australia and in similar contexts internationally. The process of identifying the principles involved informal discussion groups of the researchers comparing and discussing findings and proposing principles that would facilitate outcomes important to Aboriginal land managers. Explanation of the relationship between such outcomes and health and wellbeing is presented in this report, particularly in Sections 3.5 and 6.

2. Definitions: Aboriginal land management

In his classic study, Rose (1995, p. 2) described ‘contemporary Aboriginal land management’ as:

A mixture of resource use and management which fits in with the dominant view of what is appropriate thereby achieving some measure of support, and traditionally based resource use and management, the majority of which continues to be marginalised both economically and conceptually.

This description continues to reflect the situation in desert Australia. Hence we use it as a reference point that defines the broad scope of Aboriginal land management (ALM). We note that the ‘mix’ of a ‘dominant view’ and ‘traditionally based resource use and management’ is quite varied across different parts of desert Australia. Development of the ALM sector, or ‘movement’, has been driven by Aboriginal aspirations, from the ‘bottom up’, as outlined in Section 4.1. It has been shaped by the nature of external resources available to Aboriginal land managers. It has different characteristics in different regions or localities as a result of different environmental, cultural, demographic, political and policy influences. In some places or at some times, traditionally based or customary activities are the predominant way that Aboriginal people engage with their lands. In other places or at other times, non-Aboriginal, mainstream or ‘dominant’ actions and activities in land or natural resource management predominate. The latter, as the quote above suggests, tend to attract more external funding support. They are typically focused on threats to biodiversity conservation and ecosystem processes.

Funding and collaborations to address these threats, sometimes encapsulated by the phrase ‘weeds, ferals and fire’, invariably shapes Aboriginal people’s conceptions of what the term ‘land management’ means and what actions and activities it involves (Davies 2007, p. 80). ‘Aboriginal land management’ might readily be considered a misnomer in situations where Aboriginal people are working on projects and activities that have been designed and/or initiated by non-Aboriginal people, agencies and decision-making processes. At best, such situations might be termed ‘collaborative land management’. We recognise this tension, and consider its implications at various places in this report. Nevertheless we retain the term ‘Aboriginal land management’ as an overall umbrella term for the activities that Aboriginal people are involved in, with themselves and others, ‘on country’. We also recognise that a number of other terms are in use to encompass all or some of the field of human activity that we term ALM in this report. These cognate terms or ‘synonyms’ and some of their uses and rationales are presented in Table 2.

Table 2: Some synonyms for ‘Aboriginal land management’

Term	Where used	Rationales for its use in Aboriginal domain
Aboriginal land and sea management	Coastal regions	Emphasises the integral relationship between land and sea in the ontologies of coastal Aboriginal people
Aboriginal land and water management	Some policy frameworks	Presented as more inclusive than ‘land management’, recognising that property rights and management institutions to ‘land’ and ‘water’ are commonly, and increasingly, separate and that Aboriginal rights to water have had comparatively little attention. Encompasses inland, in-shore and off-shore waters as relevant
Caring for country	Widely used in northern Australia since mid-1990s and reflected in the policy lexicon from 2008 with the start of the major Australian government mainstream environment program ‘Caring for Our Country’	Emphasises integral and complex relationships between people and country

Term	Where used	Rationales for its use in Aboriginal domain
Looking after country	Tends to be more widely used than 'caring for country' in desert Australia, at least in central regions	As above
<i>Kuka Kanyini</i>	APY lands, north-western South Australia (e.g. Hollinsworth & Carter 2006, Lane & Williams 2009, Wilson 2005, Wilson & Woodrow 2009). Also Martu lands, WA (See 2008, Walsh 2009). From Western Desert languages: <i>Kuka</i> = meat, game meat animals. <i>Kanyini</i> = looking after	Emphasises the integration in Aboriginal ontologies between use (harvest of game meat animals for food) and management (practices, whether material, social or spiritual, to maintain abundant harvests)
Natural resource management (NRM)	Mainstream national and regional institutions for ecological and agro-ecological restoration and management including soils, water, coasts and biodiversity	Used to recognise and promote Aboriginal involvement in national and regional structures and programs, with varying degrees of adaptation of those programs to reflect Aboriginal ontologies; hence 'Aboriginal engagement/participation/involvement in NRM' and 'Aboriginal NRM'
Cultural and natural resource management (CNRM) or Natural and cultural resource management (NCRM)	Some projects, education providers and research reviews (e.g. Hunt et al. 2009) that address Aboriginal and/or more general concepts of the cultural value of natural resources	Used to recognise that Aboriginal people's (or all people's) values of natural resources are determined by their culture
Conservation and land management	Australian Qualifications Framework	Formalised framework for certification of competencies including Aboriginal cultural resource management competencies
Bio-cultural resources/conservation/management	Proposed by Langton et al. (1999), not widely adopted in Australia	As an alternative proposed to 'biodiversity' or 'biological resources', 'bio-cultural' conveys the sense that all biological resources have cultural value and cultural motivations for management; as well as pointing to global relationships between linguistic or cultural diversity and biodiversity (e.g. Harmon & Maffi 2002).

Note: 'Aboriginal land management' and similar terms are also often rendered as 'Indigenous land management'. We use the term 'Aboriginal' in this report, rather than 'Indigenous' (i.e. Aboriginal and Torres Strait Islander in the Australian context) because of our desert focus which does not encompass the Torres Strait region.

2.1 Knowledge traditions in Aboriginal land management

Aboriginal land management is informed by various cultural and intellectual traditions. Aboriginal customary traditions involve intimate personal, spiritual, emotional and economic relationships with places and ecosystems. Scientific and conservationist traditions of land management may also involve a suite of relationships but they also tend to reflect Judeo-Christian ontologies of separation of people from nature, and mastery of the human species over others. In non-Aboriginal traditions of land management this has engendered a sense that it is desirable and possible to prescribe how habitats and species populations should be manipulated to achieve particular outcomes. The resulting 'command and control approach' has been described as a 'pathology' (Holling & Meffe 1996). It leads to the range of natural variation in a system being reduced such that ecological systems are less resilient when faced with external perturbations from, for example, extreme weather events or changes in human uses (Walker et al. 2006, Walker & Salt 2006). Part of the widespread interest in Aboriginal knowledge traditions for land management is to better understand how management can be approached in ways that maintain or enhance ecosystem resilience, rather than reducing it.

There has been relatively little attention in Australia to exploring or testing the comparative efficacy or value of Aboriginal, compared to scientific, knowledge systems and land management approaches (but see Bliege Bird et al. 2008, Franklin et al. 2008, Wilson et al. 2010). Nevertheless there has been growing recognition of the use and value of both Aboriginal and scientific knowledges in land management to address contemporary issues impacting on ecosystem processes, especially on

Aboriginal land. Much of this recognition has been in practical on-the-ground approaches in land management and is driven by a pragmatic need to supplement the motivation of Aboriginal people for ALM with tools, knowledge and technologies of science that can support action on contemporary issues and threats.

Knowledge from Aboriginal and scientific traditions, as well as other traditions that have influenced Aboriginal people's thinking about land management, notably Christian theology, increasingly interact and inform one another, as Agrawal (1995) has argued internationally. Hence it is impossible to distinguish management that is based purely on 'traditional ecological knowledge' from that with science influences. However, the western scientific/conservationist tradition is the dominant Australian public and government paradigm and remains privileged on many levels in ALM as elsewhere in Australian land management. As a result, a widely used metaphor for the balance that Aboriginal people want in knowledge systems is 'two way', which was first established in relation to schooling (Harris 1990), or 'both ways' or two 'tool boxes' (e. g. Aslin & Bennett 2005, Hill 2006, Mahney et al. 1996, Rea et al. 2008). As Douglas (In press) notes, the meaning of 'two way' remains under-theorised.

2.2 'Caring for country'

Notwithstanding the increasing mix of knowledge traditions noted above, commentators, including Aboriginal leaders in land management, have widely raised the need to distinguish between activities and ways of doing things that are primarily motivated by Aboriginal aspirations and those motivated by the provision of resources or other incentives from sources external to an Aboriginal group. The term 'caring for country' was brought into use as a term to emphasise Aboriginal world views, priorities and processes and their expression in land management, as opposed to those of other land users or of governments who tend to have a much stronger focus on management of introduced species and threatened species. However, 'caring for country' has not retained such a precise meaning.

The earliest reference in literature to the term 'caring for country' may have been by Elspeth Young (1987) in describing the transmission and reorganisation of Aboriginal customary land ownership with the advent of cattle grazing and, later, Aboriginal land rights claim processes, in the Anmatyerr people's traditional country in central Australia:

Caring for country, the carrying out of traditional responsibility for the land, is a process of great importance for Aboriginal people. If the country is neglected it will become infertile and fail to provide sustenance; and the integrity of its spirit guardians and progenitors will no longer be maintained. Such truths are essential to the fabric of Aboriginal society. They form the basis for definition of Aboriginal traditional land ownership. (Young 1987, p. 156)

Young thus presents the systems of land inheritance, or customary rights to land, and the responsibilities of 'caring for country' as integrally linked, referring to a belief that was 'universal' among 'the Anmatyerre, and indeed all other Aborigines': 'that all country must be cared for'. She described 'caring for country' as 'first and foremost a spiritual affair, through which [the country's] ecological and environmental future would be assured'. Her paper discusses how, when cattle grazing and establishment of settlements disrupted their occupation of land, Anmatyerre people modified principles of inheritance. This meant that when people who had inherited customary rights to land by descent had been displaced from residence on that land, the land could be spiritually cared for by those people who were able to live or visit there (Young 1987, p.170).

Later Young et al. (1991) adopted the term 'Caring for Country' as the title of a report that reviewed, for the Australian government, Aboriginal people's access to resources for land management. However, the text of that report makes very little use of the term 'caring for country'. Instead Young et al. (1991, p.12) use the term 'Aboriginal land management' to refer both to the management of lands in Aboriginal ownership as freehold or leasehold estate, and to the management of land by Aboriginal people, including 'both policy and "hands on" dimensions' such as planning, joint management, seeking

rights to land and practical activities. The latter include ‘subsistence food gathering, cattle enterprises, commercial use of native plants and animals, land regeneration and weed and feral animal control, and improvement of living area environments’. Young et al. (1991, p. 11) noted that the ‘use of Aboriginal skills and knowledge, and the adoption of Aboriginal priorities, are important aspects’ of ALM.

Bruce Rose (1995) also distinguishes ‘caring for country’ or ‘looking after country’ from ‘Aboriginal land management’. The former term means the activities and priorities for land use and management that are motivated by and informed by Aboriginal customary law and inheritance of land rights. From his research on the attitudes of central Australian Aboriginal people to land management issues he found:

The activities involved in caring for country revolve around [Aboriginal people] being on their country, observing its responses to the seasons, maintaining an intimate knowledge of its resources and significance in terms of the Dreaming. Such activity is not seen as a specialised pursuit but as an integral part of living and a responsibility which is inherited through the social role in the community. It embraces all the traditional owners ... The clear assertion of Aboriginal people from all areas involved in this study is that looking after country is primarily carried out through the ‘Law’ and ceremonial obligations. (Rose 1995, p. 12)

After more than two decades of use by both Aboriginal and non-Aboriginal people, particularly in the Top End of the Northern Territory, ‘caring for country’ has a much broader meaning. It has come to be commonly used as a gloss for all activities that Aboriginal people are involved with in conservation, restoration and sustainable use of land, water, sea, wildlife populations and other elements of biodiversity (e.g. Northern Land Council 2006). It may be used interchangeably with other terms (see Table 2).

Wohling (2009) argues that widespread use of the term ‘caring for country’ can mask complexity and differences in understanding between different people(s):

[Caring for country] has become a key term in expressing the complex relationship of indigenous people to their estates. I argue that although useful as a ‘bridging’ term for the initial conveying of the indigenous conception of estate stewardship, such terms now serve to radically over simplify this complex, contested, and rapidly evolving realm. (Wohling 2009, p. 8)

Questions that are readily overlooked and that were important in the original conceptions of the meaning of ‘caring for country’ include:

- which Aboriginal people are involved
- their relationship or accountability to the Aboriginal people who hold customary rights
- whether such rights are able to be asserted and how they interface with the rights of other Aboriginal people or other people more generally
- the relationship of material or tangible actions undertaken on land to belief systems and social moralities.

Such questions are linked to health and wellbeing outcomes from ALM through psycho-social determinants of health. They impact on the sense of control that people may or may not have about their lives (see Section 3.5) and underpin the first of the Livelihoods inLand™ principles presented in this report (Section 7.1).

2.3 Activities involved in Aboriginal land management

ALM can be also be defined as comprising the activities that Aboriginal people undertake to maintain or enhance the flow of ecosystem [or environmental] services (see Box 1). Defining ALM through a specific catalogue or set of activities can make the broad field conceptually easier to understand. For example, Putnis et al. (2007), in a strategic plan for implementation of the Commonwealth–NT Government Bilateral Agreement Schedule for ‘Healthy Country, Healthy People’, define ‘Indigenous land and sea management’ as follows:

... a range of employment, economic development, training, community and cultural activities in the areas of:

- natural and cultural resource management including biodiversity conservation
 - land and sea monitoring and reporting for border protection, including assisting in the identification and reporting of domestic and foreign illegal fishing
 - active participation in the sustainable economic use of land and sea in industry sectors such as mining, pastoralism, forestry, tourism, fisheries, aquaculture, horticulture, wildlife utilisation and the commercial provision of environmental services
 - practical maintenance of Indigenous knowledge, culture and heritage.
- (Putnis et al. 2007, p. 5)

‘On the ground’ ALM activities reflect Aboriginal people’s beliefs and aspirations about and for country, and the resources available to them, as well as the beliefs and aspirations of government, other support agencies and investors whose resources support ALM. The kinds of land management activities that desert Aboriginal people engage in are itemised in Table 3. We use this itemisation as a checklist to define the scope of ALM while recognising that the list of activities is not exhaustive nor necessarily expressed in terms that are in everyday use by Aboriginal land managers.

The activities in Table 3 are categorised into four groups: customary or cultural resource management, natural resource management, land management for improved conditions in settlements, and commercial economic activities. Each group tends to have various components, whether formally or informally undertaken: planning, training and negotiation, as well as ‘on-ground action’. All such components involve forms of knowledge exchange, among Aboriginal people or between Aboriginal people and others.

Natural resource management tends to comprise a formal set of project-based activities, often funded through government grants, organised through local or regional Aboriginal organisations, and pursuing goals identified in grant programs. This formalised approach is less apparent in customary or cultural resource management activities. These tend to be based much more on Aboriginal imperatives and pursued in the context of self-funded family and kin groups, though formalised, facilitated activity also exists particularly in the documentation of traditional ecological knowledge and in school language and culture programs (e.g. Box 15). Customary or cultural resource management activities correspond most closely to the kinds of activities encompassed in original conceptions of ‘caring for country’ discussed above.

Table 3: Activities undertaken as part of Aboriginal land management

Customary or cultural resource management	Natural resource management (NRM)	Land management for improved conditions in settlements	Commercial economic activities
• hunting, gathering • burning • ceremony • protection/management of culturally significant places • transfer/documentation of traditional ecological knowledge • documentation/translation of language • Aboriginal knowledge/activities for youth education	• weed control and/or monitoring • feral control and/or monitoring • fire management • threatened species/ecological communities monitoring/management • natural water body conservation • soil erosion control and rehabilitation • native nursery/seed collection/planting • visitor/tourist management (track maintenance, signage)	• dust mitigation • firewood collection • management of community water supplies (e.g. bore maintenance and testing) • management of rubbish and/or sewage disposal • parks and gardens • infrastructure (building, road maintenance/construction) • outstation infrastructure	• horticulture (vegetable garden, orchard) • bushtucker horticulture • bush harvest of plant foods, medicines and seed for sale • pastoral and related activities such as mustering and sale of feral animals • plantations (firewood, sandalwood) • art and craft production • cultural eco-tourism • NRM contracting

Note: the list of activities is not intended to be an exhaustive inventory or a rigid classification but rather to indicate the broad nature of activities undertaken and one way of categorising them. For alternative categorisation, see for example Table 8. The activities listed here focus on desert Australia but many are more widespread.

3. Health and wellbeing outcomes from Aboriginal land management – evidence from literature

Aboriginal people consistently claim that their health and wellbeing is tied up with their rights and responsibilities to land (e.g. see Box 13). However, these claims are challenged by the co-existence in the Australian desert of extensive regions where Aboriginal property rights have been recognised by governments (Figure 1), a dispersed population living on these remote Aboriginal lands (Brown et al. 2008, Taylor 2003), and very poor health (Booth & Carroll 2008). To better understand the state of science knowledge about these factors, we conducted systematic literature reviews of:

- relationships between Aboriginal people's involvement in land management and their health and wellbeing
- relationships between health and wellbeing and the adherence of Aboriginal people to traditional culture.

3.1 Methods

Systematic reviews apply a series of reproducible steps to identify and evaluate evidence from literature. They aim to assess the quality and relevance of research, while minimising the bias from researchers' own ideas or opinions in the selection of literature. Standards for systematic reviews are well developed in medical science and there have been calls to extend the practice to other fields, such as biodiversity conservation where practitioners are often faced with inadequate or conflicting information about a system (Pullin & Stewart 2006). The strong impact of values and ideologies on debates about ALM, culture and policies for Aboriginal development indicated that it would be important to follow such a systematic approach in assessing evidence that literature might contribute to foundations for the Livelihoods inLand™ principles. We followed the methods of Gruen et al. (2008) in these systematic reviews. The steps taken to identify relevant literature for critical analysis are set out in Table 4.

A limitation of the reviews is that they are restricted to articles indexed in ISI Web of Knowledge up to the search date (see Table 4). There also may be publication bias: that is, studies that did not produce the result desired by researchers may not be published. Further, in medicine, critical assessment of the quality of research evidence implements a hierarchical assessment of adequacy in experimental design, with randomised controlled trials providing the highest quality evidence. However, such studies are rare or non-existent in the literature that is relevant to our purposes. Rather the relevant literature presents a relatively small number of biomedical studies, including uncontrolled experiments, correlative and longitudinal studies, and a larger number of qualitative studies.

Table 4: Method for systematic literature reviews on relationships between health and wellbeing, Aboriginal land management and traditional culture

Step	Description	Parameter	Search A: ALM and health, wellbeing	Search B: Culture and health, wellbeing
1	Keyword search by topic of ISI Web of Knowledge (all databases), all years, English only. Feb 2009 for Search A; March 2009 for Search B.	Search string	Topic=(aborigin* OR indigen*) AND Topic=(health* OR wellbeing OR wellbeing OR health policy) AND Topic=(biodiversity OR natural resource management OR environmental management OR conservation OR hunting)	Topic=(aborigin* OR indigen*) AND Topic=(health OR wellbeing OR wellbeing OR health policy) AND Topic=(customary OR connection OR identity OR heritage OR values OR land OR customs OR culture)
		No. of articles	1696	3869

Step	Description	Parameter	Search A: ALM and health, wellbeing	Search B: Culture and health, wellbeing
2	Sort Step 1 results by Relevance, using ISI Web of Knowledge function; examine title, and abstract if necessary, of 200 highest sorted articles against relevance criterion	Relevance criterion	Entire article or significant part is relevant to relationship between health and wellbeing and ALM	Entire article or significant part is relevant to relationship between health and wellbeing and culture
		No. of articles meeting relevance criterion.	12	6
1B	Repeat Step 1 with modified search strategy	Search string	n/a	Topic=(aborigin* OR indigen*) AND Topic=(health OR wellbeing OR wellbeing OR health policy) AND Topic=(acculturation OR enculturation)
		No. of articles	-	77
2B	Repeat Step 2	No. of additional articles meeting relevance criterion	-	6
3	Examine citations in articles identified in Step 2; assess against relevance criterion	No. of additional articles meeting relevance criterion	7	1
4	For each article identified in Step 2, examine the first 25 'Related Articles' as identified by ISI Web of Knowledge (based on shared citations); assess against relevance criteria	No. of additional articles meeting relevance criterion	5	3
5	Read full text of articles selected from Steps 2, 3 and 4; cull against relevance criteria	No. of articles culled	7	
6	Critical analysis of remaining articles	No. of articles analysed	17	14 (plus 2 as abstract only due to difficulties in procurement)

3.2 Definitions

For the purpose of these reviews, health and wellbeing was broadly defined as mental and physical health and wellbeing as assessed in western medical tradition or Aboriginal traditions. ALM was broadly defined, much as it is in this report (Section 2.3), to encompass activities from Aboriginal tradition such as hunting, gathering, burning, travelling on country and ceremony, and from the non-Aboriginal traditions of land management for conservation (see search keywords, Table 4). For international literature, we looked for similar activities among indigenous peoples.

Culture was defined for the purposes of the search as customs, heritage, identity or values, etc (see search keywords, Table 4). We recognise that 'adherence to traditional culture' is a contested concept. The meaning we adopted for the purposes of these reviews encompasses the situations discussed in Australian literature by Dockery (2009) who used four indicators obtained from the 2002 National Aboriginal and Torres Strait Islander Social Survey (NATSISS): speaking an Indigenous language, recognition of homelands, identification with tribal group or clan, and participation in traditional cultural activities; Morice (1976) who discusses customary social structures, sense of identity, social controls, and use of traditional medical treatments; and Morphy (2005) who describes having a secure place in a rich social world with connection to kin and country.

3.3 Health and wellbeing and engagement in Aboriginal land management

3.3.1 Purpose of review

The review sought to systematically identify and assess literature indexed in ISI Web of Knowledge up to February 2009 on relationship between Aboriginal people's involvement in land management and their health and wellbeing, to answer the following questions:

- What evidence exists for health and wellbeing outcomes from ALM?
- What arguments are made in the literature to explain health and wellbeing outcomes of ALM?

3.3.2 Discipline and region

Seventeen directly relevant articles were identified. Eleven were from Australia, five from Canada, and one drew from several developing countries. The articles came from disciplines of public health and health sciences (8 articles), nutrition (2), anthropology (1), social science (3), socio-ecological systems (1), political ecology (1), and health geography (1). Three were associated, being papers coming from different parts and phases of a larger project (Burgess et al. 2008, Burgess et al. 2005, Johnston et al. 2007).

3.3.3 Nature of evidence for health and wellbeing benefits

Evidence presented for health and wellbeing benefits was of the following types:

- theoretical and review of other literature (3 articles)
- biomedical (5)
- qualitative – interviews (6)
- qualitative – observational, anecdotal (1)
- qualitative – ethnographic, anecdotal (1)
- biochemical – dietary analysis (1)

3.3.4 Measures or indicators of health and wellbeing

The measures or indicators of health considered in the reviewed articles fall into five categories:

- general and unspecified: individual, family and community health and wellbeing (physical, spiritual, emotional and/or mental) as reported by Aboriginal people or as defined by Aboriginal people
- psycho-social: self-esteem, sense of identity, maintaining cultural connection, relaxation, enjoyment through contact with nature, level of drinking and fighting, level of existential despair associated with helplessness, control over self, suicide rates
- biomedical: body mass, risk of diabetes and cardiovascular problems, baseline prevalence of diabetes, hypertension, overweight/obesity, likelihood to die and likelihood to be hospitalised, mean age at death, metabolic abnormalities associated with type II diabetes, risk factors for chronic diseases, morbidity and mortality
- diet: diversity, level of protein in diet, level of beneficial fatty acids
- socio-economic: employment, income, housing, education.

3.3.5 Aspirations of Aboriginal people through Aboriginal land management

About half the articles describe what Aboriginal people aspire to achieve through ALM. These aspirations typically cover multiple factors. They are expressed variously in the articles in the following terms:

- to fulfil spiritual obligations to country, preserve kinship relationships, provide food, keep land healthy and strong
- to gather food, escape from stresses, and educate young people
- to avoid stress and build identity, self-esteem and positive feelings
- to look after land and cultural sites; seek safer, healthier and culturally satisfying lifestyle without risks and

- stresses of larger communities; re-establish family authority; teach young people; live healthier lifestyle with food and hunting, keep young people out of trouble with police
- to live on own country, in smaller groups; to look after young people
- to achieve health and wellbeing of individual and family, enjoyment, social connections, cultural continuity, stewardship, self-governance, spirituality
- to be healthy.

3.3.6 Aboriginal land management activities associated with health and wellbeing benefits

The health and wellbeing benefits reported from Australian studies were associated with:

- ‘caring for country’ (mainly customary ALM but also including some formalised natural or cultural resource management activities), discussed in 4 articles (Burgess et al. 2008, Burgess et al. 2005, Kingsley et al. 2009a, Kingsley et al. 2009b)
- homelands living (McDermott et al. 1998, Morice 1976, Morphy 2008, O’Dea 1984, O’Dea et al. 1988, Rowley et al. 2008)
- customary fishing (Rouja et al. 2003).

The Canadian literature reported health and wellbeing benefits associated with:

- customary activity/ies including hunting and/or gathering (Parlee et al. 2005, Samson & Pretty 2006, Wilson 2003, Wilson & Rosenberg 2002)
- access to, and control over natural resources, for continuing traditional activities, self-determination, and economic participation (Richmond & Ross 2009).

One further article considered health and wellbeing benefits associated with the traditional food systems of sub-Saharan Africa (Johns & Eyzaguirre 2006).

