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Caring for country and sustainable Indigenous development: Opportunities, constraints and innovation

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Foreword

This paper was initially written to meet an early deadline for inclusion in the proceedings from the National Landcare Conference convened in Darwin on 28 April–1 May 2003. The paper is intentionally a little polemical in seeking to engage the Conference theme 'Respecting Values—Working and Learning Together' from a particular perspective. We come from different disciplinary backgrounds: Peter Whitehead is a biological scientist, while I am a social scientist. Much of our research on natural resource management issues has been undertaken with Indigenous collaborators in the Indigenous-owned tropical savanna of north Australia. The view that we attempt to promote in this paper is that, when it comes to Landcare, there is much that can be learnt from the experience of Indigenous natural resource managers in north Australia, working in an environment that is still relatively structurally intact but coming under an increasing range of insidious pressures that are compromising ecological integrity over large areas. We hold the view that when it comes to public funding of biodiversity conservation, be it from the Natural Heritage Trust or from Commonwealth or State or Territory environmental agencies, there is under-resourcing of what appears to be working to deal with these pressures. Indigenous community-based natural resource management is predicated on people living on country and caring for country via active harvesting of wildlife and active effort to reduce feral animals, weeds and wildfires. While our particular focus here is on Aboriginal people living at outstations on Aboriginal-owned land, we believe that our argument is also applicable to other contexts where Indigenous Australians mix customary and modern practices in community-based natural resource management. In the tropical savanna this sort of activity is widely known as 'Caring for Country'.

The sheer size and the tight schedule of the National Landcare Conference 2003 was not conducive to robust debate of our, and other competing, perspectives and the CD of papers is only available to conference delegates. And as is often the case at such large conferences, we were unable to fully present our perspective in the allotted time, instead opting to provide the increasingly common Powerpoint presentation that was visually appealing but less intellectually dense than the written paper. With these provisos in mind, we thought it useful to publish our paper in the CAEPR Working Paper series. This will make it available to a wider set of stakeholders and, hopefully, to stimulate additional research and debate on an increasingly important issue: the links between sustainable Indigenous economic development on Indigenous-owned land and 'Caring for Country'.

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Director, CAEPR
July 2003

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Summary

This paper explores how Indigenous community-based natural resource management can generate both conservation benefit and economic development opportunity. We begin by noting that much of the Indigenous estate in north Australia is either thinly populated or unpopulated. There is emerging evidence that, in situations where Indigenous people live on their country, ecological and wider benefits are generated via favourable fire regimes, control over weed infestations, and potentially through feral animal harvesting. When people are on country, they generate economic benefit for themselves by harvesting wildlife for consumption and engage with the market sector by using natural resources in commercial enterprise like arts and crafts production. We argue that there is a strong correlation between such activities and cost-effective natural resource management. Links between landcare, wildlife use and biodiversity conservation need to be recognized, celebrated and supported. The removal of many barriers to enhanced and innovative Indigenous participation in such activities, and equitable public support through programs like Landcare, will facilitate sustainable economic development options that are compatible with Indigenous priorities, while ameliorating Indigenous disadvantage.

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Introduction

In the last quarter of the twentieth century, following the passage of land rights and native title legislation, the Indigenous-owned estate has expanded rapidly. In the Northern Territory, Aboriginal people now own 44 per cent of the terrestrial land mass, with up to 10 per cent to be added on completion of claims and related processes (Storrs 2003). This paper focuses on the Top End 'tropical savanna'. Here the 'Caring for Country' activities of the Northern Land Council support an important network of approximately 30 community-based land management programs. But underpinning this network is a further layer of smaller groups residing at hundreds of remote outstations, tiny communities scattered over the hinterland.

The issues raised here are built around the following observations. Aboriginal lands are some of the most biodiverse in Australia, including internationally recognised centres of plant and animal diversity. At the same time, they face many of the land and conservation management challenges of much of the Top End—the need for wild fire management and the monitoring and control of weeds, feral animals and other pests. There has been a diversity of responses to natural resource management issues on Aboriginal lands including leaseback to the national reserves system for collaborative management with governments, management of regions as Indigenous Protected Areas and establishment of the Caring for Country network. Our focus here is on one institutional form—the role that people residing at outstations, supported by the Caring for Country network, can play in natural resource management on Aboriginal-owned land. A fundamental problem that we address is that many areas in the Indigenous estate are under- or unpopulated and this presents particular challenges to biodiversity conservation and maintenance of ecosystem services.