3.3.7 Main findings

Seven articles reported that Aboriginal people testify to great health and wellbeing benefits from ALM activities, supporting this with either quantitative data or theoretical arguments. Five articles presented biomedical evidence for positive correlations between homelands/traditional lifestyle and health. Seven articles presented qualitative evidence that traditional lifestyles and/or living conditions on outstations/homelands, which typically present greater opportunity for Aboriginal people to participate in customary or cultural ALM activities, are more socially cohesive and healthier than other lifestyles or settings. None of the research reported negative associations between ALM and health and wellbeing.

Three articles consisted largely of literature reviews rather than presenting new evidence (Burgess et al. 2005, Johns & Eyzaguirre 2006, Samson & Pretty 2006). The first and last presented strong theoretical arguments and support from the literature for improving physical and psychological health through supporting Aboriginal people to be on and care for country.

The five biomedical articles each identified significant health improvements that were associated with engagement in the range of ALM activities and particularly in customary or cultural resource management activities (Table 3). Other than O’Dea (1984), which was an uncontrolled experiment, the studies report on correlations, rather than causal relationships, between engagement in ALM and health and wellbeing. They present arguments as to why causality should be inferred. Burgess et al. (2008) report decreased body mass, lower risk of diabetes, and lower cardiovascular risk among participants in ‘caring for country’ activities. Burgess et al. (2009), which was published after this review, presents these results more comprehensively (and see Box 8). McDermott et al. (1998) found that residents of a group of homelands in desert Australia were healthier than the population of a centralised community in the same general region. They had lower baseline prevalence of diabetes and hypertension; were less overweight/obese, less likely to die and less likely to be hospitalised; and their mean age at death was ten years older. Rowley et al. (2008) present longitudinal data showing lower than expected morbidity

and mortality in the same homelands population compared to the wider Aboriginal population in the Northern Territory. They showed that these people's relatively better health and wellbeing could not be accounted for by conventional measures of employment, income, housing and education. O'Dea (1984) found striking bio-medical evidence of changes in metabolic abnormalities associated with type II diabetes with reversion to a traditional lifestyle. O'Dea et al. (1988) found significantly reduced risk factors for chronic diseases in a small homeland population.

The articles based on qualitative evidence from interviews varied markedly in dataset size and mode of analysis. One had ethnographic aspects (Johnston et al. 2007) and one was based on a large survey (n=6885) of self-reported health status, socio-economic and connection to country indicators among Canadian First Nations people (Wilson & Rosenberg 2002).

The two anecdotal articles (Morice 1976, Morphy 2008) present case studies for the benefits of homelands living.

The biochemical article (Rouja et al. 2003) provides evidence that customary practices among Bardi people provide access to fish whose consumption leads to high quality fats in the diet, implying that traditional fishing practices improve health.

3.3.8 Health determinants impacted by ALM

Various health determinants are identified in the articles as being impacted by Aboriginal engagement in land management. These are summarised in Table 5. Most articles identified more than one factor, with biomedical determinants (diet, nutrition, physical activity) and various psychosocial factors being most prominent. The two most common psychosocial determinants were cultural continuity and identity, and coherence between Aboriginal ontologies and agency. Articles that identified the latter referred to Aboriginal views such as 'country needs its people' and that stewardship and customary obligations must be fulfilled. In general terms, they identified that engagement of Aboriginal people in land management promotes Aboriginal health by bringing Aboriginal agency into accord with the customary world view that there is an integral relationship between human health and landscape health. That is, the actions, time investments and application of skill and knowledge by Aboriginal people who are engaged in ALM fit better to Aboriginal cultural conceptions of how people should be behaving in relation to their environment, particularly to their customary estates, than would be the case if those Aboriginal people were not engaged in ALM.

Table 5: Health determinants impacted by Aboriginal land management in literature

Class of health determinant	Factor impacted positively by ALM	Number of articles
Biomedical	Diet, nutrition	12
Psychosocial	Cultural continuity, identity	10
Psychosocial	Coherence between Aboriginal ontologies and agency	9
Biomedical	Physical activity	8
Social	Social cohesion, customary governance structures	7
Psychosocial	Autonomy, self-esteem	5
Psychosocial	Relaxation, stress reduction	4
Social	Avoidance of trauma/aggression/alcohol/substance abuse	4
Social	Employment, economic participation	2
Psychosocial	Spirituality	2
Psychosocial	Self-determination	2
Psychosocial	'Feels good'	2

Number of articles refers to those identified through systematic search of ISI Web of Knowledge, as described in Section 3.1 and Table 4. Most articles identified >1 factor.

3.3.9 Summary and commentary

The literature reviewed here presents advocacy and evidence for health and wellbeing outcomes arising from ALM. The two major themes are biomedical evidence for health and wellbeing outcomes from traditional lifestyles, and qualitative evidence from interviews highlighting the testimony of Aboriginal people that health and wellbeing comes through relationships with the land. Results from each theme appear to corroborate one another.

The relatively small amount of investment that has been made in the research questions that guided this systematic review is evident in the small number of relevant studies and the relatively broad scope that the literature covers. As noted by Burgess et al. (2008, p. 2), ‘there is a dearth of studies that explicitly engage, measure and validate Indigenous asserted health constructs, potentially overlooking significant wellsprings of health promotion within Indigenous communities’. The biggest contribution is from Australian research collaborations from O’Dea (1984) to Burgess et al. (2009).

It is notable that most of the literature concerns those ALM activities that Aboriginal people pursue of their own volition, to fulfil their own wants and needs, without land management grant funding or other targeted programmed support. Generally these are customary or cultural ALM activities. The literature generally does not advocate or present evidence for health and wellbeing outcomes from ALM activities in the NRM arena, such as are more commonly supported by external agencies or governments.

3.4 Health and wellbeing and adherence to traditional culture

3.4.1 Purpose of review

The review sought to systematically identify and assess literature indexed in ISI Web of Knowledge up to March 2009 on relationships between health and wellbeing and the adherence of Aboriginal people to traditional culture, to answer the following questions:

- What evidence exists for the health and wellbeing outcomes from participation by Aboriginal people in cultural activities?
- How have scholars addressing this question defined the participation of Aboriginal people in cultural activities?
- How have scholars addressing this question defined Aboriginal health and wellbeing benefits?
- What explanations are offered in the literature for any relationships between health and wellbeing and the adherence of Aboriginal people to traditional culture?

3.4.2 Discipline and region

Of the sixteen articles found, two each were from Australia, Taiwan, Norway and Bolivia; four were from the USA; three were from Canada; and one was from Mexico.

The majority of the articles were published in the public health field, with several in psychology or other health sciences.

3.4.3 Nature of evidence for health and wellbeing benefits

Evidence presented for health and wellbeing benefits was of the following types:

- Descriptive, theoretical or review of other literature (4 articles)
- Biomedical, longitudinal (2) or cross-sectional (4)
- Qualitative, covering behavioural factors, through surveys, focus groups or interviews (5)

3.4.4 Measures of health and wellbeing

Six articles used specific biomedical parameters as a measure of health (McDade et al. 2007, Reyes-Garcia et al. 2008, Rodriguez-Moran et al. 2008, Rowley et al. 2008, Steenbeek et al. 2006, Walters & Simoni 2002); four used behaviours that relate to health risk (Kvernmo & Heyerdahl 2003, Lee et al. 2002, Spein et al. 2007, Yen et al. 2008); and two used self-assessments of health-related factors, being Hazel and Mohatt (2001), who used sobriety, and Wolsko et al. (2007) who used stress levels

and coping strategies. One article presented emic indigenous conceptions of health and wellbeing without attempting to measure these (Wolsko et al. 2006). The remaining three articles used no specific measures of health and wellbeing.

3.4.5 Indicators of attachment to traditional culture

A wide variety of indicators of adherence to traditional culture were used as indicated in Table 6. Some authors defined cultural change simplistically as ‘acculturation’ – a process by which people adopt the culture of another group – while others acknowledged more complex sets of associations with two cultures.

Table 6: Indicators of adherence to traditional culture in literature

Publication	Measures of adherence to traditional culture used
Wolsko et al. 2007 (Alaska, USA)	Self-assessed the extent that interviewees followed dominant culture's way of life, and how much they followed the Aboriginal group's 'traditional' way of life.
Wolsko et al. 2006 (Alaska, USA)	Observations by Aboriginal group members about cultural change including change in physical activity patterns, nutrition and social cohesion/fragmentation
Walters & Simoni 2002 (USA)	'Cultural buffers' including identity attitudes, enculturation, spiritual coping, traditional health practices
Steenbeek et al. 2006 (Canada)	Descriptors of family life, nutrition, lifestyle
Rowley et al. 2008 (Australia)	Residence in decentralised settlement (outstation/homeland)
Rodriguez-Moran et al. 2008 (Mexico)	An acculturation scale of 12 items, including language spoken at home and social gatherings, and history of migration to urban communities
Richmond & Ross 2009 (Canada)	Aboriginal people identified six health determinants: balance, life control, education, material resources, social resources, and environmental/cultural connections. All except the last are also identified by the wider Canadian population.
McDade et al. 2007 (Bolivia)	Maternal local ethnobotanical knowledge
Lee et al. 2002 (Taiwan)	'Cultural assimilation' including frequency of accessing dominant language media in childhood, ability to speak and understand and to read newspapers in that language. 'Social assimilation' including residence location; length of stay in dominant culture communities; employment style; ethnicity of neighbours, colleagues, friends and people in need.
Bartlett 2003 (Canada)	Describes (with no measures) types of change with acculturation: physical (place to live), biological (new food and diseases), political (loss of autonomy), economic (new employments), cultural (language, religion, education), social relationships, psychological (beliefs and values)
Spein et al. 2007 (Norway)	Ethnocultural measures including ethnicity, ethnic parentage, ethnic language competence, ethnic language preference with friends, ethnic identity, ethnic group identification, national group identification.
Reyes-Garcia et al. 2008 (Bolivia)	Knowledge of plant names. Non-traditional knowledge was also measured including maths ability, writing ability, dominant language fluency, and schooling.

3.4.6 Main findings

The articles could be readily grouped into four main categories described below.

The largest group consisted of empirical investigation that directly measured health indicators and compared them with direct measures of cultural identification/acculturation (Lee et al. 2002, McDade et al. 2007, Reyes-Garcia et al. 2008, Rodriguez-Moran et al. 2008, Rowley et al. 2008, Yen et al. 2008). McDade et al. (2007), Reyes-Garcia et al. (2008), Rodriguez-Moran et al. (2008) and Rowley et al. (2008) all found that less ‘acculturation’, which was defined differently in each study, was associated with better health. McDade et al. (2007) and Reyes-Garcia et al.’s (2008) studies each found a positive correlation between traditional ecological knowledge and health markers. Two articles found no relationship between culture and health: Yen et al. (2008) found no association between level

of acculturation and insight into alcohol-related problems; and Lee et al. (2002) found that weaker ‘acculturation’, which was possibly though not necessarily equated to stronger traditional cultural links, was linked to higher suicide risk.

Three studies presented results from qualitative research that related self-assessed Aboriginal health/wellbeing to self-assessed cultural orientation (Kvernmo & Heyerdahl 2003, Spein et al. 2007, Wolsko et al. 2007). All found a positive association.

Three studies presented Aboriginal testimony that stronger Aboriginal culture and way of life are related to stronger health, but did not attempt to quantify this (Hazel & Mohatt 2001, Wolsko et al. 2006, Richmond & Ross 2009). These articles all corroborated the views of Aboriginal people that health and wellbeing are closely related to aspects of traditional culture.

A further three studies described or modelled the relationship between cultural identity of Aboriginal people and their health and wellbeing, without drawing on empirical data (Bartlett 2003, Steenbeek et al. 2006, Walters & Simoni 2002).

3.4.7 Summary and commentary

Overall this literature presents advocacy and evidence for better health and wellbeing being found among those contemporary Aboriginal people who have stronger adherence to traditional culture. However, there are some contradictory findings. Comparison among the studies is also complicated by the different frames of reference that are used for assessing adherence to traditional culture.

Analysis by Dockery (2009) of the self reported data generated by the 2002 NATSISS provides some further insights. In particular, it indicates that any relationship between health and wellbeing and adherence to traditional culture is likely to be non-linear. Dockery suggests a U-shaped relationship, where Aboriginal people with either strong or very weak adherence to traditional culture may have better health and wellbeing than those with moderate adherence to traditional culture (Dockery 2009, pp. 18–19).

There is a great variety in the circumstances of Aboriginal groups studied in the literature that is reviewed here. Some are groups that would have weak to moderate adherence to traditional culture in terms of the cultural attachment index that Dockery (2009) uses, which includes speaking an Aboriginal or Torres Strait Island language at home; recognising homelands or identity with a clan, tribal or language group; and participating in cultural activities. However, the strongest evidence in the literature reported here is from Aboriginal groups that were living strongly traditional lifestyles. It shows, in these circumstances, that relatively poorer health of Aboriginal peoples is associated with relatively weaker adherence to traditional cultural norms.

3.5 Discussion

A great many factors impact on Aboriginal health (e.g. Cass et al. 2004). This presents significant problems for design of controlled experiments or longitudinal studies. Nevertheless an array of evidence of different quality in the literature reviewed here supports the assertions commonly made by Aboriginal people that their health and wellbeing is positively impacted by a strong relationship with their traditional lands and culture. In the world view of desert Aboriginal elders, land cannot be separated from customary law, ceremony and kinship – the institutions of customary governance in their society – and these factors cannot be separated from the health of their people and society. Elders say that ‘everything comes from the land’ (as depicted in Arrernte elder MK Turner’s (2005) painting of that name).

However, such Aboriginal claims run counter to global findings about social determinants of health that show that health follows a social gradient, in all nations or regions, such that people who are richer and better educated have better health (WHO 2008). From this basis it might be expected that

improving Aboriginal health is solely a matter of improving Aboriginal people's educational attainment and income levels. Claims that relatively better health results from a strong Aboriginal relationship to land and culture could be argued to be irrelevant. Indeed, Aboriginal incomes and education levels are higher, and access to education and labour markets is better, among urban Aboriginal people than it is among remote Aboriginal people. Hence a strong relationship to land and culture could be argued to be antithetical to health improvements since it influences Aboriginal people to stay in remote regions.

Such simplistic conclusions are flawed, however, because the relationship between income and education and relatively better health is a reflection of health determinants that are more fundamental than income and education. In particular, control over one's own life and its converse – uncertainty or lack of control – have an important foundational role in determining human health status. This factor is important to all people, but is particularly pertinent to the circumstances of Aboriginal peoples in regions and nations where they are minority peoples (Marmot 2007).

The Whitehall 2 study in England (Ferrie 2004) brought forward substantial evidence of the relationship between the psychosocial factor of 'control over one's life' and health. It involved a large sample of civil servants (>7 500) who self-assessed the control they had at work, defined as the degree of authority that they had over decisions and use of their skills, including opportunities for developing skills. The study controlled the analysis for age, sex, and behavioural coronary risk factors (smoking, exercise, diet, etc). It found that the amount of control that civil servants had at work was a powerful predictor of disease. People who reported low control at work had more than twice the likelihood of coronary heart disease than those who report high control.

What follows generally from that strong study and from other research on stress and health (e.g. as reviewed by Kristenson et al. 2004) is that 'control' or the capacity to 'cope' is a very powerful factor in health outcomes. Biophysical reactions to stress underpin the importance of this factor. Stress is a major cause of disease in people. The impact of stress is complicated since the physical elements of stress reactions (elevated plasma levels of epinephrine and a change of set-point in homeostatic control circuits) are normal and necessary reactions to threat. However, sustained stress reactions cause illness and disease.

Importantly, it is not the challenges or demands of a situation that are critical in determining biophysical stress reactions in people and that result in a situation causing stress to the people involved. Rather, it is the individual's expectations of the relationship between their own actions and behaviours in a situation and how the situation will turn out. If the individual expects that they can cope with a situation, typically as a result of past experience of the situation or similar situations, biophysical stress markers in their body will not become unduly elevated. A stress response may be activated for a short period but biophysical markers of stress return relatively quickly to normal levels. However, where an individual has learnt from past experience that they have no control over a situation – that nothing they do can alter the outcome – then their stress levels tend to remain elevated. Individuals in these situations also tend to develop a sense of 'helplessness' or 'hopelessness' (Ursin & Eriksen 2010).

The direct impacts of a lack of 'control' or 'coping' have been seen in health research experiments: 'Animals that are left in situations beyond their control may develop gastric ulcerations, hypertension, cardiac failure, immunological deficits, or changes in the brain biochemistry' (Ursin & Eriksen 2010, p. 879). People in situations beyond their control show similar responses, as observed during depression and psychoses (Ursin & Eriksen 2010, p. 879). They may initially report a range of subjective health complaints and these commonly proceed to serious conditions requiring medical intervention, including cardio-vascular disease.

Changing the impact of stress requires changing people's expectations for outcomes (Ursin & Eriksen 2010). Empowerment strategies, that increase the probability that people will be able to influence the outcome of the situations they experience and that build their self-image and beliefs about their

capacity to influence outcomes, are critically important (Kristenson et al. 2004). In mainstream society people's capacity to influence situations they are involved with and their expectations about having such influence (i.e. their 'sense of control' or of 'coping') generally come as a result of income and education. This helps to explain the correlation between income, education and health globally and within most nations, as noted above. In remote Aboriginal societies, it seems that empowerment through involvement in ALM is delivering an alternative pathway to an increased 'sense of control' or 'coping'.

Many of the institutions that determine how decisions are made in remote Aboriginal communities will inevitably remain outside the control of remote Aboriginal people because they are made in distant places (Stafford Smith 2008), for example through policies and legislative decisions made by governments. This lack of control contrasts to the situation in classical (that is, pre-contact) Aboriginal societies where people had the expectation that they exercised a high degree of control over outcomes. For example, people minimised uncertainties about water availability in the desert by their own mobility patterns as well as by ceremonial and spiritual practices of managing rainfall which, although not understandable in scientific terms, were powerful elements in their own belief system (Rose 2006). Such belief systems continue to be known¹ and to influence desert Aboriginal people's expectations for proper human behaviour in relation to land and environment (e.g. Rose 1995, Vaarzon-Morel 2010, Wilson et al. 2010). By promoting a greater sense of coherence between these Aboriginal ontologies and Aboriginal people's actions or agency (Table 7), engagement in ALM delivers a greater 'sense of control' or 'coping' among Aboriginal people. Associated empowerment outcomes are autonomy, self-esteem, and self-determination, cultural continuity and identity (Table 7), all of which also influence people's 'sense of control' or 'coping' through people's beliefs and expectations about their ability to influence outcomes. The literature reviewed here, and scientific knowledge about stress mechanisms outlined above, indicates that these impacts from engagement in ALM set up a pathway to improved health outcomes in remote Aboriginal societies that is different to the income and education pathways operating in mainstream society.

This is not to suggest that improvements in income and conventional modes of mainstream education do not also give remote Aboriginal people a greater sense of control over their lives, reduced stress and pathways to better health, in the same way as they do among people in other societies. However, income and education improvements also introduce new values, knowledge and world views that can readily sit in tension with customary Aboriginal ontologies. Arguably, customary Aboriginal practices and behaviours may even be antithetical to those mainstream values and world views (Trigger 2005). In this respect it is important to recognise that the ALM activities considered in the literature reviewed here to be linked to health outcomes tend to be those that derive from customary cultural practices, rather than science knowledge or mainstream NRM priorities. Tensions are likely to arise in the case of ALM activities that are driven by mainstream NRM priorities since these will have less resonance with Aboriginal ontologies and be less effective at enhancing Aboriginal people's sense of control over situations they encounter. They will therefore be less effective at addressing psychosocial determinants of health.

Although an orientation towards the past is widely noted as a characteristic of Aboriginal societies (e.g. see Trigger 2005), some leaders are consciously looking to how customary Aboriginal ontologies, worldviews, kinship and law can guide the future. For example, Ngurra-kurlu, the ontological framework communicated by Warlpiri educator Wanta Jampijinpa Pawu Kurlpururnu (Steve Patrick), is about how principles from customary law, language, kinship and ceremony and land relationships, and the interrelationships between these principles, provide a clear direction for the future, one which will protect Warlpiri people and their country for the benefit of all Australians. Wanta says that when a person internalises all of the principles and the responsibilities and behaviours that come from them, they become like a shield for their people and their country. Their strength of character metaphorically

¹ For example, as the late Joseph Lennon (Matutjara-Antakirinya) remarked in response to a question about Aboriginal knowledge of upcoming seasonal conditions, given the highly variable inter-annual and inter-monthly rainfall of the central deserts, 'Well, those old people, they used to *make* the rain'. (Pers. comm. to Jocelyn Davies 2004).

covers people and country and protects them from damage, in the same way a shield protects a fighter from attack (Pawu-Kurlpurlurnu et al. 2008). This is one illustration of how, in the Aboriginal world view, local knowledge and cultural institutions are held to be responsible for keeping people healthy and strong. The outcomes relate to the psychosocial factors identified in the literature as being engaged by ALM (see Table 5).

In community development practice it is also understood that people's social and community wellbeing will be more assured if their development is built from cultural strengths and motivations and customary institutions, and that development processes will be more efficient, with fewer perverse outcomes (Hunt 2005). Importantly, actions of outsiders – governments or others – tend to lack local legitimacy if they introduce something new, rather than building on existing institutions. Psychosocial determinants of health, encapsulated by the concept of 'control' or 'coping', show the importance of paying attention to the testimony of Aboriginal people about factors that impact on their health and wellbeing. The role of customary institutions in this points to one of the Livelihoods inLand™ principles: that ALM governance should recognise and respect Aboriginal custom and tradition and be adaptive (see Section 7.1).

4. Development of the Aboriginal land management movement

The contemporary ALM ‘movement’ has emerged from practice. Aboriginal people have been managing country for thousands of years. Over the past 30 years, recognition of the value of this work by non-Aboriginal Australians has grown. As Aboriginal land rights have received recognition, organisations and groups have re-established their management of land. Some of these activities have become ‘formalised’, through gaining government and non-government organisation (NGO) support. In turn, support from government programs, NGO projects and research activities have facilitated the growth of the movement.

This section broadly outlines the development of this movement. In doing so it introduces the main parties that are engaged in ALM: Aboriginal people themselves and their motivations that were reflected first in the land rights movement, in the associated development of homelands or outstations and in the desire to promote intergenerational transmission of cultural knowledge; CDEP (the Commonwealth Government Community Development and Employment Program) that allowed ALM to develop within the scope of local aspirations and capacities; and government conservation agencies, regional Aboriginal representative organisations and other non-government organisations that have fostered relationships, networks and funding for ALM. Some key events that mark the growth of the movement nationally or in specific desert regions are charted in Table 7.

4.1 Aboriginal motivations

Various institutional changes from the 1970s enabled desert Aboriginal people to fulfil aspirations to return to country to live or visit and care for it. These were legal recognition of Aboriginal rights to land, a shift in government policy from assimilation to self-determination, the emergence of local and regional Aboriginal organisations, and improved access to cash incomes from social security payments. These enabled the genesis of the homelands or outstation movement (Altman 2003, Morice 1976) whose most visible imprint on the physical landscape is in the access and settlement pattern of arid lands in western regions of SA and NT and in arid regions of Western Australia² (Taylor 2003).

The homelands or outstation movement is a clear example of an ‘Indigenous life project’, representing the desire of Aboriginal people to have autonomy in deciding the meaning of their life using situation-based knowledge and practice. Such projects are distinguished from ‘development projects’, those imposed by the state and market, motivated by ‘pressing moral and political objective of achieving statistical equality’ (Peterson 2005, p. 13).

Motivations for Aboriginal engagement in land management show similar characteristics to those for the outstation movement. These motivations are indicated by the scope of issues raised by Aboriginal people in central Australian workshops about land use on Aboriginal lands in the late 1990s. By far the most commonly raised issue was collecting, hunting and managing bush foods and medicine. Other very common issues raised were teaching young people, cleaning and fencing waterholes, maintaining [customary] Law, and burning country (Walsh & Mitchell 2002). These are all customary or cultural activities (in terms of Table 3).

² Settlement patterns are different in each state, reflecting historical and contemporary Aboriginal affairs policies as well as land capability and other factors. For example, neither land rights nor resources for remote settlement infrastructure were achieved by Aboriginal people in arid regions of Queensland. This, together with extensive relocations of Aboriginal people to settlements close to the coast, accounts for the relative lack of discrete Aboriginal settlements in remote parts of arid Queensland compared to other states. In WA, in contrast to SA and NT, there was no statutory mechanism to recognise Aboriginal customary property rights until after native title was recognised as forming part of the common law of Australia in 1992 and the *Native Title Act 1993* established a process for the continuing existence of native title to be determined. However, in the 1980s and early 1990s, the WA government resourced infrastructure for new settlements on leasehold and Aboriginal reserve land and associated roads. To some extent this facilitated Aboriginal people meeting their aspirations to return to country, even though land rights had not been recognised.

Table 7: Key events in the development of the contemporary Aboriginal land management movement nationally and in remote Australia

Year	Theme	Event
Early 1970s	Aboriginal motivation	Homelands movement begins to develop momentum
1977	Resources	CDEP begins, in remote settlements
1975	Conservation agencies	<i>National Parks and Wildlife Conservation Act 1975</i> (Cwth) made provision for funding for cooperative conservation management with Aboriginal people
1976	Legal	<i>Aboriginal Land Rights (Northern Territory) Act 1976</i> (Cwth)
1979	Conservation agencies	Kakadu National Park established, joint management begins
1981	Legal	<i>Pitjantjatjara Land Rights Act 1981</i> (SA)
1981	Regional Aboriginal organisations	Tangentyere Land Management services began (Carmody 1986)
1984	Legal	<i>Maralinga Tjarutja Land Rights Act 1984</i> (SA)
1985	Resources	The Miller report, a national review of Aboriginal employment and training, finds that ALM is an important area for government investment (Miller 1985)
1985	Conservation agencies	First national workshop convened by Council of Nature Conservation Ministers (now within Natural Resource Management Ministerial Council) on Aboriginal ranger training and employment (at Stirling, SA)
1985	Conservation agencies	Handback of Uluru–Kata Tjuta National Park to Aboriginal owners; first joint management Board of Management established
1985	Regional Aboriginal organisations	Alice Springs workshop on science and technology for remote Aboriginal development (Foran & Walker 1986), stimulating development of Centre for Appropriate Technology and of Central Land Council's ALM program (Davies 2007)
1987	Resources	National ALM programs (CEPANCRM and ARRI) begin (ending in 1995–1996)
1987	Regional Aboriginal organisations	Central Land Council appoints its first coordinator for land management
1988	Conservation agencies	SA National Parks and Wildlife Service conference on Aboriginal involvement in nature conservation, at Emu in the Great Victoria Desert (Kean et al. 1988)
1989	Resources	Cairns TAFE ALM courses started
1990	Conservation agencies	Second national workshop convened by Council of Nature Conservation Ministers, on Aboriginal and Torres Strait Islander Involvement in Natural Resource Management (in Cairns)
1990	Resources	National review of ALM support: Caring for Country report (Young et al. 1991) commissioned by Aboriginal and Torres Strait Islander Commission and Australian Nature Conservation Agency
1990	Regional Aboriginal organisations	Anangu Pitjantjatjara Land Management established (now Anangu Pitjantjatjara Yankunytjatjara Land Management)
1991	Aboriginal motivation	Kowanyama Aboriginal Land and Natural Resources Office established, and leads development of total catchment management for the Mitchell River
1991	Aboriginal motivation	Djelk Rangers established by Bawinanga Aboriginal Corporation
1991	Aboriginal motivation	SA ALM Steering Committee forms to develop strategic approach to funding and priorities for ALM training
1991	Resources	Royal Commission into Aboriginal Deaths in Custody reports, including recommendations to expand CEPANCRM and ARRI programs.
1992	Aboriginal motivation	Dhimurru Land Management Aboriginal Corporation established in north-east Arnhem Land
1992	Legal	Mabo decision of the High Court, recognising native title as part of Australian common law
1994	Resources	Caring for Country national consultative project for curriculum development in ALM started by SA ALM Steering Committee, Cairns TAFE, and Torrens Valley Institute of TAFE, SA
1994	Resources	Aboriginal Landcare Education Program established by Greening Australia

Year	Theme	Event
1996	Regional Aboriginal organisations	Northern Land Council's Caring for Country Unit established
1995	Regional Aboriginal organisations	Central Land Council publishes Rose (1995) report: <i>Land Management Issues: Attitudes and Perceptions amongst the Aboriginal People of Central Australia</i>
1996	Conservation agencies	Design of Indigenous Protected Areas program, spurred by government realisation that achievement of a comprehensive, adequate representative protected areas system required inclusion of Aboriginal land (Thackway et al. 1996)
1998	Regional Aboriginal organisations	First Indigenous Protected Area declared, Nantawarrina, Flinders Ranges
1999	Regional Aboriginal organisations	The first annual rangers' conference, hosted by the Djelk Rangers on the Blyth River
2000	Resources	Conservation and Land Management Training Package development starts, managed by Rural Training Council of Australia, to include Aboriginal and Torres Strait Islander-specific competencies drawn from the national 'Caring for Country' curriculum project
2000	Resources	Top End ALM and Employment Strategy (TEALMES) agreement is signed by the Northern Land Council, Australian Government agencies and the Indigenous Land Corporation, primarily to improve Aboriginal people's on-ground capacity to manage <i>Mimosa pigra</i> on their land
2002	Resources	Conservation and Land Management Training Package endorsed by Australian National Training Authority
2003	Regional Aboriginal organisations	Northern Australia Indigenous Land and Sea Management Alliance (NAILSMA) formed
2005	Resources	Northern Territory Fisheries funds six Top End NT ranger groups \$60 000 per year each for sea ranger services
2005	Regional Aboriginal organisations	First National ALM conference hosted by Central Land Council, Ross River, central Australia
2006	Resources	The Australian Quarantine Inspection Service (AQIS) begins developing fee-for-service arrangements with 14 Aboriginal ranger groups in the Northern Territory
2006	Resources	West Arnhem Land Fire Agreement established between NT government and ConocoPhillips for greenhouse gas emissions abatement through Aboriginal fire management
2006	Resources	'Healthy Country, Healthy People' Schedule to Commonwealth–Northern Territory Bilateral Agreement signed
2006	Resources	IPA program review finding that the program is cost effective in contributing to conservation, with important social and cultural outcomes, but lacks assured funding (Gilligan 2006) leads to expansion of the program
2007	Resources	Australian Government Working on Country program establishes grant funding for Aboriginal community-based ranger jobs and expands rapidly in NT with additional funding through the NT Emergency Response
2007	Regional Aboriginal organisations	Gawler Ranges Native Title Management Committee and SA Native Title Services pilot collaboration with SA Pastoral Board for monitoring land condition of pastoral leases (Blesing & Harding 2008)
2008	Resources	Australian Government funds Martu people for Stage 1 development of land management partnerships and capacity on native title lands, Great and Little Sandy Deserts, WA
2008	Conservation agencies	Australian Wildlife Conservancy enters partnership with Queensland Aboriginal landowner to sublease land for conservation
2010	Resources	38 declared Indigenous Protected Areas, comprising about a quarter of the total area of Australia's National Reserve (protected area) System, and 23 consultation projects for establishment of new IPAs
2010	Resources	Target of 600 community ranger positions nationally under the Working on Country program.

Other sources: (Agreements Treaties and Negotiated Settlements Project 2009, Ashley et al. 2002, Davies et al. 1999, Muller 2008b, NAILSMA 2009, Northern Land Council 2006, Sanders 2004, Young et al. 1991).

Motivations for desert Aboriginal people to engage in ALM are set out more directly in Table 8. These were identified in a workshop of Aboriginal and non-Aboriginal people who work in various capacities in land management facilitation (Smyth et al. 2007). The table also indicates the extent to which various motivations are engaged by different kinds of ALM activity, as assessed by the workshop participants based on their experiences. What is notable is the wide range of motivations associated with spiritual factors and cultural identity and with teaching and use of traditional knowledge. While customary and cultural activities and those associated with social development engage the highest number of motivating factors, it is also apparent that some formal NRM activities can also appeal to a wide range of Aboriginal motivations because they involve visiting and knowing country. Economic production, including earning money in land management employment, is an important motivation in association with other motivating factors.

The capacity for a wide range of ALM activities to engage multiple motivations, as indicated in Table 8, helps to account for its appeal to remote Aboriginal people and the efforts they have put in to develop ALM capacity (Sithole et al. 2008). Programs such as CDEP and conservation grant funding have frequently provided the means for desert Aboriginal organisations to undertake land management programs and projects. However, Aboriginal motivation has been a more fundamental driver. As Tjinguma Mick of the APY lands reflected at the inaugural National Aboriginal Land Management Conference at Ross River in central Australia in 2005, before there was conservation money, he went out on country in health clinic vehicles and if the conservation money dried up tomorrow he would do this again, or find some other way.

4.2 Community development and employment

The extent of Aboriginal motivation for engagement in ALM means that Aboriginal people in remote regions have strived to secure and apply resources to ALM activities, typically ‘foraging in the bureaucracy’ (Young 1994). CDEP was a relatively stable and flexible source of funding and by the early 1990s was used extensively to fund ALM (Young et al. 1991), arguably underwriting the development of the ALM movement. CDEP still played a key enabling role up to 2007, as Box 4 indicates for central Australia.

CDEP originated to provide income support to remote Aboriginal people and supplement customary economic activity in the recognised absence of a labour market or of skills among remote Aboriginal people that would allow them to readily engage with a labour market (Dockery & Milsom 2007). Especially in its early years, CDEP allowed community organisations to define their own work programs and priorities (Rowse 2001). It became a flexible, accessible and relatively stable source of money for part-time wages, equipment and administrative infrastructure for ALM. Nevertheless, it has also been widely criticised for its shortcomings, including limitations on its effectiveness for resourcing ALM (e.g. Sithole et al. 2008, p. 36).

Use of CDEP in ALM had been part of a community development approach in remote situations where there was little or no labour market demand for Aboriginal skills. As Dockery and Milsom (2007) point out, policy makers never developed ways of monitoring or evaluating community development outcomes from CDEP. As a result, policy reviews assessed CDEP outcomes in terms of transitions of CDEP participants to non-CDEP employment, and found the scheme wanting (Dockery & Milsom 2007). Some Aboriginal people engaged through CDEP as rangers also experienced frustration from not having the recognition that a ‘real job’ might give them. However, others were more focused on the positive benefits that CDEP brought, such as through access to equipment to work on their country.

Table 8: Aboriginal motivations engaged by Aboriginal land management activities

CATEGORY	ACTIVITIES	MOTIVATIONS																								TOTAL MOTIVATIONS																																																																																																																																																																
		Cultural (a) self identity	Cultural expression	Recognition of ongoing connection to land	Expression of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral connection to land	Recognition of spiritual and ancestral 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Source: Developed at a workshop of ALM facilitators 2006 for Smyth et al. (2007)

A close relationship developed in many places between CDEP and outstation resource agencies, that is, Aboriginal organisations formed by traditional owners to support outstation access and services. Many resource agencies were CDEP providers, and CDEP wages often resourced an Aboriginal homeland leader as CDEP supervisor as well as providing a basic cash income support for other adult residents. This facilitated the engagement of remote Aboriginal people in land use and management activities as described by Cane and Stanley (1985). Policy changes progressively led to CDEP providers having less flexibility in providing support to customary and cultural land management including hunting and burning. Nevertheless the program rules continued to allow providers to use CDEP funding, often augmented by environmental grant funding, to provide employment and infrastructure for remote ALM. For example, in 2006 most of the 400 rangers supported by the Northern Land Council's (NLC) Caring for Country Unit were paid through CDEP with a top-up on their basic part-time wages where the group had secured grant funding or fee-for-service contracts (Northern Land Council 2006).

Putnis et al. (2007) reported that Aboriginal land and sea management groups in the Northern Territory covered about half their wages from grants and fee-for-service contracts, and half from CDEP. We found that CDEP was being used to support ALM activity in at least 45 localities in the southern Northern Territory in 2006–07 (Box 4), at a time when higher profile efforts by CLC to develop Aboriginal ranger groups were focused on only six localities.

High reliance on CDEP changed markedly with the introduction of the Working on Country program in mid-2007 (see Section 4.5.1) at the same time as further changes were made by the Commonwealth Government to CDEP rules in order to more strongly emphasise labour market outcomes. The Working on Country program has provided 'real jobs' in ALM, typically as part of a community ranger group. The development of the 'ranger' identity and work structure reflects the close involvement of conservation agencies in fostering ALM activity and partnerships. Since the Working on Country program was introduced, CDEP has continued to be used in ALM to provide a training ground for local Aboriginal people aspiring to work as rangers in some desert areas (e.g. in conjunction with the Tjuwanpa rangers, south-west of Alice Springs).

Box 4: CDEP as an enabler of Aboriginal land management in central Australia

Authored by Matthew Campbell and Jocelyn Davies, drawing on research conducted by Kasia Gabrys, Matt Campbell, Jocelyn Davies and Diane Pearson.

The CDEP program was a critical enabler of a diverse range of ALM activities undertaken across the southern arid regions of the Northern Territory in the period leading up to a major overhaul of the program from late 2007. The relative flexibility of the CDEP program up to this point allowed a variety of land managers to negotiate and implement local ALM activities for a range of ecological and social purposes.

Our research is based on the following data:

- Quantitative data, being Australian Bureau of Statistics Census 2006 custom data; data on CDEP activities in southern NT in 2006–2007 from the Australian Government Department of Employment and Workplace Relations (DEWR), which oversaw the CDEP program at that time; and a survey of CDEP numbers, locations and work roles by Local Government Association of the Northern Territory (LGANT 2006).
- 32 interviews (conducted in 2007) with key people who were involved with ALM in the southern NT, nine as CEOs or CDEP coordinators in Aboriginal settlements and others from land management or community development NGOs and training bodies.

The interview data were analysed and then compared with the quantitative data sets to generate a more nuanced understanding of the role, nature and location of ALM activity in the study region.

We defined ALM with reference to a list of activities categorised as customary or cultural resource management, natural resource management, settlement projects and services, and ALM enterprise (as per Table 3).

We found that ALM was widespread, occurring in at least 60 locations across the southern NT. In 75% of these locations CDEP was definitely utilised to support ALM, with CDEP possibly providing support in a further 17% of locations. In only 6% of locations can we confidently say that ALM took place without CDEP support. This indicates the critical role that CDEP played in supporting ALM in the region.

A broad range of ALM activities was being undertaken in these locations. Activities reported were relatively evenly split between customary or cultural resource management (28%), natural resource management (28%) and settlement projects and services (29%). A smaller percentage (15%) of activities were associated with ALM enterprise. The most common activities were participation in natural or cultural resource management training, weed control, fire management, water management, and the application and sharing of Aboriginal ecological knowledge. ALM was widely reported by interviewees as providing many important benefits to Aboriginal people, including supporting them to fulfil cultural responsibilities to care for country.

The data indicated that organisations based outside local communities (including, for example, Central Land Council and Greening Australia) were most likely to support activities that we classed as natural resource management and ALM enterprise. Locally based agencies, including CDEP providers, supported more of the kinds of activities that we classed as cultural resource management and settlement projects and services. Although the CDEP providers that we interviewed were typically conscious that CDEP program guidelines did not allow them to directly support some of the kinds of activities that we classed as cultural resource management, such as hunting and ceremony, these kinds of culturally motivated activities were occurring to some extent with CDEP support in conjunction with other kinds of ALM activity. Indeed, our experience is that culturally motivated activities are an inextricable part of any ALM work that involves Aboriginal people in travel outside settlements onto country. This further highlights the role that CDEP was playing in supporting Aboriginal people to fulfil their aspirations for use and management of country.

We attribute the position of CDEP as a critical enabler of ALM to the relative flexibility that local people had to identify and implement priority activities. Further, it was a known and understood system, providing relatively secure funding, with service providers often based in remote settlements, including in outstation resource agencies, who often considered themselves to be accountable to local people. Agendas for a range of CDEP activity were set at the local level with individual CDEP organisations being able to determine activities that delivered services to their communities. This allowed CDEP providers in communities that identified ALM as an important activity to structure it into their work plans and to commit staff and resources to it. CDEP also offered an administrative infrastructure to facilitate longer work hours for local people where external funds were available from project grants to CDEP providers or to other organisations.

However, because CDEP support for ALM originated within CDEP organisations, for local reasons or in relation to partnerships that had evolved locally, the support that CDEP provided for ALM was not consistent or strategic across the region. One apparent consequence was that the various organisations involved in ALM were frequently operating with little information about each others' efforts or coordination, even at a local or community level.

The varying status of ALM as a recognised CDEP activity was revealed in the lack of consistent data relating to definitions of ALM activity, numbers and genders of participants, categories of ALM activities undertaken, locations of ALM work, and the intersections between CDEP and ALM employment funded from other sources. We were unable to identify any consistency between the data available from different sources related to these kinds of measures. The lack of any standardised approach to identifying ALM activity in CDEP reporting makes it likely that a lot of ALM work went unrecognised, either through being identified as something else (e.g. men's or women's activities, outstation support) or through not being formally recorded at all.

We conclude that a diverse range of ALM activities was being undertaken in the southern NT in 2007 but that much of it was unrecognised, unfunded and poorly supported and not strategic in either its approach to conservation priorities or other land related priorities of Aboriginal people. The CDEP program underpinned much of that activity, but in an ad-hoc and undocumented manner. Lack of consistency in how ALM activities were reported made it impossible to robustly measure CDEP's contribution to this sector. The fragmented and poorly documented nature of ALM activity contributed to its relative invisibility at that time in the arid regions of the NT.

This in turn compromised the capacity of people involved to make strategic resourcing and planning decisions that might have enabled ALM to better produce meaningful environmental and social outcomes.

Without the local flexibility of CDEP, or an income support program like it, a significant proportion of the ALM activity being undertaken in remote regions of desert Australia is likely not to have been possible, and many of the multiple benefits that ALM can generate (environmental, health, social, economic) would not have been realised. A clear definition of ALM, shared by ALM practitioners, CDEP providers and other agencies involved, is important to ensuring that investments and outcomes are able to be tracked and evaluated in future.

4.3 Parks and conservation agencies and programs

Researchers and other staff from Commonwealth and state/territory national parks and wildlife management agencies fostered relationships with remote Aboriginal people from the 1970s, as part of wildlife research in remote regions (e.g. Burbidge et al. 1988, Gibson et al. 1994, Pearson 1992). These collaborations have continued, although on different trajectories in various state/territory jurisdictions, at the same time as regional Aboriginal organisations have developed their capacity for this kind of research and follow-up action (Davies 2007).

Formal institutions have also driven collaborations between parks and conservation agencies and Aboriginal people. Where Aboriginal land rights have been recognised over land in national parks, as a result of land rights statutes or political accommodations, governments and Aboriginal people have entered various types of co-management arrangements in attempts to accommodate these (Smyth 2001). Co-management (or joint management) agreements provide Aboriginal people with a say in management decisions, and often require that management reflect Aboriginal cultural and spiritual values and provide for Aboriginal employment. Early examples include Kakadu National Park (est. 1979), Gurig National Park (est. 1981), Uluru–Kata Tjuta National Park (est. 1985), and Nitmiluk National Park (est. 1989). Development of joint management stalled for a decade or more in the 1990s (e.g. De Lacy 1994, Woenne-Green et al. 1994) then gained impetus more recently.

Government action to secure a comprehensive adequate and representative protected area system was a key driver for re-invigorated relationships between conservation agencies and Aboriginal groups. The extent of Aboriginal land ownership in remote biogeographic regions meant that this could not be achieved without designation of Aboriginal lands as protected areas. Aboriginal leaders engaged in consultations about policy responses to this situation negotiated a quid pro quo. This provided that the Commonwealth Government, through the Indigenous Protected Areas program (see Section 4.5.1) would support consultations and management planning for the establishment of jointly managed parks in state/territory jurisdictions, as well as for the establishment of protected areas owned and managed by Aboriginal peoples. Determination of some key native title claims, notably Miriuwung Gajerrong, has provided additional drivers for development of joint management arrangements, particularly in the NT and WA. Now joint management, or at least the existence of an active negotiation process to achieve joint management, is the rule rather than the exception for management of protected areas, particularly in desert Australia (Ross et al. 2009). Co-management arrangements for parks have not been entered into voluntarily by Aboriginal people, but rather have been a necessary compromise because of statutory or political limitations on recognition of Aboriginal land rights. In practice, equal partnership has been difficult to achieve (Davies et al. 1999, Powers 2002, Smyth 2001, Woenne-Green et al. 1994).

In spite of the difficulties of Aboriginal people and conservation managers forming easy cooperative relationships (e.g. Walsh 1990), the early development of jointly managed parks together with the experience of conservation researchers in engaging with Aboriginal people in wildlife research catalysed the broader emergence of the ALM movement on a number of fronts. Relationships developed between Aboriginal and non-Aboriginal people with common interests in land management, with very strong relationships in some cases based on working together in the field and presenting jointly in

public forums. Cross-sectoral social networks and innovations were stimulated among professionals working in conservation and those working in support of Aboriginal land rights and remote Aboriginal development. Almost invariably these were non-Aboriginal people. Remote Aboriginal people were exposed to the work role of ‘rangers’, providing a concrete model for Aboriginal aspirations for recognition and accompanying resources for ALM. Networks and partnerships between Aboriginal land managers and professionals in conservation and community development spheres stimulated training, the development of a national qualifications framework and opportunities for Aboriginal people to learn from the experience of their peers in other regions through conferences, work site visits and workshops (see Table 7).

4.4 Regional-level Aboriginal organisations

Regional-level Aboriginal organisations have played a key role in land management advocacy, planning, coordination, and liaison between funding bodies and Aboriginal people on the ground. Over the past decade these organisations have had a significant role in developing ALM capacity, including in establishment and management of Indigenous Protected Areas and developing community-based ranger jobs. They are particularly important in bridging between the interests and knowledge systems of Aboriginal land managers and other stakeholders in ALM. The relationships established by their staff are important in linking Aboriginal land managers with investors/funders and other external supporters (see Section 6.4).

The functions, accountabilities and/or strategies of the various regional-level Aboriginal organisations involved in ALM vary between organisations. Hence these organisations have different modes of engagement with ALM. The NLC, covering the Top End of the Northern Territory but not desert regions, has been prominent, as outlined below. Some of the diverse organisations in desert Australia are also introduced below.

The NLC’s Caring for Country Unit was established in 1996 to support Aboriginal Land and Sea Management as part of the NLC’s overarching aim of supporting livelihoods on country. It built on the initiatives of local groups of Aboriginal people who formed land management services, particularly in Arnhem Land. In 2006 the NLC supported and advocated for about 35 ranger groups and 400 Aboriginal people working as community-based rangers (Northern Land Council 2006). The Top End Aboriginal Land Management and Employment Strategy (TEALMES) was a significant catalyst for the expansion in the number of ranger groups. It was a four-year agreement, formally signed off in August 2000, between the Commonwealth and Northern Territory agencies, the NLC and CDEP organisations in remote settlements. It focused primarily on on-ground community-based control of the weed *Mimosa pigra*. One reason that the weed was a significant threat is that it was substantially impeding Aboriginal people’s access to land and wildlife resources. This motivated Aboriginal advocacy for resources to control infestations and eventually resulted in the TEALMES agreement. The program provided accredited training and employment to approximately 70 Aboriginal people employed on CDEP across five major communities in the Top End of the NT (Ashley et al. 2002, Northern Land Council 2006).

The Central Land Council’s (CLC) Land Management Unit represents Aboriginal people of the southern arid parts of the NT in joint management of national parks, biodiversity management, feral animal control, tourism, pastoral and horticultural projects. In 2006 it supported six ranger programs, employing coordinators and providing planning services. CLC has since engaged extensively with strategic development of ranger groups, facilitated through targeted government support programs, replacing earlier reliance on CDEP. It has also implemented a major program to support maintenance and intergenerational transmission of traditional Aboriginal knowledge.

The Anangu Pitjantjatjara Yankunytjatjara (APY) Land Management Program was established in 1991 in the north-west of South Australia. Much of its work has focused on traditional Anangu

values and land management practices, including facilitating cleaning and maintaining rock-holes and collaborations between Anangu and ecological scientists on a major biological survey program (Davies et al. 1999, Nesbitt et al. 2001, Robinson et al. 2003). The *kuka kanyini* model for adaptive management to increase the number of game animals preferred by Anangu for food is a significant innovation in integration of science and Aboriginal knowledge and management that originated in the APY lands (Wilson et al. 2010).

Ngaanyatjarra Council, covering parts of the central deserts of Western Australia, also has had a prominent role in facilitating land management based on traditional Yanangu values and land management practices. Its land management capability developed in conjunction with its facilitation of a decision by its Aboriginal constituents about establishing an IPA. The organisational structure of Ngaanyatjarra Council has the strongest correspondence to Aboriginal values and world views of any of the long established regional ALM organisations considered here. Unlike other organisations, it includes land management and culture, with ecological and anthropological professional expertise, in the same organisational unit. Formally declared in 2002, the 9.8 million hectare Ngaanyatjarra IPA is the largest protected area in Australia.

The long established South Australia Aboriginal Lands Trust has had a prominent role in facilitating land management projects, in strategic planning for ALM (SAMLISA Steering Committee 2000) and in establishment and management of Indigenous Protected Areas in central and western regions of South Australia (e.g. Muller 2003). In Western Australia and Queensland, non-statutory Aboriginal land councils and similar regional organisations (e.g. Kimberley Land Council, Balkanu Aboriginal Corporation) have strong roles in facilitating land management projects. Success in their struggle for recognition of native title over the past decade, particularly in Western Australia, has laid the foundation for Aboriginal peoples whose country is in remote desert areas to turn their attention to developing new capabilities in land management, partnerships and more formalised programs. A leading example is the Martu people, operating as Kanyirninpa Jukurrpa and the Western Desert Lands Aboriginal Corporation.

As well as organisations that work across large regions, a host of smaller-scale regional organisations have been active in ALM. The strategic alliance between an Aboriginal community controlled organisation, Arrernte Council, and the Alice Springs Desert Park (ASDP) significantly contributed to the effectiveness of the ASDP's Aboriginal employment program (Box 21). Arrernte Council utilised CDEP then STEP (Structured Training and Employment Program) resources to provide prevocational training and subsequently identify local people with skills suited to government-based employment. The demise of Arrernte Council and associated programs slowed the momentum of the ASDP employment program (Walsh & Davies In press).