Landcare and Indigenous people—an essential partnership

The Landcare emphasis on communities reflects recognition that community ownership of natural resource management issues is crucial. In the Indigenous context in northern Australia there are additional important elements to this orientation. Much of the land base is held under inalienable communal title, suggesting that approaches emphasising communality and inter-generational sustainability will be important. However, these demands also raise potential complications. A community-based approach can be impaired by 'free loaders'. That is, some may not invest in natural resource management, but still draw on the benefits. And inter-generational sustainability requires an approach that not only mixes Indigenous knowledge with western scientific knowledge, but selects best practice from both and equips practitioners to draw on both 'toolkits'.

A major element of what we propose involves integration of biodiversity conservation with Indigenous customary and commercial harvesting practice, not just agriculture and pastoral production. The subsequent problem is that in the contemporary political economy of Australia, market and state (monetary) sectors are recognised, while customary activity is largely unrecognised and ignored (Altman 2001), despite its potential private and public benefit. Moreover, the wilderness myth (Cronon 1995) persists in the thinking of many concerned with biodiversity and landscape conservation, so that the contribution that existing Aboriginal land management activity makes to national conservation goals is poorly understood by the public and policy-makers (Altman & Cochrane 2003; Yibarbuk et al. 2001).

A key issue in natural resource management in north Australia (and elsewhere) is the interdependence of conservation management goals across the landscape. An integrated whole-of-landscape approach is obviously needed, especially with highly mobile species (Woinarski et al. 1992). Consequently, the vast Indigenous estate must be accorded status equal with other areas—whether part of the National Reserve System, pastoral leasehold or privately-held lands. Historically, there has been a tendency to assume that the relative intactness of the Indigenous estate means that it does not require equitable public investment in its maintenance. This view can be readily challenged because of new

environmental threats, past degradation, and depopulation (Whitehead et al. 2003). Federal programs for creation of a comprehensive, adequate and representative reserve system acknowledge that long-term conservation goals cannot be achieved without engagement of Indigenous land owners and resource managers (Environment Australia 1999). Relevant and equitable resourcing of natural resource management on the Indigenous estate is emerging as an increasingly important issue.

Landcare and Indigenous people—maintaining the role

There is a growing recognition that Indigenous community-based involvement in natural resource management can bring significant economic and sociocultural benefits. In particular, people living on country and harvesting wildlife produce important sources of foods (imputed income) with associated economic (Altman 1987) and health benefits (O'Dea 1984). In situations where there are few commercial opportunities, engagement in productive customary activity can provide one of a very few avenues for improving socioeconomic well-being. Similarly, harvesting of wildlife (trees, bush materials) and other naturally-occurring resources can provide important inputs to the arts industry that generate cash for participants. In short, natural resource use and management can generate direct economic opportunity on country. The inherent sociocultural benefits for Aboriginal people of such engagements include the positives of living on country, often remote from access to alcohol and other potential negatives, but more positively living a lifestyle that promotes spiritual and physical well-being.

The outstations movement is now some 30 years old (Altman 1987). It was predicated on land rights, the policy shift to self determination, and equitable Indigenous access to state transfer payments. This history has perhaps contributed to the failure to recognise associated Indigenous care for country, and its resources, as a form of community-based natural resource management that considerably predates the present formalised programs. The formal 'Caring for Country' movement has only developed strongly over the last few years, in part fuelled by the Natural Heritage Trust and the associated Landcare Program. Somewhat paradoxically, the growth of this movement and the establishment of formal community-based ranger programs has facilitated a political mobilisation that is starting to highlight previously unrecognised contributions, demonstrating that some representative organisational capacity and institutional scale is essential for policy influence.

While outstations today tend to be clustered within 100 kilometres of Aboriginal townships, there is certainly no evidence that non-Indigenous people are willing to reside in such remote localities which often lack the most basic amenities, such as reliable electrical power. Taylor (2003) show that, according to the 2001 Census, 14,000 Indigenous people in the Northern Territory resided in 570 communities with populations of less than 200. And while some of the most remote parts of regions like Arnhem Land are not permanently occupied today, existing remote outstations and their rudimentary infrastructure, like bush tracks and airstrips, provide important jump-off points to access even the remotest and harshest parts of Australia. Managing these remote lands constitutes one of the nation's most significant land management challenges (Whitehead 1999). Failure to rise to that challenge will affect not just the remote sites themselves, but the nation as a whole. For example, entry and establishment of foot and mouth disease in the remote north could generate ripples affecting every primary producer in Australia and depress the nation's economy for many years.