Tangentyere Council's Landcare Unit has worked extensively with Aboriginal communities in southern NT, educating Aboriginal people about mainstream land management concepts, linking these to traditional knowledge, land relationships and Aboriginal people's experiences of change (Wohling 2001), and supporting Aboriginal people in landcare projects. The Tangentyere Council Land and Learning program is one of the very few pathways for bringing two-way appreciation of traditional ecological knowledge and ecological science into education in remote bush schools, as discussed in Box 5.

Cross-jurisdictional linkages for ALM have been developed in northern Australia through Aboriginal land councils and land management agencies forming the North Australian Indigenous Land and Sea Management Alliance (NAILSMA) to advocate for and facilitate increased land and sea management by traditional owners across the region. NAILSMA was established in 2003 and currently comprises the Kimberley, Northern and Carpentaria Land Councils and Balkanu Cape York Development Corporation (NAILSMA 2009). On-the-ground linkages and coordination across northern Australia have been fostered by NAILSMA, particularly through action on dugong and turtle conservation.

Box 5: Tangentyere's Land & Learning – providing critical support for traditional ecological knowledge and ecological science in remote schools

Authored by Josie Douglas based on Douglas (In press)

Tangentyere Land & Learning, a program run by a community-controlled Aboriginal organisation, supports Indigenous Language and Culture (ILC) Programs in both bilingual and English-only schools in the southern Northern Territory. It is the only entity supporting both traditional ecological knowledge (TEK) and science education in central Australian remote primary schools. However, it is poorly resourced, and its future is not secure.

The need for improved collaboration between Northern Territory schools and the environment sector (Johnson 2006, Pawu-Kurlpurlurnu et al. 2008) is underscored by the unique demographics of the NT's remote and very remote regions, achievement gaps in Aboriginal education outcomes, the importance of sustainable management of Aboriginal-owned lands and their nationally and internationally significant biodiversity values (Altman & Whitehead 2003). Aboriginal people are major landowners in the NT, so the current generation of students have future legal and custodial responsibility for looking after a significant proportion of the NT. New and introduced environmental threats on Aboriginal lands increasingly need to be managed with a mix of TEK and science. However, there are few formal policy links or other systematic connections between the natural resource management (NRM) and education sectors. Tangentyere Land & Learning is a unique example of a program providing two-way education in TEK and ecological science in remote schools.

My research on ILC Programs, focused on two remote Aboriginal schools in central Australia, found that the main entry point for scientific education in remote schools is through local ILC Programs. Common to all ILC Programs is a strong focus on 'country', its ecosystems, and interrelated cultural knowledge and practices. This focus provides a strong connection point to ecological science. I found that beyond ILC Programs, science education is minimal and delivered on an ad-hoc basis. Contributing to this limited science content is a lack of even 'rudimentary' science infrastructure and equipment in remote schools (e.g. see Robinson 2008).

Aboriginal people at both case study sites view education as more than just 'schooling'. Education for remote Aboriginal people encompasses a framework based on TEK where country, people, language and the *jukurrpa* (creation time) are fundamental learning areas that can inform classroom work and become a stimulus for reading and writing activities linked to the NT Curriculum Framework. The ILC component of the NT Curriculum Framework maps, to some extent, to the way that Aboriginal people organise their knowledge. However, some non-Aboriginal staff in remote schools are often unwilling or unable to incorporate an ILC Program into the school's activities. Some consider 'language and culture' to be an impediment to education and employment. Those teachers who are willing to include an ILC program are often uncertain about how to go about it. Tangentyere Land & Learning has a unique role as a bridge between Aboriginal and non-Aboriginal teaching staff in schools, ensuring that what Aboriginal teachers and elders see as important is reflected in the development of localised ILC curriculum while supporting education outcomes desired by non-Aboriginal teaching staff.

'Country visits' are central to ILC Programs and to TEK transmission, since this is place-based. During 'country visits' students leave their classroom and community to travel and camp with elders and teachers. They observe, talk about, prepare and use plants, animals and other natural resources. For some schools this also includes students observing and then participating alongside elders in performing the songs and ceremonies for country. Tangentyere Land & Learning staff provide hands-on activities and worksheets that complement both Aboriginal and non-Aboriginal education frameworks. These methods have synergies with science learning, with its focus on demonstration and experimentation to inform more theoretical understandings. I found that Tangentyere Land & Learning, which has worked with 25 schools in central Australia, provides highly effective support to both non-Aboriginal and Aboriginal teaching staff. They do this by producing TEK literacy resources and worksheets, planning classroom activities and undertaking practical science based activities with students and teachers during country visits (see <http://www.schools.nt.edu.au/tlcland/>).

Despite a paucity of resourcing, ILC programs have been an integral part of the NT school system because of the deep commitment of Aboriginal people and the two Tangentyere part-time positions. No other organisation, whether government or non-government, runs a program in central Australia that is equivalent to Tangentyere Land & Learning. However, Tangentyere Land & Learning relies on piecemeal and short-term funding of one year or less covering only 1.2 full time equivalent staff positions. The program repeatedly falls between the cracks of 'education' and 'natural resource management' program funding. For example, policy changes with the introduction of the Caring for Our Country national program closed the NRM education funding option that Tangentyere Land & Learning had previously accessed. The precarious nature of funding means that the future of Tangentyere Land & Learning is under threat, jeopardising support to students, Aboriginal staff and community members wishing to incorporate TEK and ecological science into their education programs.

4.5 Resources

Development of the ALM movement from the bottom-up has been a strength in terms of its engagement with Aboriginal people, their motivations and knowledge. However, it has also meant ALM has struggled for resources. Many ranger groups and projects have only been able to develop by accessing resources through multiple small, and often ad-hoc, grants (Davies et al. 1999, Putnis et al. 2007, Sithole et al. 2008). Multiple grant funding sources require constant administration, with complex application processes, administration and reporting requirements (Muller 2008a). The Djelk Rangers Case Study (Box 6) provides an example of how an Aboriginal organisation has utilised disparate and erratic funding sources to do land management work. A key factor in the success of Djelk and other early pioneers in the ALM movement's development was that they were able to invest their own resources or earned income into establishment of their ALM capacity, rather than being totally dependent on government funding (Davies et al. 1999).

Box 6: Djelk Rangers Case Study

*Authored by Hannah Hueneke,
based on Cochrane (2005), CAEPR (2008), Bawinanga Aboriginal Corporation (2009).*

The Djelk Rangers were established in 1991 by the Bawinanga Aboriginal Corporation (BAC) with a grant from the Australian Government's Contract Employment Program for Aborigines in Natural and Cultural Resource Management (CEPANCRM). BAC is an outstation resource centre established in 1974 to support people who were moving out of the government settlement of Maningrida back onto their clan estates. The rangers work on Aboriginal land owned under the *Aboriginal Land Rights (Northern Territory) Act 1976*. Their work builds on knowledge and skills developed over generations, and today they are involved in diverse activities. For example, in 1995 AQIS paid the rangers a bounty for feral pigs under a disease monitoring program. This continues to be implemented every 2–3 years. In 2005 the rangers began patrolling for illegal fishing vessels with the Northern Territory Department of Regional Development, Primary Industry, Fisheries and Resources' Fisheries Unit, paying \$60 000 per year to BAC for Djelk Rangers' surveillance, coastal and estuary patrols as part of Marine Ranger Program (Northern Territory Department of Resources – Fisheries 2005, Northern Territory Regional Development Primary Industry Fisheries and Resources et al. n.d.). In 2006 Djelk rangers began work on the West Arnhem Land Fire Abatement project, which also involves Wardeken, Jawoyn, Adjumarilarl and Mimal ALM organisations earning money for greenhouse gas abatement (see Section 4.5.3). In 2007, the Working on Country program funded 18 full-time equivalent ranger positions. Djelk rangers manage an Indigenous Protected Area, accessing support funding through the IPA program. The CDEP scheme has covered wages for most periods of the ranger group's existence, at times 'topped-up' by Australian Government employment-related funds. The NLC's Caring for Country Unit has also provided support and advocacy.

4.5.1 Government programs

Throughout the development of the ALM movement, government support programs have aimed at both employment outcomes, with associated social and economic development, and at conservation outcomes. Conclusions of the 1985 Review of Aboriginal employment programs (Miller 1985) about the value of land management as a direction for Aboriginal social and economic development had led to Commonwealth programs introducing incentive programs for parks and conservation agencies to contract Aboriginal people for natural and cultural conservation works. These conclusions were reinforced by the Royal Commission into Aboriginal Deaths in Custody (Johnston 1991). The programs had strong appeal to cash-strapped state government parks and conservation agencies as they provided a work force subsidy. The mode of implementation of the programs, through conservation agencies, was an important catalyst for the relationships that developed between staff of those agencies and Aboriginal people.

The first Commonwealth program introduced in the late 1980s to promote Aboriginal engagement in parks and conservation management (Contract Employment Program [CEP], later Contract Employment Program for Aborigines in Natural and Cultural Resource Management [CEPANCRRM]) was initially accessed more or less exclusively by parks and conservation agencies and was progressively made more available to Aboriginal organisations who wanted to initiate projects. Parallel developments in the sphere of agriculture led to the first, and still the only national program, that has aimed to promote Aboriginal commercial use of native and feral wildlife species (Aboriginal Rural Resources Initiative [ARRI]). It provided seed funding for Aboriginal enterprises, fostered strong relationships between Canberra-based program staff and a number of remote Aboriginal groups, and had wide appeal among Aboriginal people. These distinctive and favourably reviewed programs (Breckwoldt et al. 1997, Desmond & Rowland 2000, Williams et al. 1995) targeting ALM contracting capacity and enterprise development were wound up in 1996–97.

The Caring for Country report (Young et al. 1991) comprised a major review that brought the issue of equity for Aboriginal people in access to funding and other resources to land management to the attention of policy makers. Commonwealth NRM programs have since progressively developed more sophisticated mechanisms to promote Aboriginal engagement and opportunity to access funds, notably through a network of paid ALM facilitators; standards for good practice in government engagement processes; strategic regional-scale planning by Aboriginal landowners and representative bodies; and requirements that NRM regional bodies engage Aboriginal people in their planning and management. However, many ALM projects have continued to compete with other community and regional interests for grant funding through national NRM programs, notably the Natural Heritage Trust and Caring for Our Country programs (from 2008–09), further raising issues of equity in access by Aboriginal landholders (e.g. Lane & Williams 2009).

Two major programs targeted specifically at Aboriginal landowners are Indigenous Protected Areas and Working on Country. An Indigenous Protected Area (IPA) is declared when traditional Aboriginal owners make a voluntary declaration, which may be supported by a funding agreement with the Commonwealth Government, for the main purpose of promoting biodiversity conservation and for associated purposes consistent with World Conservation Union (IUCN) protected area objectives. The areas may be recognised as part of the National Reserve (protected area) System, and the IPA program may support landowners with funding for planning and on-ground works. Being voluntary and mutually beneficial, IPAs avoid some of the compromises and barriers of joint management. They have proven popular among Aboriginal people and an efficient way for governments to achieve expansion of the protected area network (Gilligan 2006). However, resources available directly through the program are limited, and are mainly devoted to coordinating management.

The Australian Government tasked the Department of the Environment, Water, Heritage and the Arts (DEWHA) to implement the Working on Country program in 2007 as part of a broader move to convert CDEP positions that contributed to government service delivery to fully paid jobs (Putnis et al. 2007). With the announcement of the Northern Territory Emergency Response in 2007, additional funding was allocated specifically for Working on Country projects in the Northern Territory for the purposes of employment creation. The program is on target to have 600 Aboriginal people in community ranger jobs nationally in 2010 (DEWHA 2010).

Most of the long established regional land management organisations in desert Australia have attracted Working on Country funding to develop employment for local Aboriginal people in land management, typically as community rangers. The program has also enabled land management capacity to develop in other desert regions, notably the Martu lands of the Gibson and Great Sandy Deserts of WA, where Martu native title rights were recognised in Australian law for the first time in 2002. In the NT, additional funding allocated through the 2006 Healthy Country, Healthy People schedule to the Commonwealth–Northern Territory Bilateral agreement and from the Aboriginal Benefit Trust Account established through the ALRA has also supported development of ALM over the past 5 years. These government resources have been mainly directed at employing Aboriginal men, following a long standing trajectory in which Aboriginal men have had stronger influence than women in formalised approaches to ALM. However, this appears to be changing with women’s engagement prominent in some ranger groups and also in associated programs for recording TEK and promoting intergenerational transmission.

Conservation sectors of government have come to see ALM as a platform for broader government policy goals for Aboriginal health and wellbeing, as indicated by the Healthy Country, Healthy People Schedule (Commonwealth of Australia and Northern Territory Government 2006). This realisation has fostered and been supported by research (Burgess et al. 2009, Garnett & Sithole 2007). However, there has been very little high level engagement of health sectors of government and their resources in the ALM movement. There is also limited monitoring of social or health outcomes from IPA and Working on Country investments. Tracking or assessing outcomes from ALM for biodiversity conservation is also limited. Project inputs (e.g. staff time) or outputs (completed actions or works) are monitored. The link to outcomes for biodiversity conservation is indirect, such as through IPA program logic that maps actions or works undertaken by IPA managers to biodiversity conservation outcomes through their impact on threats to biodiversity values. A standard methodology and tool was recently developed for desert Aboriginal people and ALM projects to monitor more directly the state of some key biodiversity components through recording animal tracks (Southgate & Moseby 2008).

4.5.2 Corporate and NGO support

Conservation NGOs have had a minor influence on directions for ALM compared to regional Aboriginal organisations and government and compared to their influence in comparative situations internationally. However, there are some longstanding linkages. For example, Greening Australia’s Aboriginal Landcare Education Program (ALEP) was established in 1994. It focuses on environmental health within Aboriginal communities and their immediate surrounds. ALEP works with individual families and traditional Aboriginal owners on projects such as dust suppression, trees for shade, weed management and erosion control and has a strong record of on-ground engagement with Aboriginal people, including some desert communities (Alford 2007, Putnis et al. 2007). Direct partnership between Aboriginal people and conservation NGOs is another relatively new development in ALM. In 2008 the Australian Wildlife Conservancy (AWC) entered into a partnership with Frank Shadforth, a Gawara man, under which 110 000 hectares of his property ‘Seven Emu’ will be subleased to AWC for conservation (Australian Wildlife Conservancy 2009). Aboriginal people also work with the AWC on a number of its private conservation reserves, managing fire, maintaining infrastructure and conducting wildlife surveys for example (Fleming 2009).

Mining companies are a fourth actor in desert ALM. They support it directly by partnerships and contracts to Aboriginal groups for land management activities in the vicinity of some mines (e.g. Stoll et al. 2005). They also support it incidentally through the visits made by Aboriginal traditional owners to mining exploration areas. Often such ‘clearance’ activities are to areas where access is difficult, promoting their value in maintaining Aboriginal knowledge of country. Indirect support for ALM comes from the expenditures that Aboriginal people make on land management activities, individually or collectively, from royalty equivalents and compensation payments they may receive from mining activity on their lands.

4.5.3 Contracting and PES

Some Aboriginal groups have been successful in taking on contracts for environmental management works. For example, in 2006 the Australian Government Department of Agriculture, Fisheries and Forestry provided approximately \$6 million to the Australian Quarantine and Inspection Service (AQIS) for fee-for-service arrangements with 14 Aboriginal ranger groups in the Northern Territory. These arrangements aim to monitor and mitigate quarantine-related threats. Fee-for-service contracting is also developing in some desert regions, notably by the Tjuwanpa Rangers in maintenance and construction services for visitor facilities in parks.

The Indigenous Protected Area and Working on Country programs are premised on the principle that the government is purchasing environmental outcomes (Salmon 2008). However, as discussed above (Section 4.5.1), it is difficult to find examples of such arrangements that meet strict international criteria for PES (see Section 1.2). The clearest example of an initiative where resources are tied to outcomes is the West Arnhem Land Fire Management Agreement (WALFA), signed in August 2006, which engages Aboriginal burning to reduce greenhouse gas emissions from savanna fires. Under this agreement, the NT Government contracts the NLC and traditional owner groups from western Arnhem Land to implement a fire management strategy. Darwin Liquefied Natural Gas (a subsidiary of ConocoPhillips) provides about \$1 million per year for 17 years for this purpose. Payments are linked to achievement of greenhouse gas emission targets that are 34% below the level predicted, from baseline studies, as probable if the fire management strategy were not being implemented. A total reduction of 420 000 tonnes in CO₂ equivalent greenhouse gas emissions was achieved over the first three years of the project at a direct monetary cost of less than \$10 per tonne. Additional biodiversity and social benefits achieved have included new employment opportunities for Aboriginal land managers, re-engagement with country, and protection of *Allosyncarpia* rainforest, mangrove swamps and a range of other resources from inappropriate fire regimes (Agreements Treaties and Negotiated Settlements Project 2009, Tropical Savanna CRC n.d., Whitehead et al. 2009)

Neither WALFA nor other contract arrangements between Aboriginal groups and agencies or corporates for delivery of environmental management services have involved market transactions. Rather, such contracts have developed from negotiations and mentorship arrangements between agencies and corporates and Aboriginal groups (Law et al. 2007). In the WALFA case this was facilitated by nearly a decade of engagement between fire researchers, NT government fire managers and people from the relevant traditional owner ALM groups.

4.6 Desert Aboriginal land management

The ALM movement is less prominent in desert Australia than it is in tropical northern Australia, notwithstanding the large areas of Aboriginal land in desert Australia that are now being managed for conservation and related livelihood outcomes. The suite of inter-related factors discussed by Stafford Smith (2008) has a fundamental impact in explaining the relative invisibility of ALM in desert Australia. Because rainfall is low and variable, and soils are poor, human populations and population density are very low in the desert. These factors account for the high proportion of desert Australia that

has been recognised as Aboriginal land, most of it in the parts of arid Australia that are least suitable for extensive commercial market economic land uses such as pastoralism (Smyth et al. 2007). Lack of opportunity for gaining resources for ALM through market economies helps to explain the appeal of the IPA program to desert Aboriginal landowners. These same desert environmental factors also account for the persistence in desert regions of about half of Australia's extant Aboriginal languages and the relative vibrancy, compared to eastern and southern Australia, of traditional ecological knowledge, kinship systems and cultural norms. However, desert environmental factors also mean that developing a critical mass of people and resources for ALM in any particular region, including administrative and management capacity, has been relatively harder.

Environmental degradation is more pronounced in desert Australia than in the tropical savannas, particularly through the earlier impact of mammal extinctions and their disruption to customary economies and cultural relationships to natural resources. Service provision (education, health, housing, etc) in the desert is also more difficult and costly because of the vast distances involved and the sparse scattered populations. This means that failures in service delivery are more marked in the desert, as Young and Guenther (2008) have established for education. Small populations also mean that the time that individual Aboriginal people need to put in for consultations and engagement in management of these services is relatively higher, impacting on the time available to spend on country. It means that managerial capacity to develop locally based land management organisations is relatively harder to secure. This helps to explain why there is relatively greater reliance on regional Aboriginal organisations for management of ranger programs and ALM projects in desert regions compared to northern Australia, where a number of strong locally based ALM organisations have developed over the past two decades.

The suite of factors that make it difficult for Aboriginal people to live in the small family-based settlements (homelands/outstations) which were the genesis of the contemporary ALM movement, and where there is some evidence of relatively better health (Rowley et al. 2008), are more pronounced in the desert than in northern Australia. Put simply, it is much more difficult to get food and water from the bush in the desert than in northern Australia. The relatively more sparse and patchy distribution of resources means bush foods in the vicinity of settlements are also more readily depleted. Hence desert Aboriginal people engaged in ALM are even more reliant than in northern Australia on being able to travel quite long distances in vehicles, with associated costs, for getting out of settlements and onto country that can sustain them. The outcome overall is that the barriers that need to be overcome in order to spend time out of settlements on country are more pronounced in the desert than elsewhere in Australia. Customary estates are also larger in the desert than in other regions of Australia, adding to the long distances that people need to travel in order to monitor and know their traditional country.

As a consequence of such difficulties, central Australian Aboriginal people increasingly describe ALM activity as 'country visits' (e.g. see Douglas In press). Country visits involve Aboriginal people travelling out from the settlement onto surrounding lands. The purposes are varied and may be focused on a particular natural or cultural resource management activity or on keeping customary knowledge alive through practice, or simply on looking around and observing the condition of country. Aboriginal people and agencies engaged in ALM are now very commonly using the term 'country visit' particularly for organised activities, including school camps or fire management work. The phrase highlights the extent to which most of the time and energy of desert Aboriginal people is now focused in townships rather than on surrounding Aboriginal lands and outstations/homelands. Many Aboriginal people no longer tend to see themselves as 'living on country' even though their residential base might be a small settlement that is quite remote from any large towns or cities. Rather they have become 'visitors'.

There are also differences between the desert and northern Australia in the nature and scale of threats and opportunities that have emerged in the ALM arena and in the way that traditional owners, the Aboriginal organisations representing them, governments and other agencies have perceived these

and developed strategic responses to them. In the north, engagement with fisheries management and quarantine issues has provided fee-for-service opportunities that have no parallel in the desert where bio-security threats and commercial natural resource harvesting are much less prevalent. While some fee-for-service and contract opportunities have developed through Aboriginal relationships with mining companies and park management agencies, contract opportunities are inhibited by low investment overall in natural resource monitoring and management in the desert. Government agencies tend to aim at economies of scale in delivering desert NRM services, engaging specialist contractors to work over a large region on specific NRM management tasks such as monitoring water quality or aquifer levels. This approach can limit opportunities to identify and package up a bundle of routine NRM tasks that might together provide a contracting opportunity for a local ALM group (see Childs 2009). Hence institutional change in government, as well as local ALM capacity, is needed to expand the suite of contracting opportunities for desert ALM.

The strategy of developing cross-jurisdictional coordination and networks in northern coastal Australia through NAILSMA also has no recent parallel in desert regions. In the north, the coordinating role of NAILSMA in dugong and turtle management has catalysed the development of ALM systems at a very large scale. The desert does not have recognised iconic threatened species of the same stature and political importance to governments, or with the same high economic as well as cultural value to large numbers of Aboriginal people. While species such as red kangaroo, emu, bustard and quandong are iconic to Aboriginal people and there are reports of declining populations, they are not formally recognised at state/territory or national levels as threatened. Remaining populations of bilby, giant desert skink and some other formally designated threatened species are scattered over a large area of the desert, but cross-border networks and coordination for Aboriginal involvement in their conservation has diminished, rather than increased, in recent years with the closing down of the Threatened Species Network's Alice Springs office.

In the Top End of the NT, the significant threat posed to the health of country and to Aboriginal access to country by the weed *Mimosa pigra* was important in catalysing the early growth of ALM. Buffel grass and camels now arguably pose similar scale threats to biodiversity values in the desert, as well as to bush foods and to access to country in the case of camels. Emerging cross-border action on camel management and control may have a catalysing impact on the further development of regional scale ALM networks and capacities as *Mimosa* had in northern Australia. However, developing locally-based capacity similar to that of leading northern Australian ALM organisations such as Dhimurru Land Management and Bawinganga's Djelk Rangers, is likely to continue to be difficult in the desert because of small, scattered populations and the vast areas being managed.

Notwithstanding such difficulties, the potential for desert ALM to deliver integrated outcomes for health, social and economic development of remote desert Aboriginal people, biodiversity conservation and the maintenance of ecosystem services points to the need for frameworks that can help practitioners, policy makers and researchers assess benefits and trade-offs from ALM activity. Two such frameworks are set out below. A framework for economic analysis and scoping economies addresses the need for policy guidance as to the design of incentives and the distribution of public and private benefits from ALM. The sustainable livelihoods framework (Section 6) is targeted at a smaller scale and more local level, as a tool to assess outcomes for individuals and families from ALM and identify capacity and institutional issues that impact on such outcomes. Our consideration of findings from our research as well as from literature through these frameworks has helped to identify the Livelihoods inLand™ principles for desert ALM presented in Section 7.

5. Economic relationships between Aboriginal land management and health

5.1 Frameworks for economic analysis

Frameworks for conceptualising and assessing economic impact of ALM are poorly developed, notwithstanding recent efforts by scholars to address such limitations (Luckert et al. 2007). Altman's (2001) conceptualisation of the economy of remote Aboriginal regions as hybrid between the market, the state and customary sectors is apt in general terms.³ Desert ALM spans all the three of these economic sectors. Market activity is through commercial harvest of bush foods (Ryder et al. 2009), through the underpinnings that Aboriginal relationships to land provide for art (Morphy H 2005) and tourism industries, through a relatively small number of commercial Aboriginal pastoral enterprises and through ALM contracting. The customary sector of food production has diminished in recent decades and is less important than in more humid climates with more abundant predictable resources. However, data are inadequate to quantify the extent of bush food production or to detail trends, with Devitt (1988), Walsh (2009, 1990) and Bird et al. (2004, 2005) providing some of the very few quantified studies. The state sector provides the main resources that sustain desert ALM through the programs outlined above (Section 4.5.1) and also through the income that individuals and families receive from social security entitlements and government funded jobs. The corporate sector is a fourth actor in remote Aboriginal economies (Section 4.5.2) though not specifically accounted for in Altman's model.

However, the hybrid economy model does not in itself offer any clear pathways for assessing the economic impact or the return on investment from ALM. Assessing 'return on investment' has been seen as important to overcoming constraints on development of the ALM sector from the short-term and discontinuous nature of many investments that characterise the sector. However, such assessment is difficult, requiring extensive data and encountering substantial difficulty in translating the value of multiple non-market benefits at different scales into monetary units (Luckert et al. 2007). Assessing return on investment also needs a framework that accounts for cross-sectoral inputs and outcomes from ALM. Consideration of scoping economies provides such a framework.

5.2 Scoping economies

The health outcomes and environmental outcomes generated by ALM comprise an integrated mix of public and private goods, that is, goods that benefit the individuals and families involved in ALM and goods that benefit the broader Australian public. The nature of this joint production is explained in Box 7.

The economic concept of joint production indicates that assessing the return on investment from ALM only in terms of the value of benefits that accrue to the broad Australian public would be misguided. Activities that Aboriginal people are motivated to pursue because of their private benefit, such as hunting and teaching traditional knowledge to children, also have public benefits, at least through their contribution to improved health. Contributions to health do benefit individuals but also benefit the broad Australian public, since improved Aboriginal health is a public policy priority (Campbell et al. 2008a). Where ALM activities also give rise to environmental benefits, such as occurs indirectly in the case of hunting where patch burning for hunting generates habitat mosaics (Bliege Bird et al. 2008), they support scoping economies (Box 7). Psycho-social determinants of health are important in this relationship, as are other issues such as diet and exercise identified in literature (see Section 3.5 and Table 5).

³ Equally, the hybrid economy model could arguably be applied to any regional economy if the 'customary sector' were reconceptualised to include voluntary activity and home production of food and other goods and services.

In scoping economies the same set of inputs (resources to support ALM) produce more than one set of products (that is, better health and also better environmental condition). It is particularly important to take scoping relationships into account in development strategies for desert regions (see Stafford Smith & Huigen 2009) because resources (including people, money, etc) are very limited in deserts. Partial indications of the value of health outcomes from ALM have been generated from analysis of the cost savings for primary health care of individuals who are engaged in ALM and who have been found to have lower risk of chronic disease conditions than individuals who are not engaged in ALM, as outlined in Box 8.

The implication from the economic relationships outlined above and in Box 7 and Box 8 is that returns on public investment into ALM will be most efficient if they appeal to motivations that Aboriginal people have to engage in ALM because of its private benefits. Such motivations have been outlined in Table 8. They align with the kinds of culturally motivated ALM engagements that are also highlighted in literature on health and wellbeing outcomes as having health benefits (see Section 3.3.9). The sustainable livelihoods framework, introduced below, brings together a number of other concepts and inter-relationships that are important to further exploring such motivations, how they are engaged in ALM and what they indicate about principles for ALM to generate health and wellbeing outcomes.

Box 7: Joint supply of public and private goods through Aboriginal land management

Authored by David Campbell

Understanding the economic characteristics of how public and private goods are jointly supplied through ALM is important to designing incentives or disincentives to achieving optimal social benefit.

Economists use the term 'goods' for products that have economic value. The exchange and use of goods may be carried out within the market or outside of the market. All human behaviour, including Aboriginal people's activities in caring for country, generates outcomes that can be classified as either private goods or as public goods. Pure public goods and pure private goods differ according to one important distinction: whether the enjoyment or consumption of the good by one person reduces the amount available to others by the amount consumed.* If the consumption of a good by one person results in an equivalent decrease in the amount available, as with food for example, it is referred to as a pure private good. Alternatively, if the consumption of the good by an individual does not reduce the amount available for others, it is known as a pure public good. Biodiversity and the climatic benefits of reduced greenhouses gases are examples of pure public goods. According to the criterion set out here, a pure private good that is worth \$1 to you has a net social value of \$1, while a pure public good that is worth \$1 to you has a social value that is greater than \$1 because others are able to enjoy the same good at no additional cost to society.

While some private goods and public goods are supplied independently, in many instances they are supplied *jointly* as the result of a single activity. That is, the production of a private good, whether for own use or for sale on the market, often also results in the supply of public goods. Regardless of whether the public goods are sold on the market, the net value to society of the activity that jointly provided the public and the private goods is greater than the value of the private goods.

As discussed in Box 8, Aboriginal people's involvement in caring for country results in the joint supply of improved health for Aboriginal people and a range of environmental benefits, including biodiversity and greenhouse gas bio-sequestration (Campbell et al. 2008a, Campbell et al. 2008b). Because closing the gap in health outcomes for Aboriginal people is appreciated as a public responsibility, such outcomes, along with the environmental benefits, have public good characteristics.

* Many, but not all (Perman et al. 1996) writers on public goods include the requirement that a public good only exists if it is not possible to exclude people from access to the good and therefore to charge for access to the good. However, whether to exclude and charge for a pure public good under economic social optimisation criterion must depend on the relative marginal social costs and benefits of excludability and charging for access and relates to questions of the best means by which public goods can be distributed. Roadways, bridges (aside from issues of crowding) and health are examples of where public good benefits are supplied to the public at zero price in some instances and charged for in other instances.

For Aboriginal people, caring for country includes meeting cultural responsibilities, and access to and use of food, traditional medicines and materials. Such benefits are, for the Aboriginal community, community private goods. While the community shares some of the public good benefits, their investment in caring for country does not take into account the marginal social value of these non-marketed public goods that are enjoyed by Australian society as a whole. That is, the public good benefits that are provided to the broader society are not accounted for. As a result, investment in caring for country by Aboriginal people and the social benefit of a range of public goods is likely to be less than what is socially optimal (Campbell et al. 2008a).

It is important to recognise that not all joint outputs, through private activities, will result in positive public goods, as some public outcomes of private activity will result in public 'bads'. A case in point might be when excess grazing in arid Australia results in the loss of vegetative cover and increased dust storms. Dust storms such as these are likely to result in negative health impacts (Campbell et al. 2008b). When public bads exist, the net value to society will be lower than the value of any private goods.

The issue, then, is to provide appropriate incentives for additional activity by Aboriginal people in caring for country when the joint supply of private and public goods is under-supplied and to provide disincentives when the joint supply of private goods and public bads are over-supplied.

Appropriate incentives require consideration of a number of factors. These considerations exist because caring for country-derived public goods occur outside the market. One approach to achieving an optimal economic outcome is to use processes that mimic the market. Market-based resource allocation efficiency requires the marginal value of the caring for country-derived public benefits to equal the marginal or incremental cost of the incentive paid. In most instances the cost of such incentives is likely to fall to government. Fundamental to this is getting the nature of the incentive correct (positive or negative) and ensuring that the incentive only applies to the additional, otherwise under-supplied, public benefits.

As incentives are intended to affect the behaviour of Aboriginal people, they need to be consistent with their preferences and cultural norms. It is also important to address the likely impediments affecting the delivery and the efficiency of delivery of ALM services in any particular region. Such deficiencies would be expected to be addressed in a 'perfect market' (Coase 1960). Given that such a market does not exist, adequate consultation is an integral part of designing ways to provide for efficient delivery. This makes it clear that the transaction costs of achieving an optimal outcome will be more than would occur in a perfect market.

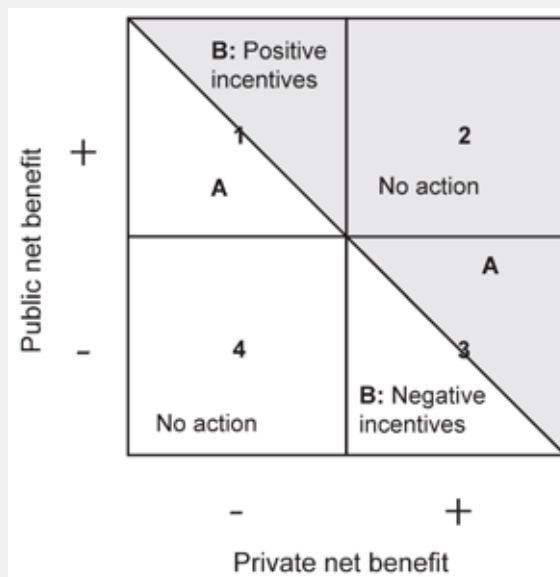


Figure 4: Cost effectiveness plane for optimising the application of incentives to achieve public net benefit

The appropriate application of such incentive measures can be developed using the cost effectiveness plane, as developed by Black (1990), extended by Pannell (2006, 2008) and shown in Figure 4. Figure 4, which is explained in greater detail by Campbell et al. (2008a), consists of four quadrants and is divided diagonally into two halves. Below the diagonal line the sum of private net benefits plus public net benefits results in a negative net social benefit. This means that we do not want caring for country activities to occur, regardless of the net private benefits. Above the diagonal the sum of private net benefits plus public net benefits results in a positive net social benefit. In quadrant 1 the private net benefits are negative and are not sufficient for the private supply of public goods. Positive incentives are therefore necessary to encourage the desired private activity to a level where net social benefits are maximised, in 1B. In quadrant 2 there are sufficient net private benefits, without additional incentives, for the joint supply of public benefits to be maximised. In quadrant 3 net public bads as well as net private goods are generated. Disincentives are necessary to a level where net social benefits are maximised, in 3B. Because there are no net private benefits in quadrant 4, there are no private activities and no private bads or public bads are generated.

The cost effectiveness plane provides a tool for recognising that Aboriginal caring for country has joint private and public benefit and that incentives, or disincentives, for activities that have private benefit to Aboriginal people impact on the amount of public benefit to society as a whole. The diagrammatic structure can be readily transposed into a mathematical formulation, as per Willan and Briggs (2006), to approximate optimal costing and supply. A difficulty with this next step is that there have been limited attempts to identify the characteristics of the caring for country derived public goods, let alone their likely values. Box 8 describes a step to addressing this shortcoming.

Box 8: Quantifying the net social benefit of Aboriginal land management

Authored by David Campbell

Two policy issues receiving public attention that relate to remote and very remote Australia are the poor health of Aboriginal Australians when compared with the total population, and the loss of biodiversity. Taking advantage of the interconnections between these two issues can result in improved social outcomes (Campbell et al. 2008a).

The interconnection between the loss of native species and the health of Aboriginal people has historic origins. The desert fauna and flora observed by the early Europeans entering remote and very remote Australia was the result of thousands of years of ALM. For Aboriginal people, land management formed an integral part of their culture, social framework and economy. The dispossession of Aboriginal people from their traditional country resulted in a change in land management and a loss in biodiversity and environmental services. For Aboriginal people this involved the loss of culture, personal identity, social framework, economy and control over their own lives, in addition to the trauma of invasion (Ashdown 2007).

While we do not fully understand the factors affecting chronic disease, we do know that psychological and social determinants of health are important to all Australians and that they have a relatively greater impact on the health of Aboriginal people (Cass et al. 2004). These factors are important to explaining the gap or shortfall in expected life span for Aboriginal people when compared with the Australian population. In 2005–07 this gap was 11.5 years for males and 9.7 years for females (SCRGSP 2009).

There is increasing evidence supporting the connection between health and environmental outcomes that is generated through the involvement of Aboriginal people in land management. Much of the earlier research supporting a possible interconnection was carried out in central Australia (McDermott et al. 1998). McDermott et al. (1998) found that those Aboriginal people who resided on outstations were healthier and less likely to be suffering from chronic diseases when compared to those living in the larger settlements. While some argue that these results arise because those people who were unwell moved into the larger settlements to access better health services, this is not necessarily consistent with the available evidence. Research carried out 10 years after McDermott et al. (1998) indicated that people remained on outstations up until they required hospitalisation (Rowley et al. 2008). These results are consistent with what Aboriginal people tell us, that they feel healthier when living on country (Johnston et al. 2007, Morice 1976).

More recent research carried out in cooperation with an Arnhem Land Aboriginal community provides stronger support of the interconnection between Aboriginal health and improved biodiversity outcomes (Garnett & Sithole 2007, Johnston et al. 2007). As part of this study, Burgess et al. (2008), in cooperation with the traditional owners, developed an index to measure people's level of involvement in ALM, termed 'caring for country' in that study. This index, based on varying frequency and time spent on six different kinds of activities, ranges from 1 to 25. The activities were spending time on country (living in a homeland, travelling through country); burning grass (cleaning up country, fire-work); using country (bush tucker, bush medicine, hunting, fishing); protecting country (sacred sites, animals, totems); ceremony; and making artworks (painting, weaving, carving). Many of these were self-organised and self-motivated customary and cultural activities, rather than part of formalised projects for natural resource management.

Based on a 23.2% sample of the community population of 1284, Burgess et al. (2009) showed a direct linear association between increasing involvement in ALM and decreasing risk of chronic disease. While it was not possible for the study to directly elucidate causative relationships, significant correlations were established.

To highlight the policy significance of these results, Campbell et al. (2010) estimated the possible savings in primary health care for this Arnhem Land community on the basis of observed participation in caring for country. The expected annual savings for primary treatment of three chronic disease conditions (hypertension, renal disease and diabetes) were found to be in excess of a quarter of a million dollars.

Such estimates are conservative for a number of reasons, including because the health benefits of ALM are estimated post participation, or *post hoc*. A range of other health savings, including the foregone or delayed cost of hospitalisation, are not accounted for. In addition to outcomes for reduced morbidity, there are the personal, family and community wellbeing benefits that are the result of having healthier people, especially as these people are often the repositories of cultural knowledge. Environmental benefits are also not accounted for by this estimate. In addition to biodiversity, environmental benefits from ALM may include the biosequestration of greenhouse gases and, in the desert, the minimisation of dust storms (Campbell et al. 2008b, Russell-Smith et al. 2009).

These results support arguments by Campbell et al. (2008a) that cost savings in the provision of environmental and Aboriginal health benefits are possible through the involvement of Aboriginal people in land management as a result of the achieved scoping economies. Such an integrated approach to economic analysis is important in considering policy options for services and other support to remote Aboriginal people. Analysis of the costs and benefits of applying public funding to services for Aboriginal residents of homelands/outstations should properly take into account the cost savings and benefits of healthier people that derive from relatively greater engagement in self-organised and self-motivated ALM activities.

6. Sustainable livelihoods

The sustainable livelihoods framework, portrayed generically in Figure 5, highlights the interrelationships among many factors that impact positively or negatively on an individual or a group of people (typically a family or household, rather than a ‘community’) developing, maintaining or changing their way of life. It has evolved from international practice in developing countries and has been applied in Australian desert research over the past decade (Davies & Maru 2010, Davies et al. 2008). The basic framework is adaptable to different contexts, as outlined in Box 9 which shows its adaptation to Australian desert Aboriginal world views and land management contexts.

When interpreted flexibly, with an emphasis on dynamic interrelationships (Armitage 2007), the sustainable livelihoods framework provides a sound mental model to aid understanding of the opportunities that people have in their lives, the choices they make and how these are enabled or precluded by social norms and decision-making processes at multiple scales in the local setting, in regional organisations and governments. These opportunities, choices and decision-making processes have an important relationship to the psychosocial determinants of health. The sustainable livelihoods framework promotes a ‘people-centred approach’, encouraging attention to human diversity, ingenuity and agency rather than to ‘deficits’ in capacity. It also highlights the impact of factors beyond the control of local people on their aspirations and opportunities, suggesting how cross-scale linkages are critical to local outcomes.

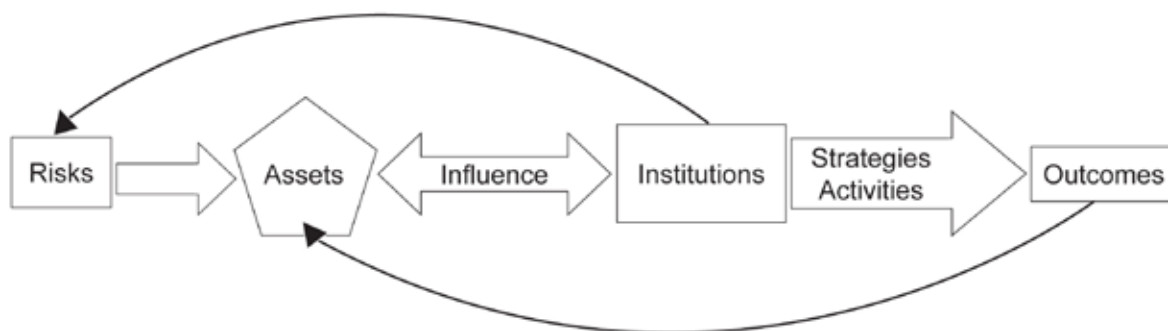


Figure 5: Sustainable Livelihoods Framework

This diagram incorporates key elements that are common to many different versions of the Sustainable Livelihoods Framework as it has been developed and used by NGOs and aid agencies, notably UK Department for International Development (1999–2001). See text for explanation of terms and interactions.

6.1 Components of the sustainable livelihoods framework and their interrelationships

At a broad level, the sustainable livelihoods framework identifies that people use assets to generate livelihood outcomes by applying various strategies (the main left to right flow between the ‘boxes’ in Figure 5). Practitioners often categorise assets according to five capitals (human, social, physical, natural, financial). Some of these are increasingly used in sustainability planning and national accounts (e.g. financial, natural, human) while others are very hard to measure (e.g. social capital). Cultural and political capitals are sometimes suggested as additional categories.

People engage in livelihood ‘strategies’ that may involve converting assets from one category to another (such as using financial assets to pay for education or health care, and thereby safeguarding or increasing human assets). However, use of the term ‘strategies’ often puts too strong an emphasis on planned action. Everyone faces constraints on what they can do in their lives as a result of limitations on assets and also limitations, encapsulated by ‘institutions’ in Figure 5, on how they can access and use assets. Where people lack assets or influence, they generally cannot put their plans in place. There is

also a path dependency: what people do generally depends on what they are accustomed to doing. Hence ‘activities’ is often more apt than ‘strategies’ as a term that encapsulates the things that people do in their lives that generate the livelihood outcomes they experience (De Haan 2000).

‘Institutions’ have a central role. They include the rules and norms established by government or by people within their community organisations (often called ‘formal institutions’), and those norms or ‘ways of doing things’ that are embedded in the culture of communities or families or organisations (often called ‘informal institutions’). Institutions determine what livelihood strategies/activities are available to people (the main left to right flow between the ‘boxes’ in Figure 5). They also impact on the risks or vulnerability context that people encounter in their lives (the feedback arrow from right to left at the top of Figure 5). Effective institutions ameliorate the uncertainty that people encounter in their lives as a result of risks from the ecological, social or political environment they live in. Indeed, this is why societies craft institutions (Ostrom 2005). Drawing from dialectical understandings of structure and agency, the framework indicates that people have varying degrees of influence on institutions (as indicated by the right hand direction of the ‘influence’ arrow in Figure 5). People may exercise agency to change formal institutions or engage in independent action that contributes to diffuse processes of cultural change and hence to changes in informal institutions. Conversely, institutions also determine which of the assets held by people are accorded value and hence how much influence those people have (as indicated by the left hand direction of the ‘influence’ arrow in Figure 5).

Livelihood outcomes can be conceived of in material terms, such as income, food, and shelter (Scoones 1998) and also include higher order conceptions of what is important for a ‘good life’. This dimension of the sustainable livelihoods framework interfaces with many other efforts to define the dimensions of human wellbeing or happiness. Amartya Sen’s work has been influential. Sen (1999) developed the concept of ‘capability’, which he defined as ‘the ability of human beings to lead lives they have reason to value and to enhance the substantive choices they have’ (Sen 1997, p. 1959). ‘Capability’ is a social goal, applicable to all Australians. For example, it provides a conceptual underpinning to the Australian Treasury’s wellbeing framework (Henry 2007), a descriptive tool designed to improve Treasury’s policy advice to governments by helping to make trade-offs explicit (Australian Government Treasury 2004). It encapsulates the same kind of meanings as the concept of ‘control’ over one’s life or ‘coping’ that is discussed above (Section 3.5) as a fundamental psychosocial determinant of health outcomes.

Application of the sustainable livelihoods framework to desert ALM systems in Livelihoods inLand™ research has generated insights into the outcomes that Aboriginal people and partner agencies aspire to. These outcomes are outlined below. The research also highlights the key role of three other elements of the sustainable livelihoods framework in achieving those outcomes: institutions, human assets (knowledge and skills) and social assets (social capital and relationships). These elements offer particular guidance for principles for ALM to generate health and wellbeing outcomes and are also explored in more detail below.

6.2 Outcomes

Our research has consistently found that the main motivation for desert Aboriginal people’s engagement in ALM is improving livelihood outcomes rather than income or any specific improvements in land condition that might be generated. Box 10 illustrates this, drawing attention to motivations of Yuendumu-based Warlpiri people to engage in ALM. These people seek outcomes from their engagement in ALM for knowledge transfer, meaningful employment, improved health, increased sense of wellbeing and maintaining responsibility to country. Outcome areas identified in two ALM situations outlined in Box 20 included employment; learning new skills; a chance to reconnect with family, culture and environment and to relax and recharge; a stronger sense of mutual trust and belonging; and pride in a growing reputation for what these Aboriginal people had achieved in restoration of the environment.

The differences between the outcomes sought from ALM by Aboriginal people and by the staff of two funding and support agencies are illustrated in Box 11. In this case, agency staff did identify Warlpiri people's own aspirations for management of the Northern Tanami IPA as one of the outcomes they seek to support. However, the research has found that this is one outcome area that gets little attention or support in the ALM program: both the agencies involved and Warlpiri people agree it is the outcome area that is not being achieved.

Most ALM relies on external resources. As a result, it is subject to the risk that accountabilities to funders determine the decision-making processes within ALM systems. Contract work is helping to ensure that ALM is relatively less reliant on government funding programs. However, concern is emerging that as contracted work increases Aboriginal land managers have less time to put towards the priorities that were identified by elders at the inception of their ranger programs. For example, Top End leaders in the ALM movement have identified the need for a greater understanding of what is meant by 'caring for country', and greater support for all caring for country values and activities, not just the natural resource management components and contracted work (Charles Darwin University et al. 2007, Muller 2008a). Their successful efforts to secure contracts from government agencies for land management activities, and gain resources to develop their ranger programs, can mean that they have little time to pursue their own priorities. Discussing these issues, these leaders reflected that they had adopted the terms 'land management' and 'ranger' in setting up their ALM organisations because they thought these terms would be meaningful to government staff and other non-Aboriginal people, and would help them get support for their ALM efforts. They found that this strategy worked. However, these leaders have come to realise that mainstream Australia now assumes that these terms have the same meaning wherever they are used. What gets overlooked as a result are distinctive Aboriginal world views and motivations for land and sea management and allocations of resources to undertake the customary and cultural activities that these prescribe, such as learning from elders on country, understanding and respecting kinship relationships to plants, animals and place, and carrying out ceremonial obligations (pers. comm. to J. Davies and see Charles Darwin University et al. 2007).

Aboriginal landowners' experiences of failing to meet their own goals from their engagement in ALM will compromise the potential for health and wellbeing outcomes from ALM. This is because of the fundamental need for people's expectations of outcomes to be matched to a capacity to influence outcomes in order to manage stress. As discussed above, this is linked to the concepts of 'control' over one's life or 'coping' (Section 3.5) and capability (Section 6.1). From consideration of the goals and outcomes that Aboriginal landowners are seeking from ALM livelihoods, we conclude that it is critical that Aboriginal land managers' goals are given priority attention in ALM. This conclusion informs one of the principles for ALM systems that will promote health and wellbeing outcomes, as presented below (Section 7.4).

The priority that Aboriginal landowners give to livelihood goals, rather than to biodiversity conservation, as outcomes from their ALM engagement is paralleled by the priorities of most other indigenous and community-based conservation management around the world (e.g. Berkes 2009a, Oviedo 2006). Conservation, meaning 'wise use of natural resources', is typically implicit as a goal in these peoples' efforts to sustain and enhance their livelihoods, because their world views require the maintenance of ecosystem services for their own health and wellbeing. However, stakeholders such as conservation NGOs and agencies who are operating nationally and globally often have a more explicit focus on biodiversity conservation as an outcome from community-based conservation management. They may recognise that social factors (e.g. livelihood outcomes from conservation, increased human and social assets) are both a means to successful community-based conservation and a picture of what 'success' looks like. However, evaluations continue to focus on success in terms of biodiversity conservation outcomes (Axford et al. 2008). Approaches to recognising and managing for integrated conservation and development objectives, as are required by emerging international certification

schemes (Box 3), are poorly developed (Agrawal & Redford 2006, Berkes 2007). One barrier to better integration is the common presumption among conservation scientists that the social objectives of local peoples will dilute conservation efforts (Berkes 2007).

Integration of goals is important to rebuilding the linkages among the social, economic and ecological dimensions of remote Aboriginal Australia that have been adversely impacted by colonisation and economic marginalisation. Rebuilding these linkages is important for social-ecological resilience and adaptive capacity (Walker & Salt 2006) and arguably also for approaches to biodiversity conservation that are effective at landscape scale and for the long term (Hoole & Berkes 2009). Effective integration of goals requires explicit attention to the different scales of interest that are important to different stakeholders in ALM, notably to Aboriginal people themselves and to their partners or funders (see Box 18). Within the construct of the sustainable livelihoods framework, this situation directs attention to design of effective institutions, as discussed below (Section 6.5). Human and social assets engaged by ALM inform this institutional design challenge, as first discussed below.

6.3 Human assets (knowledge and skills)

ALM is enabled by knowledge and skills that frequently draw from both Aboriginal and non-Aboriginal traditions. Desert Aboriginal people commonly call for a better balance between these two knowledge systems. They may have experienced a chain of positive outcomes for health and wellbeing flowing from Aboriginal ‘bush’ knowledge, and contrasting negative outcomes flowing from mainstream knowledge, as indicated in Box 12.