But the 'Caring for Country' movement remains fragile, being dependent on difficult-to-manage bundles of often small individual projects, funded from the sale of public assets. Responding to apparently arbitrary shifts in priorities, eligibility criteria, and the details of complex multi-layered assessment processes imposes unnecessary additional costs for administering Indigenous institutions. Uncertainty and difficulties of maintaining continuity are exacerbated by *ad hoc* interventions of State, Territory and Federal Ministers, who sometimes ignore the technical and operational advice offered by regional

assessment committees. Maintaining and building capacity under these circumstances creates major challenges.

Important contributions to natural resource management on the Indigenous estate draw mostly on long-standing customary knowledge and skills, especially in the use of fire. Contemporary circumstances require new skills to deal with a growing array of new threats. The need to develop Indigenous capacity, however, extends well beyond just engaging with new introduced threats like incursions of feral animals and environmental and agricultural weeds (Storrs 2003). There must also be a commitment to decentralisation in the aftermath of decades of land alienation and colonial pressures to aggregate in larger settlements. Many groups have had their connections to country eroded by colonisation processes (Rowley 1970) and the re-occupation of country is either not a viable option or is not desired. In such situations, capacity to visit country on a seasonal basis for natural resource management purposes may need to be developed and underwritten. It would be a mistake to make gross generalisations and assume sameness in Indigenous cultures. Even within apparently homogeneous environments, with superficially similar colonial histories, there is considerable contemporary cultural diversity.

Perhaps the most difficult challenges faced by Indigenous land managers seeking assistance for 'enhancing the long-term productivity of natural resources' are widely-shared restricted views of acceptable forms of rural enterprise, limited understanding of workable mechanisms for achieving social, commercial, and conservation goals, associated regulatory barriers, and difficulties of retaining benefits of successes in isolated communities. We discuss these issues below.

Landcare and Indigenous people—opportunities and constraints in recognising and growing the role

There is growing recognition that Indigenous economic futures in northern Australia must deliver, *inter alia*, sustainable development opportunity on the Indigenous estate where people reside. Taylor (2003) recently estimated that 72 per cent of the Northern Territory's Indigenous population resides on Aboriginal land. Many options available for sustaining Indigenous people on their lands are currently being explored. We discuss some of these by drawing on examples from the Northern Territory. We propose some different approaches to support Indigenous landcare as a critical contributor to achieving national goals in sustainable development, conservation and environmental management.

Sustainable customary harvest

Recent research, funded in part by Landcare, has shown that use of wildlife by some Aboriginal groups in central Arnhem Land has remained remarkably consistent between 1979 and 2003 (Altman 1987, 2003). People harvest wildlife for a large part of their diet, and the imputed value of wildlife represents up to 50 per cent of total income for some individuals and groups. In addition to confirming the continued importance of wildlife for regional 'hybrid' economies in northern Australia (Altman 2001), the continued availability of the species favoured for harvest, combined with independent measures of their continued abundance, constitute important demonstrations of sustainability of harvest practice.

Moreover, the inter-generational engagement of children and young adults in such activity indicates that the skills required to hunt successfully and to maintain conditions favouring hunted species are being effectively transferred (Altman 2003). Continuity and associated transfer of knowledge are important because they indicate that skills and interest in applying them to manage ecosystems are culturally sustainable under contemporary circumstances.

However, threats to cultural sustainability include poor recognition of the value of Indigenous knowledge and practice in the wider society, and little or no external support

for exercising those skills in new and difficult contexts that generate public benefits. Status and esteem for skilled practitioners is thereby eroded within communities. This problem is exacerbated by policy decisions that directly or indirectly call into question the validity of customary practice, mostly on philosophical grounds rather than on evidence of its contributions to sustainable resource use. For example, the Federal Government has recently produced a redraft of a 'Recovery Plan for Marine Turtles'. That rewriting removed provisions written by technical experts that treated Indigenous use as a right to be protected and substituted language that treated such use as a threat. No technical arguments were made to support this change, which would appear to be inconsistent with the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*. This legislation has as one of its principal objects the application of Indigenous knowledge to the conservation and sustainable use of natural resources.