We have found that Aboriginal traditional knowledge has a key role in motivating Aboriginal engagement in land management, including for young people. Among Warlpiri people at Yuendumu, employing senior traditional owners as educators in land management activities was seen as a key factor in creating a genuine two-way approach to land management (see Box 13). Ironically, employment of elders is often not resourced due to priorities given by agencies to environmental outcomes. This is indicative of the kinds of institutional mismatch that are prevalent in ALM systems (Section 6.5). Yet, as indicated in Box 13, elders’ employment is central to the outcomes that Aboriginal people are looking for from ALM. So too is the requirement that the elders involved be those that have specific responsibilities in customary law for the area of land where the land management activities are being undertaken.

The knowledge of elders about ALM, in combination with multi-media technologies, has been shown in Livelihoods inLand™ research to have an important role in re-engaging youth into learning and building their communication skills, as outlined in Box 14. Having youth and elders accompany community-based rangers on country visits promoted inter-generational learning; video recording the activities increased youth skills; paying elders showed respect for and recognition of the value of their knowledge; and sharing videos with other young people who were isolated in town increased their scope of experience. In the school environment, engagement of elders and their knowledge about ALM in the teaching program can generate important flow on benefits for community engagement with the school, which is an important foundation for effective schooling, as indicated in Box 15.

Livelihoods inLand™ research indicates that the building of human assets (knowledge and skills) through ALM extends beyond inter-generational transmission of knowledge of country to ‘two-way’ learning and the potential to introduce desert Aboriginal people to science. Research on Aboriginal employment success at the Alice Springs Desert Park (see Box 21 and Walsh & Davies In press) found that the learning that Aboriginal employees experienced from elders and through training in non-Aboriginal approaches to plant and animal management was a key positive outcome for them from their employment. Other examples of how two-way learning is actively being pursued in recent desert ALM include through cultural mentorship of young people engaged in formalised training

programs (Rea & Messner 2008, Rea et al. 2008) and through the Tangentyere Land and Learning program (Box 5). Pilot projects on science learning in remote schools through School Dustwatch (<http://school.dustwatch.edu.au>) have engaged remote Aboriginal students in helping to fill in gaps on science knowledge of the environment and predicting and managing wind erosion. Experience from the engagement of a wide range of people from desert Australia with the DustWatch network is that community DustWatchers' observations are every bit as valid as those of scientists. They show insight into how local areas respond to different seasons and management and indicate that engagement in the DustWatch network has education value for community DustWatchers (Leys et al. 2008). School and community ranger group engagement with DustWatch suggests one way of linking science and maths learning by desert Aboriginal people to an environmental knowledge area that has national significance.

Overall, from consideration of human asset dimensions of ALM livelihoods, we conclude that learning is an important theme. It is the focus of one of the Livelihoods inLand™ principles for ALM systems that will promote health and wellbeing outcomes, as further discussed below (Section 7.2).

6.4 Social assets (social capital, relationships)

Social capital refers to the social bonds or relationships among people. High social capital is reflected in shared norms, or ways of doing things, among a group of people. Trust, reciprocity and exchange are key features. Trust reduces the cost of working together because where there is trust individuals do not have to check up on whether others are acting as expected (Pretty 2003, Pretty & Ward 2001). Trust is strongest among people who have the same ways of doing things, that is, people who respect and follow the same norms or rules for behaviour. Such norms are among the informal institutions that impact on sustainable livelihood outcomes, as further discussed below.

The social order of desert Aboriginal people revolves around kin relationships, rather than contractual relationships as is more common in government or business transactions. Hence their emphasis is frequently on friendly or family-style relationships. These kinds of relationships and the reciprocity and exchanges that they involve provide the basis for trust among Aboriginal groups (Peterson & Taylor 2003). The social capital that is generated is not always a positive feature. Negative consequences among groups whose social networks are very densely clustered, with high degrees of trust and reciprocity among their members, can promote distrust and exclusion of outsiders, stifling innovation, and restricting the freedom of individuals (Davies et al. 2010, Hunter 2004, Porter 1998). If social capital is to be an effective asset for sustainable livelihoods, bonding social capital (within groups) needs to be balanced by bridging social capital (to other people outside the group) and linking social capital (linking people at local levels to those in government or other non-local organisations) (Woolcock 2000).

In terms of social network analysis, people who have relationships that bridge between two or more densely clustered groups of people or that link between different kinds of people, communities or organisations are termed 'brokers' (Burt 2005). People in broker roles in ALM are commonly non-Aboriginal professionals, and less commonly are Aboriginal people who are not part of a local land-owning group. They may be employed by or contracted to conservation agencies, regional ALM support organisations, research organisations or Aboriginal community organisations. Alternatively, they may interact closely in other ways as 'trusted outsiders' in remote Aboriginal communities (Moran 2007, Moran & Elvin 2009). For example, CLC employs coordinators to work with the community-based ranger groups in its region in the southern Northern Territory, as well as employing regional land management officers and Indigenous Protected Area coordinators (see example, Box 18). Such people have a key structural role for developing sustainable land management systems, implementing goals important to ALM funders as well as the livelihood and health and wellbeing goals that are typically of prime importance to Aboriginal landowners. Organisations that serve a similar brokering role, linking between different levels of governance and knowledge systems and catalysing development of

trust, collaboration, and learning are termed ‘bridging organisations’ (Berkes 2009b, Cash et al. 2006). Regional Aboriginal organisations (Section 4.4) are strong examples in the ALM arena, as noted in Box 19 for CLC.

The existence of social networks and relationships between Aboriginal landowners and people in broker roles, including staff of bridging organisations, has underpinned the development and growth of the ALM movement over the past three decades and the sharing of science and Aboriginal knowledge within this movement. Long-term engagement of such professionals with some ALM groups is a key factor that helps to account for the effectiveness of those groups in developing organisational capacity (Davies et al. 1999). We also found this in government Aboriginal employment in land management: the persistence of a key individual in management roles at the Alice Springs Desert Park for more than a decade was a key feature in the sustained employment of Aboriginal staff at the Park (see Box 21 and Walsh & Davies In press).

Conversely, such professionals may also be mobile, working in various different regions or at different organisational levels, moving from employment by a regional Aboriginal organisation to government employment, for example. Such mobility has fostered national and regional networks among ALM professionals, and to a lesser extent among the Aboriginal landowners they work with, generating innovation in policy and in local approaches. It has generated informal ‘communities of practice’ (Wegner 1998) that have extended learning about effective practice in ALM through informal processes. However, mobility of professionals is also problematic for building local ALM capacity. Just as in a school context, where high turnover of teachers and school principals generates uncertainty for local Aboriginal teaching staff and discontinuity in community engagement with schools (Douglas In press), high turnover of ALM professionals impacts on the continuity of ALM projects and activities. The relationships that are formed between Aboriginal people and ALM professionals can build incentives for ALM professionals to continue working in a local area, acting as a counter force to other factors such as career development and family obligations that might otherwise lead them to move on.

Aboriginal people commonly seek to bring other people who are working in ALM, such as locally based ALM facilitators, into trusted family-style relationships by sharing knowledge (Box 16). Sharing knowledge supports stronger social relationships or stronger social capital. Desert Aboriginal people commonly describe the process of ‘sitting down together’ (Box 17) as critical to working together (and see Horstman & Wightman 2001). The personal interactions involved in that process of cross-cultural dialogue are important to effective knowledge sharing and collaborations between Aboriginal people and others in ALM.

The close relationships that have developed between Aboriginal leaders and non-Aboriginal workers in ALM are also found in many other remote situations (Batty 2005). The goal expressed for self determination, that ‘white advisers’ would ‘work themselves out of a job’ to be replaced by Aboriginal people in professional and managerial roles, has rarely been achieved in health, education, or community management roles. It seems even less likely to be achieved in ALM, notwithstanding the importance of doing so, as argued in Box 16. A significant reason is that professional training in ecology tends to be heavily emphasised in recruitment to such positions, reflecting the biodiversity conservation-oriented goals and priorities of agencies that are funding ALM (as discussed in Box 11), and there are few Aboriginal people with such training. However, the challenges of generating knowledge-sharing partnerships in ALM, engaging Aboriginal knowledge and science, highlights the need for additional or alternative competencies among people working in coordinating or advising on ALM. These include a capacity to understand and communicate about local institutions and knowledge, and skills in network building, negotiation and conflict resolution (Berkes 2009a).

ALM is vulnerable when there is insufficient recognition of the complexities of coordination positions. Knowledge sharing and collaboration between NRM/ecology professionals and the Aboriginal people involved in ALM is often not achieved effectively, contributing to ongoing power imbalances that

typically characterise ALM systems: the NRM-based priorities of funding bodies are readily able to be asserted more powerfully than the goals of local Aboriginal people (Box 11, and see Robinson et al. 2009). Establishing and maintaining effective intercultural relationships may be very difficult because of different styles of knowledge sharing (Box 16) or because one individual in a broker role is actually representing a large number of organisational interests and accountabilities (Box 18). This compromises their capacity to give priority to local interests and issues and address power imbalances that work against Aboriginal landowners goals for ALM engagement.

To be effective in supporting sustainable livelihoods through ALM, facilitators or coordinators need to have strong horizontal relationships at local levels – with the individuals and families with responsibilities for ALM, and with staff of other local organisations. Aboriginal land managers tend to see such horizontal networks as the priority (for example between local ALM organisations and outstation resource agencies and schools, Box 19). Nevertheless, lack of horizontal coordination between natural resource management and other sectors at a local level is apparent in the Lake Eyre Basin (Robinson et al. 2009) and also in other places (e.g. see Box 4).

Facilitators also need to have good vertical relationships through to funding bodies and agencies. In the desert ALM context, key characteristics of the ecological and social environment need to be accounted for in all transactions if these are to promote sustainability (Stafford Smith 2008). Hence it is particularly important that facilitators or coordinators understand the context of Aboriginal environmental governance, have good capacity to respond to the complexity of that context, and to recognise and integrate Aboriginal knowledge into planning and decisions at regional and higher levels. Such factors indicate that ALM facilitators/coordinators need to be recruited and rewarded for cultural competence, for their capacity to rapidly become aware of and understand which Aboriginal people have rights and responsibilities towards particular areas of land, and how these various rights and responsibilities can be effectively represented in contemporary governance. ALM systems need to support these competencies.

The need for facilitators/coordinators to have really good support from agencies if they are to be effective in their roles is emphasised from Lake Eyre Basin research (Robinson et al. 2009). It is also apparent from Livelihoods inLand™ research, particularly in experiences from Northern Tanami IPA. As discussed in Box 18, stresses and tensions on people in coordinator positions, and the risk of perpetuating power imbalances, are exacerbated because coordinators wear more than one hat, being accountable to traditional owners, and also to funding bodies. This is a particular cause for tension in a relationship-based society since it can compromise the development of trust. Support for facilitators/coordinators in such cases needs to extend to a willingness and capacity among various funding and support agencies to establish their own direct relationships with traditional owners and negotiate their own priorities for ALM, rather than relying on locally-based ALM coordinators to do so. Theoretical analysis of the particular characteristics of social networks in arid regions (McAllister et al. 2010) complements these findings. The dense hubbed network structures that develop when information and communication is channelled through one node in a network (such as an ALM coordinator or one Aboriginal ALM leader) have benefits (promoting good leadership and fast adaptability) but also risks (centralised power and dependence of others on a single person, with potential for corruption and nepotism). Arid network structures that are more effective at building local resilience to crises and adaptive capacity are generated when flows of information and communication between outside parties are with a broader set of local people and organisations.

Overall, from consideration of the social asset dimensions of ALM livelihoods, we conclude that interpersonal relationships are very important in ALM. Recognition of the importance of relationships is the focus of one of the Livelihoods inLand™ principles for ALM systems that will promote health and wellbeing outcomes, as further discussed below (Section 7.3).

6.5 Institutions

Significant tensions commonly arise in ALM because of institutional mismatches. As discussed above (Section 6.2), external funding is generally accountable to deliver to the targets of particular programs, commonly related to improvements in land condition or addressing threats to biodiversity. Incentives and reward structures of people in broker roles, such as facilitators or coordinators of ALM programs, are commonly linked to those targets rather than to the livelihood outcomes that are of more immediate importance to Aboriginal land managers (Section 6.4). Effective governance is important in ALM to guard against the very real risk that outcomes important to Aboriginal landowners and managers are ignored or overridden with the result that their capability or sense of control is reduced, rather than enhanced, through engagement in ALM. Understandings from commons research and from collaborative adaptive management provide significant guidance for understanding institutional dimensions of ALM systems that will generate health and wellbeing outcomes.

6.5.1 Self-governing local institutions

Commons research since the 1980s has developed understandings of the circumstances under which groups of people develop and sustain ways of managing resources that they hold in common. However, little use has been made of these understandings in conservation management globally (Berkes 2007) or in ALM in Australia.

Aboriginal land has the two defining characteristics of commons: it is difficult to exclude potential users of the land (the exclusion problem), and the use made of land by one person can subtract from the welfare of others (the subtractibility problem) (Berkes 2007, Ostrom 1990). Aboriginal customary governance systems, or customary laws, comprised institutions that address these two characteristics by allocating rights to occupy and use the land, to ‘speak for’ the land, make decisions about use of the land, and to authorise others to occupy or use the land. Customary governance systems are not static, but continue to evolve and change, as they are transmitted inter-generationally under a barrage of new cultural influences. Nevertheless, they have proved to be very assertive (Sutton 1998). In remote Australia they continue to be integrally linked to complex kinship structures and to belief systems about the creation and proper care of landscapes, plants and animals. In short, they are fundamental to the ontology of many Aboriginal landowners.

Recognition of Aboriginal land rights in remote Australia typically encompasses, at least implicitly, a recognition that decisions about access and use of the land by members of the Aboriginal landowning group will be made by the group in accordance with their own customary law, or by applying complementary or alternative rules or procedures that the group develops. Land rights instruments also typically set out under what circumstances or conditions people who are not members of the group may access or use the land. Effective governance in ALM requires that these two sets of institutions effectively manage excludability and subtractibility problems such that access and use of the land does not detract from ALM goals.

Difficulties may arise where people who have rights to use the land under Aboriginal custom or law are not involved in decision-making about ALM projects and activities or are unaware of or disrespectful of the decisions that are made. As a result such people may use the land, or authorise others to use the land, in a way that subtracts from the benefits of ALM. For example, if people involved in an ALM project or activity decide to close an area for revegetation, or for regeneration of wildlife populations impacted by hunting, and the decision is taken without involvement or agreement of people who have customary rights to access the area or hunt the wildlife, then the decision is unlikely to be respected by the customary rights holders. Benefits anticipated from the closure can be readily compromised as a result. Environmental benefits would be reduced by continued access or hunting by the people who hold customary rights. Health benefits would be reduced because the ALM project would not have delivered any sense of control to the people involved in it. Conversely, it would indicate that their efforts had been wasted.

The importance of managing excludability and subtractibility in ALM commons highlights that customary norms and governance structures need to be recognised in order that ALM systems promote health and wellbeing outcomes. This is the focus of the first Livelihoods inLand™ principle, as presented below (Section 7.1).

Commons research provides considerable further guidance for how this principle interfaces with widespread Aboriginal aspirations for self-governance and with sustainability. Ostrom (1990) identified eight ‘design principles’ that characterise situations where groups of people had managed, over time, to sustain the benefits from their common property and to effectively self-govern that property. These design principles, summarised in Table 9, have been refined and tested by other scholars and shown to retain their basic validity for situations where small groups of people need to work together in management of a resource (Ostrom et al. 2002). As such they provide a guide for how customary norms and governance structures might best adapt and evolve in order to meet contemporary challenges of managing access and use of Aboriginal lands by people who hold customary rights. Livelihoods inLand™ research offers some insight to the application of these principles in ALM.

A key challenge for the application of Ostrom’s design principles (Table 9) in ALM comes from the very prevalent use of the term ‘community’ with the ‘tacit assumption ... that the geographically defined community (i.e. people who live in the same place) is also a community in the sense of being people who share common values and beliefs and have a shared set of interests’ (HRSCATSIA 1990, p. 16). Such usage can debase or render invisible the primary social networks of Aboriginal people that are based around family or kinship groups (Ah Mat 2003, Gerritsen & Straton 2006) and cultural views that are ‘based on the individual and family as number one’ (Walsh & Mitchell 2002, p. 18).

Lack of transparency about the meaning of the term ‘community’ also adds to the difficulty that ALM groups can experience in identifying clear boundaries for the group of people who have rights to use and manage a resource (Design principle 1 in Table 9). It engenders confusion between those people who have rights to use and manage an area and the people who live in the vicinity of the area. Over time, uncritical use of the term ‘community’ can generate tensions and conflict among Aboriginal people, working against health and wellbeing outcomes from ALM. This is the case in the examples summarised in Box 20.

One of the important design principles for enduring self government of common property resources is that the people who benefit from a collectively managed resource must contribute proportionately to the collective effort required to manage that resource (Design principle 2 in Table 9). Empirical research has shown that this condition is met in self-governing common property regimes that have stood the test of being sustainable over time. The governance structures that the examples in Box 20 refer to appear to address that principle. However, they are not recognised as legitimate by a number of other local Aboriginal people. One important reason is that they are portrayed publicly as benefitting the ‘community’ of Aboriginal residents in the area, and/or the ‘community’ of particular tribal or language groups, even though they mostly benefit members of one family. Hence they are contested, and do not meet the design principle for common property resource management regimes to be recognised as legitimate by outsiders (Design principle 7 in Table 9). Sustainable self-governance would be promoted in such cases by greater transparency in communications, among Aboriginal people and with others, about who is getting what benefits from an area of Aboriginal land; and by negotiations leading to an accord or agreement between the families who are involved in managing and benefiting from an area of Aboriginal land and others who claim a right to be involved and to benefit.

The interface between customary institutions for ALM and contemporary governance is further explored below in discussing the first Livelihoods inLand™ principle (Section 7.1). Lessons from research internationally on collaborative adaptive management extend the guidance that commons research offers to ALM, and are particularly pertinent to the three other Livelihoods inLand™ principles presented below: on relationships, learning, and the importance of giving priority to Aboriginal goals in partnerships.

Table 9: Design principles for effective self-governing common property regimes

1.	The boundaries of the commons resource, and membership of the group that benefits from use and management of the resource, need to be clear.
2.	There needs to be a balance between the effort that various members of the group put into managing the resource and the benefit they each derive from the use of the resource. Overall, the benefits derived by the group need to be commensurate with sustainable yield from the resource they are managing.
3.	Members of the group need to have a say in making the rules that govern their use and management of the resource. They also need to have ways of changing rules that are not working effectively.
4.	Compliance of members with the rules that govern use and management of the resource needs to be monitored. The people doing the monitoring need to be accountable to the membership group.
5.	Members who break the rules need to be sanctioned, with the severity of sanctions matched to the seriousness of the infringement.
6.	Members of the group need to have access to low-cost mechanisms for conflict resolution.
7.	The rights of the group to use and manage the resource need to be recognised by outsiders.
8.	Governance at the local scale should nest into higher order governance systems that can manage issues and opportunities at regional and broader scales.

Source: based on Ostrom (1990, 2005)

6.5.2 Collaborative adaptive management

Adaptive management of landscapes and ecosystems recognises that there is considerable uncertainty in whether any particular action taken by managers will achieve desired outcomes. It applies an iterative cyclic process of planning, acting, observing and reflecting on outcomes, and then applying the learnings to inform planning for subsequent action. As such it is a process of learning-by-doing. Adaptive management has emerged from literature and practice in applied ecology (Berkes 2009b, Berkes et al. 2000, Lee 1999). The iterative cyclic process involved is the same as that involved in action research methodologies and more generally in the learning processes that all people are involved in when they engage in livelihood strategies/activities, experience and reflect on the outcomes from those strategies, and apply their learning to modify their subsequent actions.

Collaborative adaptive management⁴ has emerged as an approach to conservation from the recognition that no single agency or knowledge system holds all the knowledge required for managing the complex issues that impact on the health and functioning of ecosystems and that impact on biodiversity conservation. It recognises that learning-by-doing needs to encompass different approaches and different kinds of knowledge if it is to be effective in sustainably managing natural resources. Collaboration among parties holding different kinds of knowledge and management resources is therefore important (Armitage et al. 2007, Armitage et al. 2009). In ALM, this situation is widely recognised by Aboriginal land managers, brokers and bridging organisations through their emphasis on the need for two-way toolboxes and two-way learning (Sections 2.1 and 6.3). Collaborative adaptive management also emphasises the importance of recognising that different values of ecosystems and different outcomes from management are important at different scales of analysis, and to stakeholders at different organisational levels. Collaborations need to bring effective linkages and knowledge sharing strategies between these different stakeholders and levels, addressing cross-cultural and cross-scale challenges such as those outlined in Box 19. Collaborative adaptive management offers a body of theory and practice that highlights the importance of Livelihoods inLand™ principles about relationships, learning, and giving priority to Aboriginal goals in partnerships, as discussed further below.

⁴ An alternative term, 'adaptive co-management' is increasingly used in international literature (e.g. Armitage et al. 2009, Berkes 2009b, Olsson et al. 2004), with various definitions typically emphasising sharing of power and responsibility for resource management between community and government organisations. One use of co-management in the Australian context is as a synonym for 'joint management' of national parks, but there is little recent critical review of its meanings in relation to international understandings (Ross et al. 2009). Here we use the longer term 'adaptive collaborative management' because we wish to avoid confusion with formal joint or co-management arrangements concluded between Aboriginal landowners and governments. Collaborative adaptive management is an approach that is applicable to these and is equally applicable on Aboriginal land that is not subject to formal joint or co-management arrangements.

7. Livelihoods inLand™ principles

Four principles are important in order that ALM systems promote health and wellbeing outcomes for Aboriginal people. These are discussed below. These are common themes across Livelihoods inLand™ research as well as being supported by other literature. The principles have been developed inductively through shared reflection among project researchers on the findings and implications of our research. They may be considered as hypotheses for further development and testing as part of collaborative adaptive management processes. Given the diversity of ALM settings in desert Australia, we have aimed to present general principles rather than detailed prescriptions.

These principles do not aim to encompass all factors that impact on health and wellbeing of remote Aboriginal land managers. Diet, exercise, smoking, alcohol consumption and environmental health in housing and settlement services also have substantial impacts on health and wellbeing and are not addressed in these principles. We nevertheless consider that, all other factors being equal, ALM will have the best prospect of delivering health and wellbeing outcomes if these principles are put into practice.

7.1 Governance recognises and respects Aboriginal custom and tradition and is adaptive

Governance encompasses the institutions and processes whereby people make decisions, assign responsibility for implementing decisions and manage the sharing of costs and benefits from those decisions. If ALM governance is to be recognised as legitimate, whether in terms of statutory requirements, at least in most Australian jurisdictions, or in terms of Aboriginal cultural conceptions, then it needs to recognise and respect Aboriginal custom and tradition. It needs to be based on Aboriginal people's right to speak for country rather than mainstream notions of delegation and representation or 'top down' control (Howitt 2001, Lane 1997, Walker Submitted). Recognition and respect for Aboriginal custom and tradition provides the foundation from which the actions that Aboriginal people exercise in ALM can have coherence with their world views and belief systems, and hence can promote the 'sense of control', coping or capability that is fundamental to health and wellbeing outcomes (see Sections 3.5 and 6.1). One practical implication for biodiversity conservation is that the operation of Aboriginal customary law, as a mechanism that may regulate wildlife over-harvesting, is less likely when ALM governance is not congruent with Aboriginal custom and tradition (Wilson et al. 2010).

Recognising and respecting Aboriginal culture and tradition as the foundation for ALM governance is fundamental to ensuring a continuing and vibrant role for Aboriginal ecological knowledge in ALM. The vibrancy of ALM in desert Australia is linked to the rich knowledge embedded in Aboriginal languages and to the time that Aboriginal people spend in practice, using and managing land and wildlife. Loss of language and of experiential knowledge of land presents a critical threshold for the social-ecological systems important to desert Aboriginal people and to Australia as a whole. ALM governance needs to be adaptive in order to operate effectively in conditions of social and ecological change, to actively transform systems to a more desirable state as necessary and avoid unintended and potentially less resilient transformations (Walker & Salt 2006).

Recognition of Aboriginal custom and tradition in ALM means that the 'right' people need to be involved, and have their authority recognised, in ALM decisions (e.g. Box 12, Box 13, Box 21). Decisions about ALM priorities and how they are implemented should not be taken by coordinators, ranger groups or funders, but by people with customary authority. 'Traditional owners' and 'elders' are commonly used as terms to signify who are the 'right' people to be involved in ALM decisions.

However, these terms disguise much complexity in the rights and responsibilities for land, natural and cultural resources, and their use and management. In customary law systems of the Australian desert, decisions about rights and responsibilities for particular areas or resources, their allocation and maintenance may involve two inter-dependent groups of people – e.g. *kirda* and *kurdungurlu* in Warlpiri systems. In addition, moieties and skin groups may have different responsibilities for various dimensions of an issue (e.g. Pawu-Kurlpurlurnu et al. 2008). Customary responsibility for decision making may also have passed from people who no longer live in an area to others who do (Sutton 1998, Young 1987). Further, the people with the best developed knowledge for an area, or who have assumed and exercised responsibilities to know and look after an area, may be recognised by other Aboriginal people as having pre-eminent rights to speak and make decisions about the area, with greater authority than other people whose claim only relates to ancestry, kinship or residence in the area.

While there are clear difficulties in any prescriptive approach to identifying who the ‘right people’ are, it is clear that ALM projects and activities that do not work with the authority of the ‘right people’ can readily generate anger and conflict among Aboriginal people (e.g. Box 13, Box 18). Hence deliberative processes (Berkas 2007), through which Aboriginal people with an interest in an area of land determine how decisions will be made and how benefits will be shared, are critical. New structures, such as Management Committees comprising all authoritative Aboriginal people (e.g. Walker Submitted), are often necessary to make customary law authority more transparent to outsiders, such as funders, who have an interest in the implementation and outcomes from ALM. A degree of transparency is important to ensure the rights of the group to make decisions and hold accountabilities for ALM are recognised by others outside the group (Design Principle 7 in Table 9). This also contributes to promoting public respect and validation of the importance of Aboriginal custom and tradition, and thereby supports empowerment and associated health and wellbeing outcomes.

In a changing world, however, governance cannot be static. It needs to also be adaptive to new circumstances. Ostrom’s design principles for sustainable self-governing common property regimes (Table 9) provide guidance for this adaptation as well as indicating some tensions with common modes of Aboriginal decision making about land. In particular, these design principles hold that for a common property resource management system to be sustainable, people who have an interest in the resource being managed must be clear who is and who is not a member of the group. The boundaries for membership of the group and for distribution of the benefits of membership must also be respected by others (Design Principles 1 & 7 in Table 9). This sits in tension with the fluid and constantly re-negotiated systems of some Aboriginal groups for allocating and recognising customary rights (e.g. Myers 1991, Sutton 1998). It means that the deliberative processes through which a group might establish a new governance structure or a new set of rules for ALM need to engage with a wide array of Aboriginal people and clarify their rights to be involved, or not, in the decisions by the group.

Ostrom’s design principles also hold that the benefit that comes to individual people from their engagement in ALM should be proportional to the effort they put in (Design Principle 2, Table 9). This implies that livelihood outcomes (for income, capability, etc) should accrue to those who are actually engaged in ALM, whether through labour or by contributing knowledge or leadership, rather than to those whose claim to benefit is based solely on birth or inheritance of customary responsibilities for a land estate or totem. The latter claims are commonly recognised for decisions about proposals from outsiders for the use of Aboriginal land, for mineral extraction or tourism. Rents or other financial benefits may be distributed widely to people with customary rights to the land. However, financial sustainability of ALM systems, and reduced reliance on government funding, would be better served if such incomes from land use were applied to support ALM and managed through ALM governance structures that are legitimate in terms of Aboriginal custom and tradition and adaptive to the need to build self-sustaining management systems.

7.2 Learning is embraced as a life-long process

Learning is both a motivation and an outcome from ALM (Section 6.3). ALM is fostering intergenerational transmission of Aboriginal knowledge (e.g. Box 10, Box 12, Box 13, Box 14, Box 15, Box 21) and provides pathways for Aboriginal people to learn about science (e.g. Box 5). Learning is also central to adaptive management of wildlife and ecosystems (Section 6.5.2) and to people's capacity to cope with and adapt to change in their environments (Armitage et al. 2008, Berkes 2009b). This provides a key link to health and wellbeing outcomes by reducing the stress of uncertainty and avoiding the ennui of helplessness (see Section 3.5). Hence learning is not something that should be seen as only occurring in training courses or schools. Rather, learning needs to be embraced as a life-long process that happens on country and for which all ALM projects and activities provide opportunities.

The link between inter-generational learning or transmission of Aboriginal traditional knowledge and ALM is very direct. Aboriginal traditional knowledge and ecological knowledge is situated in a place. It is more than a set of facts or skills. Rather, it is enacted and comes alive by 'doing' (Lauer & Aswani 2009). Transmission of that knowledge is meaningless except through practice. For example, many desert Aboriginal people have extraordinary ability to 'read the landscape'. The passing on of knowledge inter-generationally involves nurturing this ability in younger people, with recognition of the signs, symbols and other markers that give meaning to what is seen and not seen in landscape. ALM provides the contemporary setting for sharing practice among people, rediscovering traditional practice, applying it to new problems and thereby keeping it vibrant.

The important link between customary authority for land and learning also needs to be recognised in ALM. Thus ALM learning needs to start within the framework of the customary responsibilities that Aboriginal people have to keep country in good condition rather than only addressing skills and techniques such as for weed control or wildlife survey. Learning needs to address questions of who is responsible for an area; what 'good condition' means; how Aboriginal custom and traditions, goals, values and behaviours relate to good land condition; what actions are required to achieve it; and who else needs to be consulted or involved. Involving the 'right' people as educators/mentors is critically important for learning processes to be effective. Two-way learning needs to be given attention throughout, involving ALM collaborators from outside the community and Aboriginal land managers themselves being reflective and conscious of how their own practice is changing as a result of what they are learning.

Learning-by-doing proceeds most effectively when people get 'honest signals' about the outcome of their actions. Conscious monitoring of changes observed in the environment or social group following ALM actions, and reflection and deliberation on these changes, is important in the implementation of collaborative adaptive management, as through this people learn whether actions are effective or have surprising or unintended consequences.

7.3 Relationships are recognised as very important

Kinship relationships and the reciprocity and exchanges that they involve provide the basis for trust within Aboriginal groups. Efforts to attract and recruit people to support ALM in coordinator roles and through partnerships need to seek out people who want to be part of this kind of community (e.g. Box 16). Approaches to ALM that recognise the importance of relationships support health and wellbeing outcomes from ALM by promoting flows of information and management resources through pathways that are accessible and familiar to Aboriginal land managers (e.g. Box 17). Tensions arising from family-style relationships need to be recognised, however, as they can lead to power imbalances within an ALM group. This emphasises the need for people with coordination roles for ALM to have good skills of negotiation and conflict resolution (e.g. Box 18). Direct personal involvement in deliberation and negotiation processes for ALM by the staff of agencies is also an important point for balance.

When people with coordinator roles for ALM groups wear multiple hats because they need to represent the interests of funding agencies or partners, their own trusted relationships among Aboriginal land managers can be compromised (Box 18).

Relationships are important for learning. People in broker roles, with relationships among and outside of ALM groups, are important sources of new ideas and innovation. The social learning that occurs when experiences and ideas are shared with others builds mutual understandings and cooperation and is the foundation for collaborative adaptive management (Berkes 2009b).

7.4 Partnerships give priority to doing things that all parties agree are important

Partnerships and networks are important for effective community-based conservation (Berkes 2007). They are a critical mechanism for local people to have impact on the higher level institutions (e.g. policies, laws, funding mechanisms) that often determine the opportunities that local people have to achieve outcomes important to them. More than ten partnerships were involved in each project/management area in one sample of effective community-based conservation actions in equatorial regions of the globe (Berkes 2007). They served various purposes such as empowerment and equity, business networking, knowledge transfer, fund-raising, training and research. ALM partnerships in Australia have not developed to this extent outside of a small number of examples in tropical northern Australia. Evidence from international experience is that partnership development is an important arena for the growth of ALM in desert Australia. From experiences with inter-sectoral collaboration (Wakerman & Mitchell 2005), which is required in ALM partnerships because of their cross-cultural dimensions and potential for integrated social and ecological outcomes, it is clear that partners need to share clear and agreed objectives that reflect the reason for their collaboration.

Widespread acknowledgement of the importance of participatory processes and of the value of Aboriginal knowledge means that partners in ALM projects and activities generally recognise the importance of Aboriginal engagement and of supporting achievement of Aboriginal land managers' own goals. However, power imbalances can readily subvert their intentions, such that Aboriginal land managers' goals become a secondary consideration to the goals of a conservation funding program (Section 6.2). This outcome reduces the likelihood that engagement in ALM will promote Aboriginal people's sense of control or coping and their capability. The stress generated has adverse flow-on impacts on health and wellbeing outcomes. Hence an important principle for health and wellbeing outcomes from ALM is that partnerships need to give priority to doing things that all parties agree as important. Often these things will be the aspirations of Aboriginal people for management of an area, which are linked to livelihood outcomes.

Giving priority to doing things that all parties agree as important can also be a strategy to ensure that management is being clear and specific about priorities. It can encourage some attention to monitoring, since clear management priorities lead to questions such as 'How do we know how well we are doing?' and 'Have we achieved what we set out to do?'. Over time, as partners build relationships and awareness of achievements and barriers, other areas of emphasis in management are likely to emerge, addressing issues that were not an initial priority. Social network theory would predict such an outcome as the new social relationships that develop among people who are involved in partnerships foster sharing of information and perspectives, supporting innovation in management.

Such processes need to recognise that scale has an impact on how different people perceive issues, who they consider needs to be involved in decisions, and on the scope of partnerships. For example, local people may see management of an IPA as a localised activity and want to use it to build partnerships with local organisations, whereas regional and national agencies see the involvement of other higher level agencies as important (Box 19). Differences in the spatial and temporal scales at which the

various values of Aboriginal lands are perceived by different parties need to be acknowledged so that parties can work to a congruent understanding. Deliberative processes are important, where parties communicate about and exchange information, observations and views about issues, and negotiate and consider the likely consequence of actions and potential trade-offs (Berkes 2007). Such processes clarify understandings of the appropriate roles and responsibilities of various parties as well as providing a foundation for agreement about shared priorities. ‘Sitting down’ together is an ALM metaphor for such processes (Box 17).

Deliberative processes are fundamental to the development of collaborative adaptive management. They inevitably require long time scales for trust to develop among parties and for the cumulative outcomes from cycles of deliberation, planning, action and learning to become apparent to the people involved. To be effective participants in such processes, Aboriginal land managers need access to the time and resources to work out what they see needs to happen in ALM, such as through visits to country where there may not be a clear ALM purpose or agenda worked out in advance. It needs to be recognised that deliberative processes among Aboriginal people may be no less complex and demanding than those among potential ALM partners. Yet they are equally important if partnerships with clear agreed and shared objectives are to result.

8. Conclusion

We have developed a set of four principles that, if fully respected in ALM systems, will promote health and wellbeing outcomes for Aboriginal people from their engagement in ALM. Our concern is to support the development of ALM systems that are sustainable over time, that generate livelihood outcomes that desert Aboriginal land managers aspire to, and that also integrally support the maintenance and enhancement of ecosystem services. ALM is an important pathway for achievement of both health and environmental outcomes, through scoping economies. In order to realise this potential it is important that ALM appeal to motivations of Aboriginal people for engagement in land management. These relate strongly, though by no means exclusively, to customary and cultural resource management activities.

The Livelihoods inLand™ principles are:

- ALM governance recognises and respects Aboriginal custom and tradition and is adaptive
- Learning is embraced as a life-long process
- Relationships are recognised as very important
- Partnerships give priority to doing things that all parties agree are important.

The principles draw on findings from varied research components of the Livelihoods inLand™ research and from literature across a number of domains of theory and practice. They have been developed inductively and aim to be general principles rather than specific prescriptions or standards for best practice.

The principles are important in promoting Aboriginal land managers' 'sense of control', coping or capability which is important in managing psycho-social determinants of health and, through this pathway, are fundamental to health and wellbeing outcomes. They are congruent with the world view or ontology of desert Aboriginal people. They also provide a basis for adaptive approaches to governance and for collaborative adaptive management, which are important for the capacity of ALM systems to operate effectively in conditions of social and ecological change.

The Livelihoods inLand™ principles may be considered an early stage in the development of a certification scheme for ALM. At this time the benefits of developing a formalised certification scheme for ALM are not clear or compelling, given its costs. Nevertheless, overt recognition of these principles and attention to their application by people and organisations involved in ALM will contribute to promoting confidence that ALM is supporting social development.

9. Summaries from Livelihoods inLand™ research

The following boxes provide summaries of findings and insights relevant to the above principles from studies conducted under the umbrella of the Desert Knowledge CRC Livelihoods inLand™ project (see Methods, Section 1.5).

Box 9: An adaptation of the sustainable livelihood framework to the planning context of desert Aboriginal people

Authored by Michael LaFlamme based on LaFlamme (2007, 2010a, In press)

Holistic concepts and frameworks are useful tools to enable Aboriginal people and those who work with them to explicitly see the effect of power imbalances and to work more equitably to solve specific land management problems. To support this process, I adapted the sustainable livelihoods framework to make it more applicable to planning and management in a desert Aboriginal context.

The sustainable livelihoods framework has been found effective for designing livelihoods in many countries (Hussein 2002). Desert Aboriginal groups have their own frameworks to frame problems and work through solutions. These are in stories and sometimes in visual representations (Hogan 2006, Pawu-Kurlpurlurnu et al. 2008, Turner 2005). They typically emphasise the same kinds of interactions as are encapsulated in the sustainable livelihoods framework. While Aboriginal frameworks may appear visually simple, they contain many layers of meaning in the associated stories (e.g. Dobson et al. 2009).

Well-developed skills are needed to address the wide range of problems that impact on contemporary societies. Customary Aboriginal problem-solving skills, based on stories and visual representations, can be developed further if people who work with Aboriginal groups give those groups more decision-making power (e.g. Cornell 2006). Often this does not happen, as Rose Kunothe-Monks has pointed out:

... everyone else is trying to think of the solutions for us instead of resourcing us to learn lessons and make mistakes on our own. (Kunothe-Monks 2006)

International experience has shown the importance of 'paying much greater attention to the changes needed in the non-Indigenous environment, to create genuine and trusting partnerships' (Hunt 2005, p. 26). The Desert Livelihood Framework has been developed as a tool for people to work in an equitable way to identify directions for sound partnerships, including through changes in non-Aboriginal environments.

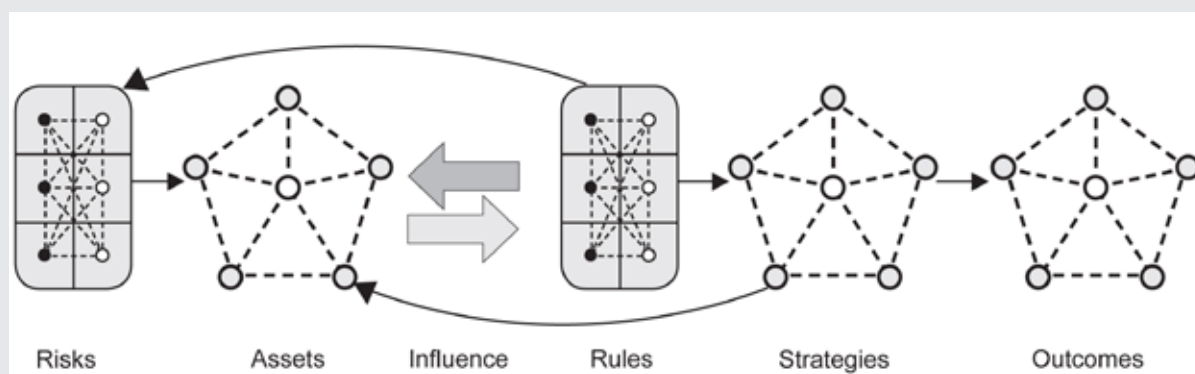


Figure 6: Desert Livelihood Framework

See text for explanation of symbols

Figure 6 is a visual representation of the Desert Livelihood Framework, drawing on the international sustainable livelihoods framework and on desert Aboriginal frameworks. Its design encapsulates the idea that Aboriginal values of language and culture are livelihood assets, while at the same time being strategies and outcomes. This categorisation of assets, strategies and outcomes also corresponds with principles of desert ecology and rangeland science (LaFlamme 2010a). The design of the rules and risks icons indicates visually that these are important areas for inter-cultural analysis: the two columns and three levels in these icons indicate the complexity of working across multiple levels and across cultures to both make rules and reduce risks.

For development of sustainable livelihoods for remote Aboriginal people through land management activities:

- Assets need to be recognised as including land, law, language, ceremony and kinship
- The influence of culturally knowledgeable people is critical
- Rules need to allow people to use their cultural assets
- Strategies need to be designed to put those cultural assets into action
- Outcomes from such strategies will strengthen those cultural assets
- Risks posed by the external environment include the dominance of mainstream cultural values.

Applied in practice in community-based planning processes, this framework has helped some Aboriginal groups identify critical obstacles. For example, one Aboriginal group wanted to put their knowledge (asset) into practice (strategy) to strengthen that knowledge (outcome) but was not able to because government rules did not prioritise that strategy. Through discussions based around this framework, the group identified 'low influence on government rules' as the main obstacle in the system.

In another example, staff of a local agency worked through a problem using the Desert Livelihood Framework as a tool. They came to recognise that their service delivery program was not improving outcomes for local livelihoods because it did not engage Aboriginal people in culturally meaningful livelihood strategies that strengthened Aboriginal cultural assets. A different program in the same community consistently sustained good outcomes by engaging local people in designing and re-designing effective strategies that also respected cultural assets.

The Desert Livelihood Framework is a way to more systematically design locally meaningful livelihoods in a way that recognises that livelihood concepts differ among cultures. It is a tool to enable outside brokers and Aboriginal groups to discuss possible livelihoods, examine inter-cultural power relations, and design meaningful livelihood strategies that have good prospects of being sustained long enough to achieve desired benefits.

Box 10: Improving livelihood outcomes is the primary motivation for Aboriginal engagement in land management

Authored by Karissa Preuss, based on Preuss (In prep)

Livelihood outcomes, including knowledge, employment, health and wellbeing, are key motivations for Warlpiri people to be involved in ALM.

Consistent with international and other Australian research (Agrawal & Redford 2006, Berkes 2006a, Berkes 2007, Borrini-Feyerabend et al. 2004, Rose 1995), my research found that local Aboriginal people and Western land managers have very different motivations, perceptions and values regarding land and the role of conservation programs. Throughout the research, which involved a case study with Warlpiri people from Yuendumu, Warlpiri people demonstrated a high level of interest in collaborative land management, including the local ranger program and Indigenous Protected Area (IPA) development process. However, their motivations for getting and remaining involved were predominantly due to perceived improvements in livelihood outcomes. Natural resource management issues, such as weeds, threatened species and feral animals, were only a small part of the impetus for Warlpiri participation in ALM.

The key factors motivating Warlpiri engagement in land management elucidated in this research include knowledge transfer, improved health, increased sense of wellbeing, meaningful employment, and maintaining responsibility to country. Each of these factors are briefly described below.

Knowledge transfer: The opportunity that land management provides for inter-generational transfer of cultural and ecological knowledge was found to be a fundamental reason for Warlpiri participation. Throughout this research, Warlpiri people expressed serious concern about the loss of culturally embedded knowledge of country, and hope that collaborative land management programs can address this. An elder, who regularly participates as a supervisor in land management activities explained, 'We gotta show 'im, young people and ranger, how to look after country ... [They have] got to know ... who's owner, where's that soakage place, *yapa* [Warlpiri] names ... everything, we can show them. And when we pass away they can look after ... It's most important.' Young people, including rangers, also described Warlpiri cultural and ecological knowledge as 'most important', and stated that learning this from elders is a key reason for their involvement in land management activities.

Improved health: A perceived improvement in health outcomes was highlighted as a key motivation for Warlpiri people's participation in collaborative land management. Research participants expressed, 'Working on country is a good life for *yapa* [Warlpiri people], it makes us strong, happy, healthy and strong' and 'ranger work ... [is] good exercise, I always walk around ... come back feeling more light.' Land management is also seen to improve health outcomes through reducing substance misuse. One Warlpiri ranger described, 'When I do ranger work, I don't worry for grog, I worry for work.' Warlpiri people of all ages, including many who do not drink at all, highlighted the important role of land management (particularly activities involving elders) in reducing the pull to 'go drinking in town'.

Improved wellbeing: Land management is seen to promote an increased sense of self-esteem, identity and wellbeing. This is an important reason that Warlpiri people undertake these activities. Permanent rangers often made comments such as 'it makes me feel proud to be a ranger'. Other research participants who engage in land management in less formalised ways explained, 'You know where you belong when you are out bush'. Research assistants described their observations that old people, who appear sick and incapacitated in the community, 'liven up' and 'feel free' when they are out on their traditional country.

Meaningful employment: Land management, and particularly ranger work, is seen by Warlpiri people of all ages as a promising livelihood pathway. Increasingly, Warlpiri people are valuing 'real jobs', particularly those that enable traditional knowledge to be valued and utilised in a contemporary context, such as land management. As one of the Warlpiri rangers described, '*Yapa* (Warlpiri people) like to work ... do a job they like ... ranger is a good job'. Elders are also keen to see their young people employed, particularly in jobs that 'look after country'.

Maintaining responsibility to country: Finally, looking after country and maintaining responsibility to country is an important motivating factor for engagement in land management activities. For example, while describing the multitude of benefits gained personally from his work as a Warlpiri ranger, one young man said, 'If it's true government will give us money to look after my grandfather's country, I want to do that'. Over the period of research, Warlpiri people involved in the Southern Tanami IPA development process have demonstrated ever-increasing understanding and concern for natural resource management issues, such as weeds and feral animals, and described how they want to see these threats to country addressed by rangers. Additionally, elders often explained that their interest in collaborative land management is an attempt to carry out their traditional responsibilities to country, largely related to the inter-generational transfer of cultural and ecological knowledge.

Part of the reason Warlpiri people value, support and participate in collaborative land management is to 'look after' and fulfil their traditional responsibilities to country. However, my research indicates that livelihood outcomes may be a more significant motivating factor for Warlpiri people's engagement in land management. These research findings highlight the inter-related nature of livelihood and environmental systems in a Warlpiri worldview. A 'two way' approach to land management, which values and recognises Aboriginal approaches to country and takes into account Warlpiri motivations for involvement, is a critical success factor for promoting either social or environmental outcomes through collaborative land management activities.

Box 11: Working towards a common agenda?

Authored by Jane Walker, based on Walker (Submitted)

Differences in stakeholder values and interests in managing country are evident in Aboriginal managed protected areas. Research carried out on the Northern Tanami Indigenous Protected Area (IPA) clearly depicts that diverse values create multiple management interests which, in most cases, do not align between key stakeholders. For Warlpiri people the health of country is intertwined with people and underpinned by values of cultural tradition, identity, emotional and physical wellbeing, and spiritual connection. This worldview directs how Warlpiri people understand, interact and manage country. It is based on being able to access and use the land and its resources. As such, the Warlpiri research participants have interests in the IPA because it provides for improved support and recognition of Warlpiri management of country and can help promote livelihood opportunities.

In comparison to this, nearly all agency staff interests were underpinned by the need to maintain or improve the ecological value of the Northern Tanami IPA. Their interests, including building the National Reserve (protected area) System (NRS), improved biodiversity conservation, information brokering and training, whole-of-landscape management, and partnership creation, all focused on the need to protect and enhance the biological diversity and landscape function of country within the IPA. Even their interest in engaging with and meeting Aboriginal aspirations for country was underpinned by the ecological benefits from incorporating Warlpiri traditional knowledge and skills in management practice. All of these interests were considered by agency staff to be significant at the national level for the creation of a comprehensive, adequate and representative NRS. Agency staff were aware that cultural, social and economic benefits were being generated at local and regional scales through the IPA. These outcomes were a stronger priority for staff of Central Land Council (CLC) than they were for staff of the Australian Government's Department of the Environment, Water, Heritage and the Arts (DEWHA). They were reflected principally through CLC interests in improved community development, sustainable livelihoods and partnership creation.

The above discussion indicates that diversity exists because management interests are underpinned by differing value systems and are significant for different stakeholders at different levels. Such findings are common in broader literature on Aboriginal resource management in Australia (e.g. Howitt 2001, Nursey-Bray 2009, Ross et al. 2004, Sithole et al. 2008, Suchet 2001). Of the above mentioned management interests, the only one common to the three participant groups in the research (Warlpiri people, and CLC and DEWHA staff) was *support Warlpiri management of country*. This finding is significant because agency staff and Warlpiri people need to be able to work together to overcome differences in management interests and achieve multiple agendas. One of the best places to start would be where interests overlap. Research on the IPA has shown that the one area of interest that local people and agency staff agree is important, that is, Warlpiri management of country, is little reflected and supported within management to date.

Box 12: Knowledge and its impacts in Aboriginal land management

Authored by Michael LaFlamme based on LaFlamme (2010a, In press)

My research with Aboriginal families and communities has focused on working with them to design strategies to put their own ideas into action. It seems that a more common approach is that Aboriginal aspirations are moulded to fit the objectives of agencies or programs. The difference lies in the question of whose aspirations and cultural knowledge drive the planning and partnership.

Due to a long history of social exclusion in Australia the complex management roles involved in coordinating ALM projects are not an option for most desert Aboriginal people. However, they invariably use their skills and knowledge to emphasise their own aspirations in ALM through:

- skills: demonstrations of how to find bush food, game and water; the tools and skills to find and prepare food; and how to identify and use medicine
- knowledge: people with cultural authority telling accurate stories of the plants, animals and places
- family: the 'right people' get involved in telling those stories; sharing knowledge with youth and with the public; and sharing bush food, medicine, game animals and water with others.

Traditional skills, knowledge and relationships have a beneficial effect on health and wellbeing because they support meaningful relationships among people and their social-ecological environments. Desert Aboriginal leaders commonly want to strengthen the role of Aboriginal 'bush' knowledge because they have seen that this catalyses a chain of connected outcomes for wellbeing. This chain is illustrated in Figure 7, and compared with the chain of outcomes from what the people involved called 'town' knowledge, which came out of their experience of colonisation and mainstream culture. Leadership by experienced people is the key to making the transition.