If Aboriginal people are to continue to provide land and resource management services of a nationally significant scale and quality, it will be essential that such provisions be honoured, and the continuation of customary harvest and related conservation activity on country be actively supported by the Australian community. In stark contrast to the uninformed view that Indigenous communities in remote Australia are bludgers on the public purse, urban conservationists could be regarded as free-riders on the efforts of under-resourced Indigenous landowners.

Sustainable commercial harvest of plants

Aboriginal people are already heavily engaged in commercial activity based on use of native plants harvested from the wild. Many artworks and craft objects are made from wild plant resources. The arts and crafts industry engages thousands of Aboriginal people in the Northern Territory in meaningful employment and contributes substantially to regional economies through both direct sales and an indirect contribution to the tourism industry. The significance of this sector was quantitatively demonstrated over a decade ago (Altman 1989) and continues to grow (Hoegh-Guldberg 2002).

Examination of a number of existing harvests reveals few issues with sustainability and, where use of some species is substantial, communities have identified risks and sought remedies ahead of regulatory authorities (Griffiths, Philips & Godjuwa in press). Other studies exploring options for additional commercial harvests suggest that activity could be considerably expanded and the economic base for some communities broadened without serious risk to ecological sustainability (Whitehead et al. 2002). This conclusion is to a considerable extent dependent on the ability of Aboriginal entrepreneurs to 'capture' elements of the market, perhaps by linking products to aspects of their culture that, like arts, are especially valued by non-Indigenous people. This opportunity again illustrates the wide range of benefits that can accrue from support for the continuation of customary practice. Harvests of materials for artworks, botanical medicines, or related products requires application of a wide range of skills and regular activity on country, during which other land management obligations are also met.

Constraints on this form of activity arise mostly from clumsy systems of regulation. Provisions have sometimes been so onerous that they compromise the commercial viability of operations, while doing little or nothing to assure sustainability (Whitehead et al. 2002). Indeed, with regard to the only harvests where serious questions of sustainability have arisen (taking of tree stems for didjeridu), regulatory arrangements have failed to prevent illegal collection by mainly non-Indigenous interests for production of imitation instruments (Whitehead et al. 2002).

Sustainable commercial harvest of native animals

A number of Aboriginal communities are engaged in trade in wild animals. The best known involves collection of crocodile eggs for supply to farms directly or after hatching in artificial incubators within communities (Bawinanga Aboriginal Corporation 2002). This links commercial returns from crocodile farms directly to the maintenance of crocodile

habitats necessary to sustain the availability of eggs. Other activities include harvest of freshwater turtles, lizards and snakes for the Australian pet trade. Proposals are being considered for ranching of magpie geese in a manner similar to crocodiles.

In most of these cases, the biology of the species is sufficiently well understood to permit the design of demonstrably sustainable systems of use. In other situations, the proposed extent of use is so low that there is no prospect that populations will be significantly affected. These proposals are also consistent with the Northern Territory Government's Strategy for Conservation through the Sustainable Use of Wildlife and could be authorised through permits issued under the *Territory Parks and Wildlife Conservation Act 2000*. However, if export from Australia is sought—and many of the best markets are overseas—the provisions of the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999* also apply. In recent amendments to cover wildlife trade, the Federal Government has re-imposed blanket bans on exports of live wildlife. As illustrated above with respect to marine turtle management, emphasis has been placed on the protection of native animals *from* use rather than effective management *of* use, irrespective of sustainability.

This preoccupation with animal rights for terrestrial wildlife contrasts strongly with provisions concerning already exploited aquatic organisms, where many species are regarded as common resources to which access is allocated through fisheries legislation. Options for commercial harvest of aquatic species by Aboriginal people are constrained for reasons diametrically opposed to the anti-use sentiments that distort policy about terrestrial animals. These aquatic species are regarded as fully allocated to existing patterns of exploitation. These patterns are fixed without serious reference to Indigenous people, leaving no space for subsequent and costly entry by Indigenous interests. This results in perverse outcomes, where landowners are unable to use species like barramundi even for local commerce, and are unable to prevent either heavy exploitation adjacent to communities that may damage customary use or the attendant waste of discarded non-target species that are highly valued. Commercial fisheries may also directly compete with joint-venture Indigenous recreational fishing ventures (Altman 2002).