Figure 7: Long-term effects of 'bush' knowledge compared with 'town' knowledge on desert Aboriginal wellbeing

Model developed in consultation with the Aboriginal-led Walkatjorra Rangers and Walkatjorra Art Centre (WA)

In my research on communicating knowledge and youth engagement with five desert Aboriginal communities in three language areas (LaFlamme In press), Aboriginal leaders indicated that 'bush' knowledge of relationships among people, places, plants and animals provides benefits across multiple levels:

- For families, sharing knowledge is the heart of Aboriginal identity. Parents are concerned that young people learn their dreaming so that they know who they are, where they are from, and are aware of their leadership responsibilities
- For service organisations, knowledge of bush food, medicine, land and law contributes to distinctive Aboriginal roles in clinics, shops, schools, media, law enforcement and other services
- For communities, working with adults to design livelihoods that value their unique cultural knowledge is a strategy to sustain local employment
- For regions, sharing knowledge among Aboriginal communities, such as through video, develops the confidence of small settlements that they have the knowledge to address their challenges.

The unique situations in each community require elders and adults to creatively adapt traditional knowledge to changing local contexts. However, the far greater challenge is to engage residents in putting that knowledge into action. Some local agencies marginalise local authority by providing well-paid employment to local adults without taking into account the extent to which those employees have cultural knowledge or respect for elders. A major opportunity for leadership continuity is thus lost. It is important that agency staff talk to and listen to local people about how the outcomes they are seeking can be achieved in ways that also strengthen cultural knowledge and local leadership.

Box 13: Involving Aboriginal elders in land management activities promotes both environmental and wellbeing outcomes

Authored by Karissa Preuss, based on Preuss (In prep)

ALM can support both environmental and livelihood outcomes if senior traditional owners are employed as land management educators, supervisors and mentors. My research, based on a case study with Warlpiri people from Yuendumu, found that involving the 'right' senior traditional owners in ALM is a key factor in creating a genuinely 'two-way' approach to land management.

The need for Aboriginal community-based rangers to learn environmental knowledge both from their elders and from Western science is widely acknowledged (DEWR 2007, Christie 2007, Muller 2008b, Northern Land Council 2006, Putnis et al. 2007). However, this has not always been achieved in practice (Sithole et al. 2008). My research shows that Warlpiri people consider paid roles for elders in ALM to be a priority issue.

Throughout this research project, Warlpiri people were adamant that their 'old people' have extensive environmental skills and knowledge to pass on to younger land managers. A Warlpiri man described how, 'The right traditional owner ... [*kirda*] and right *kurdungurlu* [traditional managers] always got to be there. Always ... not just *kardiya* [non-Aboriginal people] always coming in to do the job, we need *yapa* [Warlpiri people] to educate our young people.' This quote demonstrates how traditional owners feel a right and responsibility to be involved in all land management activities that occur on their traditional country. It also highlights that traditional ownership is not a straightforward concept, given the complementary responsibilities of *kirda* and *kurdungurlu*. Many participants in this research were quite angry about the low level of senior traditional owner engagement in previous ALM work in the region.

Employing elders as land management educators is an important step towards a 'both ways' approach to ALM, in which Warlpiri ecological knowledge is valued and utilised as an essential part of the approach. To be successful land managers on Warlpiri country, Warlpiri people believe that rangers must have a minimum understanding of Warlpiri ecological knowledge that is embedded within cultural frameworks. Warlpiri people, including the rangers, consider that this education about country from senior traditional owners is equally as important as Western land management training. For example, a Warlpiri ranger stated:

We need training from [our] old people and kardiya [non-Aboriginal people] ... For training from kardiya, we can learn about GPS and other things too, like cybertracker. We can learn from old people tracking, and names for plants and animals ... jukurrpa, and other things yapa way ... It's got to be both ways.

Employing elders in ALM is considered to be an ideal and necessary strategy to support rangers' work in looking after country.

Warlpiri people often focus on health and wellbeing benefits when discussing the importance of elders' involvement in ALM. Given the intrinsic links between environmental and livelihood factors in the Warlpiri worldview, Warlpiri people believe that the intergenerational transfer of cultural and ecological knowledge can provide young people not only with better skills to manage country, but also better skills for managing life. One community leader stated, 'When young people are out bush with old people they learn about their culture ... Culture is most important ... for country ... for everything ... Without their culture they've got nothing. They'll be lost ... they'll just go drinking in town.' Young people who are engaged in ALM also describe an increased sense of health, self-esteem, identity and wellbeing associated with working out on country, particularly when elders are involved.

Collaborative land management is increasingly being seen as a meaningful livelihood pathway, which enables traditional knowledge to be valued and utilised in a contemporary context, for both social and environmental benefit. Employing elders as educators and supervisors in land management activities is a critical success factor for land management programs to promote not only improved environmental conditions, but also enhanced health and wellbeing outcomes.

Box 14: Stories inLand: Recording knowledge to support bio-cultural diversity

Authored by Michael LaFlamme, based on LaFlamme (2010b)

Stories inLand was a research project supported by RIRDC that demonstrated how inexpensive video can be an effective tool for peer-to-peer sharing of information among remote Aboriginal land managers. It showed the value of that communication for improving the effectiveness of ALM in remote communities. The project was particularly effective in engaging young people with elders.

Because significant desert biological and cultural diversity has been lost since European settlement of desert Australia, it is urgent for desert people to share and strengthen their knowledge of lands, plants and animals across generations. Use of video technologies provides a new stimulus for Aboriginal people to engage together in teaching and learning this knowledge in the bush and to share this knowledge in other settings. As a social media, video also brings families together in ways that are intrinsically motivating to all generations. In these ways video technologies stimulate sharing and intergenerational transmission of knowledge that is important for maintaining bio-cultural diversity (Harmon & Maffi 2002).

This research project developed collaboratively with PAW Media and Aboriginal participants. It involved:

- Engaging families in desert Aboriginal communities as participants and identifying their specific objectives for involvement
- Making videos by collaborating in a way that addressed all participants' objectives, involving young people as video makers to film elders' demonstrations of particular aspects of their knowledge
- Screening the videos to participants and other community members, and discussing them in order to identify the objectives that were achieved.

In the process of making the videos and in viewers' responses during screenings, close linkages were apparent between using video to communicate information and to improve practice. Participants also identified links among the personal objectives they had identified for participation and talked about how making and viewing the videos contributed to those objectives. From their discussions, seven important areas for future practice were identified: teaching *jukurrpa* ('dreaming', creation time, or customary law) stories on country to show the big picture; sharing knowledge of country with other communities and cultures up to the national level; teaching on country about places, histories and how to protect them; addressing young peoples' desires to learn culture in active ways on country; involving everyone together on country in their correct responsibilities; teaching on country about food and medicinal plants and animals; and preserving knowledge, language and culture for future generations.

Young people were motivated to participate in each action in the video production process: to work with researchers they liked; to go on adventures to important places with their families; to learn new knowledge from family members; to learn useful video skills; to develop their own 'voice' by making all production decisions; to make videos that share knowledge among communities; to communicate the value of Aboriginal knowledge across Australia; and to be paid fairly for their work.

The key recommendations from the project were that elders, adults and community service organisations need to work more as an inter-dependent system to strongly value Aboriginal culture in order to build the knowledge base of young people, and to use video as a key technology to record and share knowledge. Production of videos by families on country enabled the sharing and recording of traditional knowledge and motivated young people. However, sustaining that motivation, and the knowledge itself, requires that elders' knowledge and youth multi-media skills have a stronger place in the practices of all organisations. Steps to this goal include:

- Government and business cooperate with elders to mentor and employ young people in remote communities to produce archival-quality media and to distribute it through a network of local 'keeping places'
- Elders and adults work with each other and with community services to identify and teach young people how Aboriginal knowledge applies in all community livelihoods
- Community services work with each other and with elders to create livelihoods for culturally knowledgeable young people and to prioritise their employment.

Box 15: Local elders and their knowledge support community engagement with schools

Authored by Josie Douglas based on Douglas (In press)

Language and culture programs in remote schools are facilitated by Aboriginal teaching staff and respected Aboriginal elders. Aboriginal families and community members are much more likely to become involved in school-based activities when a strong language and culture program exists in the school.

National research strongly supports the intrinsic education benefits of schools and education systems involving Aboriginal parents, families and communities in school activities (MCEETYA 2006). However, the willingness of schools to comply with policy that supports such involvement has been patchy and dependent on the goodwill of school principals (Gray & Beresford 2008, p. 215, Hoogenraad 1994). The pressing need to maintain language and culture has resulted in Aboriginal people calling for more formal or institutional ways to keep language and culture strong through schools (Hoogenraad 1994, McConvell & Thieberger 2001). In the NT, pedagogy that is particularly used in remote schools is referred to as 'two-way' (Harris 1990). Aboriginal people believe that two-way education should accord equal value and status to Aboriginal knowledge alongside Western knowledge, and to classroom use of the language that children speak at home. The involvement of local elders is critical to two-way education. However, elders' involvement is dependent on whether or not the community school supports and resources an Indigenous Language and Culture (ILC) Program.

My research at two remote schools in the southern NT found that local elders have an important role to play in ILC Programs. Based on the involvement, or non-involvement, of elders in the school, Aboriginal community members judge the 'health' of the school environment and whether non-Aboriginal staff respect local people and their values. ILC Programs are the main way for elders to have meaningful involvement with school activities. Local elders are critical for 'strong language learning' and the inter-generational transfer of traditional ecological knowledge. Social relations are integral to the way remote communities understand and interact with the school in their community. Elders' involvement in ILC Programs also brings the respect of other community members to the school.

ILC Programs provide a practical way of building tangible partnerships between the school and the local community that directly relate to Aboriginal aspirations for education. In the remote context, ILC Programs enable a school to become part of and accepted by the community by positively and actively responding to community priorities. Aboriginal teaching staff rely on elders for support, governance and in-depth cultural knowledge. A strong recurring theme from both the case study sites involved in my research was concern among Aboriginal people for future generations: if children aren't taught properly now, they won't have 'strong language' or 'strong culture' to teach future generations. Elders are critical for teaching 'strong language' and 'strong culture.'

There are positive flow-on benefits to all aspects of school education when schools have local ownership and input and when language and culture is well supported and resourced in schools. For example, the first 'Willowra School Family Reading Night' in 2008 attracted over 120 people, about a third of Willowra's population. Activities included a session on 'Reading with your children' or 'Pinajarrinjaku Riitimaninjaku Ngurrangkaku' giving parents practical steps to encourage and help children with reading at home. Willowra teaching staff directed children, parents, grandparents, uncles, aunts and siblings into classrooms to listen to students read and to play reading games. This was followed by a presentation of a book bag to each student to take home for more reading practice. Such a strong community turnout was a result of a well supported ILC Program and an attitude that 'the elders run the school'. A community learning atmosphere was evident.

I have found that the involvement of elders is essential for building and maintaining strong school and community partnerships. When elders are involved in ILC Programs, tangible and valued community partnerships eventuate, with a range of benefits relating to engagement with the school academic program. Such partnerships are realised through relationships between elders, Aboriginal teachers and school teaching staff.

Box 16: Sharing knowledge to develop relationships

Authored by Michael LaFlamme based on LaFlamme (In press)

Desert Aboriginal groups prioritise family relationships. As they see it, building land management knowledge through durable relationships is essential for sustaining results over the long term.

Aboriginal land management involves sharing knowledge between people and country through language in songs, stories and dance. For this knowledge to sustain social order it is critical to have the 'right people' involved: those who have accepted their traditional responsibilities for country and have the knowledge to fulfil those responsibilities. In land management, this may include having representatives from each moiety who will work together in a team.

In this kinship context, facilitators, coordinators or researchers from outside the local group have responsibility to share their organisation's knowledge about land management, education, health, infrastructure, and other skills that communities need to sustain livelihoods. This knowledge includes the nature of the assets that they control, who controls which assets, how rules are made, which strategies are allowed, the intended outcomes of those strategies, and how various of these factors impact on a community's vulnerability to risk. Information transparency enables local people to be engaged as partners in designing livelihood strategies that benefit their community.

Aboriginal elders frequently emphasise the importance of people from outside the community sharing their knowledge in a friendly way to build the ideal community. One person described that community to me as 'One family, one system; being friends together, sitting down to make one decision'. The Wikipedia definition of friendship is also apt: 'A cooperative and supportive relationship between people ... which involves mutual knowledge, esteem, affection, and respect along with a degree of rendering service to friends in times of need or crisis'. In this context of friendship, successful community-based organisations share the knowledge that local people need to build their capabilities for long-term control.

I have observed the frustration of Aboriginal leaders when staff of agencies withhold important information from community members or when they only present information to community members after key decisions are made in their own organisational hierarchy. These 'unfriendly' strategies are particularly evident in major funding decisions. As one Aboriginal leader described it to me, 'government gives with one hand while holding the other behind its back'. These are both examples where people from outside a community who are in broker roles effectively exclude local people from applying their own creativity to problems. Paradoxically, by maintaining control, such people in effect accept responsibility for solving local problems. The consequence is that outside staff often remain frustrated by the political challenges of achieving their organisation's goals, while indicators associated with those goals remain poor.

Conflicts between the 'transaction-based' cultural values of mainstream organisations and the 'family-based' values of Aboriginal communities are a challenge for all people in remote communities. This complex problem can be approached through improved communication, involving all people involved in ALM sharing their views of the whole livelihood system. In the short term, such transparency can help to make cultural conflicts explicit. It allows individuals to share their different criteria for making decisions, and can encourage collective action in spite of uncertainty and mistrust.

However, in the long term this cultural conflict can only be resolved with much greater numbers of Aboriginal people in the key roles of facilitators and coordinators for ALM. Thus it is necessary that organisations prioritise the training of Aboriginal staff and that communities help redesign those roles to increase their effectiveness.

Box 17: 'Sitting down together': Increased cross-cultural dialogue and decision making

Authored by Karissa Preuss, based on Preuss (In prep)

The process of Aboriginal and non-Aboriginal land managers participating in cross-cultural dialogue is important for ALM to promote health and wellbeing outcomes.

My research found that effective cross-cultural dialogue and decision making, which Warlpiri people often refer to as 'sitting down together', has a significant impact on the ability of ALM to generate social and environmental outcomes. The importance of 'sitting down together' and prioritising cross-cultural discussion as part of ALM may seem obvious. However, research shows that this has not always been achieved in practice (Berkes 2007, Borrini-Feyerabend et al. 2004, Sithole et al. 2008). Warlpiri people also consider that cross-cultural interactions regarding land management have not always been as effective as they would like.

In this study, Warlpiri people repeatedly referred to the importance of 'sitting down together' as a short-hand phrase to describe Warlpiri and non-Aboriginal staff working collaboratively to plan, develop, implement and evaluate new land management activities; to respond to concerns; and to resolve differences of opinion or any other issues that arise. One Warlpiri elder stated:

We need to sit down together, yapa (Warlpiri people) and kardiya (non-Aboriginal people) ... We don't want kardiya to come in with their own picture already painted about how things are going to be. We need to sit down and paint it together, yapa and kardiya together ... talk about what we want that picture to look like and ... make it happen ... sit down together, talk together ... work together.

This research highlighted the importance of adaptive management, including local management committees, community-based land management coordinators and on-country planning trips in promoting positive cross-cultural working relationships.

'Sitting down together' and participating in effective cross-cultural dialogue is a critical success factor for land management activities to promote social and environmental outcomes.

Box 18: Pressures of leadership within management structures

Authored by Jane Walker, based on Walker (Submitted)

Leadership by individuals within agencies is a key part of ensuring strong management processes in ALM, including through knowledge exchange and relationships. Within the Northern Tanami Indigenous Protected Area (IPA), it is the IPA Coordinator who is the intermediary between Warlpiri people, the Central Land Council (CLC) and the investing government agency, the Australian Government Department of the Environment, Water, Heritage and the Arts (DEWHA). If the coordinator is not an effective leader, the structures and processes to support cross-cultural co-management will not emerge and power imbalances occur (Cash et al. 2006). The role of the IPA Coordinator is therefore critical to the management success of the IPA.

As my research on the Northern Tanami IPA shows, power imbalances exist in the IPA governance structure. For example, the IPA management committee, which is the body that represents Aboriginal land owners of the IPA in management planning and decision making, actually has limited autonomy and control. The IPA Coordinator, on the other hand, is in a position of great power. This position is the link between all the management layers and is critical to the success of each layer in achieving their aspirations and being able to work collaboratively together. At present the IPA Coordinator is expected to be able to represent CLC at the regional level, DEWHA interests at the national level, and community concerns and interests at the local level. The level of responsibility and reliance on this one position has led to management vulnerability within the Northern Tanami IPA. For example, while I was carrying out research in the Northern Tanami IPA there had been two changes in Coordinators. This made the program inactive for months at a time. This occurred principally because of under-resourcing, limited on-ground support and extensive job requirements. It has also occurred through limited on-ground engagement of regional and national agency staff to build relationships and to represent and negotiate their own priorities in management. It is important therefore to recognise that individuals in leadership positions are invaluable in cross-cultural management settings, and that these positions need to be properly supported so that management vulnerabilities are reduced.

Box 19: Issues of scale in collaborative management arrangements

Authored by Jane Walker, based on Walker (Submitted)

The scale at which stakeholder values are perceived needs to be acknowledged if collaborative management arrangements are to be effective. In the Northern Tanami Indigenous Protected Area (IPA), I have found that scale impacts on how stakeholders view management roles and responsibilities and partnership creation.

Firstly, Warlpiri people and agency staff had some different opinions on key management stakeholders. For example, Warlpiri research participants did not identify the Australian Government Department of the Environment, Water, Heritage and the Arts (DEWHA) as a stakeholder in IPA management, even though DEWHA is the main funding agency. Neither agency staff (from DEWHA and Central Land Council) nor Warlpiri people identified Central Land Council (CLC) as a stakeholder. Rather, the role of CLC was intertwined with that of the IPA Coordinator, which is hosted by CLC. However, CLC has other important interests and influences in the IPA stemming from its statutory functions. In the adaptive co-management literature, the CLC would be considered a bridging organisation. It brings together differing institutions, levels of knowledge, information and resources in order to create management opportunities based on trust, social learning and collaboration (Berkes 2009b). Properly, CLC should be considered as a stakeholder in its own right.

Secondly, the research participants saw stakeholders as relative to their own scale of management interest. For Warlpiri people, stakeholders were people or organisations who Warlpiri people interacted with on a regular basis, or who they wanted more support from to manage country. These were locally based organisations. For example, the Wulain Resource Outstation Centre is an Aboriginal-owned organisation in Lajamanu that Warlpiri community-based rangers and traditional owners work collaboratively with to manage outstations. Similarly, Warlpiri people wish to work more closely with the local school (Lajamanu Community Education Centre) in the future. The stakeholders that Warlpiri people identify also reflect their specific individual interests in managing country and their locally based relationships. In contrast, staff of DEWHA and CLC identified a broader range of government departments and organisations as stakeholders. These included Australian Government and Northern Territory Government departments, and a suite of local and regional partners. These stakeholders were seen as being able to provide support and resources to help improve management.

Differing scales of interest come about because people are part of different institutions with differing rules and norms that influence and inform how management decisions are made (Ostrom 2005). In this research the cultural value of country underpinned Warlpiri interests and decision-making processes, whereas it was the ecological value of the IPA and the organisational mandate of agencies that influenced the management interests and decision-making of DEWHA and CLC staff (see also Box 18). Due to such diversity, collaborative management arrangements need to be managed as multi-scale systems. If this is not recognised, understood and valued, uninformed and inappropriate management interventions result (Berkes 2006b).

Box 20: Community management? Community benefit?

*Authored by Jocelyn Davies
drawing from Brahim (2007), Anderson-Smith (2008),
Kate Brahim pers. comm. 2007–08, Bronnie Anderson-Smith pers. comm. 2007–08*

Aboriginal land management is criticised by some local Aboriginal people because benefits do not go to the whole 'community'. This was the case in two IPAs in semi-arid regions where Livelihoods inLand™ research explored livelihood benefits. In each case the workload of decision making, and investments of time for planning and problem solving were being undertaken by people from one family group. Livelihood benefits were flowing mostly to members of those families. These benefits included employment; learning new skills; a chance to reconnect with family, culture and environment, relax and recharge; a stronger sense of mutual trust and belonging; and pride in a growing reputation for what they have achieved in restoration of the environment. Aboriginal people from other families found it hard to access the areas due to lack of suitable vehicles in one case and to social barriers in the other case – a feeling that they were not welcome or were not invited. This limited their benefit from the area and generated social tensions. In one of the areas, some of the tensions stemmed from frustration among members of the involved family that people from other families would not get involved in the IPA management, in spite of their efforts to encourage broader involvement. In both cases public communications that portrayed the IPA as benefitting the whole 'community' was an underlying factor in the social tensions, since local critics considered that it benefitted only one family.

Box 21: Sustained employment of Aboriginal people at the Alice Springs Desert Park

Authored by Fiona Walsh adapted from Walsh and Davies (In press)

The Alice Springs Desert Park has achieved and sustained a high level of Aboriginal employment compared to most other Australian government organisations and the Australian private sector. For more than 10 years, between 20% and 25% of its staff of about 50 people have been Aboriginal people. They include Aboriginal people who have previous work experience, elders with strong cultural knowledge, and young Aboriginal people being introduced to a workplace culture through apprenticeships and traineeships.

Procedures that support Aboriginal employment at the Alice Springs Desert Park were found to be determined by three major pathways. One pathway had steps similar to a performance management system that has been widely used in the mining industry. These steps aligned to leadership, policy, planning, implementation, monitoring and review of progress stages. A second parallel pathway derives from the Park's core business to authentically and appropriately interpret the Aboriginal culture of central Australian environments to visitors. This was the initial reason for the Park to develop Aboriginal employment and it continues to be a strong driver. A third pathway derives from the wide involvement of Aboriginal people in diverse roles at the Park and in community projects. This contributes to the positive views that Aboriginal staff have of their employment. Apart from Aboriginal staff, Aboriginal people are involved in the Park as *apmereke-artweye* (traditional owners), correctional services inmates on work assignments, artists, school students and visitors. *Apmereke-artweye* are particularly important. The Park's mission statement identifies the cultural importance of the land to Arrernte people. This carries through to the workplace: through their culturally prescribed roles, traditional owners advise, validate and reinforce the work roles of Aboriginal staff.

Aboriginal staff particularly value the opportunity that employment at the Alice Springs Desert Park offers them to present, learn and re-engage with their cultural knowledge about land, plants and animals. In the wider context of rapid cultural and language fragmentation, this rationale needs to be more strongly recognised and supported. They also value:

- working in a place that supports learning and professional development
- the congruence between work that involves interpreting Aboriginal culture and natural environments and their own personal life experiences
- the operation of cultural protocols in the workplace, such as respect for *apmereke-artweye* (traditional owners) and consideration of seniority and gender in work tasks

- effective pre-employment pathways
- a reasonable income.

The policies and practices that underpin strong Aboriginal employment at the Alice Springs Desert Park result from strong leadership, a clear and consistent vision and key individuals. Aboriginal staff work across the various departments of the Park as guides, horticulturalists, zoo-keepers and in other roles. Aboriginal and non-Aboriginal staff collaborate in the day-to-day park operations with little racial distinction. The main time that Aboriginality is specifically recognised by Park management is for access to government programs and resources that can proactively support Aboriginal people and Aboriginal employment. For example, the Park's Aboriginal staff have generally been recruited into positions that are formally designated as being for Aboriginal people.

Aboriginal staff identified challenges in their employment including perceived low pay levels within the Northern Territory public service, high demands from their public roles, and boredom associated with repetition of tasks. While such challenges may have contributed to the comparatively short retention of some Aboriginal employees, they also affect non-Aboriginal employees. Specific suggestions from Aboriginal staff about how Alice Springs Desert Park strategies could change to be more effective for Aboriginal recruitment and retention included developing a formal role for Aboriginal people in Park governance and formal benchmarks for Aboriginal cultural knowledge, with recognition for prior learning.

Strategies used effectively by the Alice Springs Desert Park to recruit and retain Aboriginal staff may be applicable elsewhere in the public and private sectors. They include:

- a long-term approach with clear strategic objectives on Aboriginal employment regularly articulated by leaders and managers
- employment targets that parallel local demographic ratios of Aboriginal to non-Aboriginal people
- a relationship-based management style that especially recognises and supports key individuals
- flexible and innovative ways of working cross-culturally, e.g. use of personal networks, elders and community groups
- designated Aboriginal positions and a 'critical mass' of Aboriginal staff
- strong emphasis on pre-employment and work readiness, e.g. a 'buddy' system and cultural mentoring by senior Aboriginal people
- diverse work tasks and career pathways within the organisation and links to other organisations to facilitate career transitions into related sectors
- learning and training approaches that strengthen cultural knowledge as well as introduce new skills
- flexible leave arrangements that include 'cultural' leave options
- recognising and respecting traditional owners of the area
- developing multiple roles for Aboriginal people in the organisation, additional to employment
- a workplace culture that encourages Aboriginal input and cross-cultural collaboration, recognising that non-Aboriginal staff can be enriched by 'new' cultural insights
- long-term, stable and substantial funding levels and programs with capacity to be flexible and responsive to local opportunities.

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