In combination, the range of wildlife use options is broad: the management of many species is amenable to significant commercial harvests that are ecologically sustainable. But a number of barriers need to be overcome, particularly in dealing with the two extremes: anti-use, on the one hand, and complete or over-allocated use, on the other. A more sustainable position between these poles is needed. Experience with crocodile management indicates that concerted effort from communities, Territory and Federal governments and research institutions will be essential to overcome these often artificial, but nonetheless difficult, barriers (Webb, Whitehead & Manolis 1987).

Management of feral animals

Well-established markets exist for a number of feral animal species: in safari hunting (Palmer 2001); live export trade (for buffalo and camels); and for meat for human consumption or for pets. Most herds are not managed to optimise production nor to minimise environmental impacts. Consequently, commercial use is sometimes seen as putting herd size reduction for environmental protection at risk—those benefiting financially may wish to see larger populations. However, this need not be the case. Production of trophy animals, for example, can be optimised by keeping populations well below the carrying capacity of the environment. Therefore it may be possible to increase overall income from smaller herds that have less environmental impact. Such increased income might in turn be used to enhance management of feral species in fragile environments where the notion of a sustainable harvest is untenable. Design of such systems is presently constrained by lack of information on the dynamics of particular feral animal populations in response to control.

Indigenous people have incorporated a number of feral species, like swamp buffalo, into their diverse cultures, including their customary economy (Altman 1982; Bowman &

Robinson 2002). This utilisation is suppressing feral animal populations in some parts of the landscape, but is not resulting in effective regional control. As previously argued, Indigenous people will require support to take their activities into the most remote and inaccessible areas. While commercial operations and redirection of incomes (gained from harvesting accessible, exploitable populations) to remote sites may provide long-term solutions to landscape-wide feral animal control, it will require some time for these solutions to be designed, researched and implemented. In the meantime, engagement of Aboriginal people in monitoring for disease in feral herds is making a valuable contribution to the national good, and warrants support.

A primary constraint is lack of knowledge of optimal herd management strategies; this can be overcome by investment in well-targeted research. Another important constraint is the ability to meet health standards for sale of field-slaughtered meat to local and international markets. Testing options in conjunction with regulatory authorities warrants resourcing. An additional issue that has arisen in recent times is the legal hurdles of gun laws that Indigenous people must overcome to access even the most basic equipment, like firearms, essential for effective feral animal management and for subsistence hunting of these species.

Biodiversity conservation

Some preliminary analysis by Whitehead (2002) assesses the relative cost effectiveness of a number of Australian models for land and wildlife (natural resource) management in the tropical savanna. The models examined include jointly-managed national parks financed by the Commonwealth and the Northern Territory governments; the Commonwealth-funded Indigenous Protected Area managed by Dhimurru in north-east Arnhem Land; and an area of 10,000 square kilometres in central Arnhem Land populated by about 600 residents of over 30 outstations, serviced by Bawinanga Aboriginal Corporation. Even though this analysis is preliminary, it is clear that the central Arnhem Land situation represents the cheapest regime. Whether it is the most effective is a question that cannot be currently answered unequivocally. As the Australian National Audit Office (2002) notes, with respect to conservation outcomes measurement in Commonwealth national parks, appropriate performance monitoring frameworks are currently undeveloped.

However, work on the Indigenous estate suggests that biodiversity conservation outcomes are of a high order. For example, satellite imagery reveals finer-scale, putatively lower intensity (early dry season) fire regimes near populated outstations (D. Bowman, unpublished data). The importance of these regimes for limiting destructive fires later in the dry season is illustrated by increases in the proportion of native Cypress Pine *Callitris intratropica* stems that have died further away from outstations (Bowman et al. 2001). Late dry season fires deep in the hinterland also damage many other conservation values (Pardon et al. 2003; Russell-Smith, Ryan & Cheal 2002; Russell-Smith et al. 1998). Preliminary comparisons of biodiversity values in the Maningrida region indicate that they are being maintained at least as well as in Kakadu National Park, just 150 kilometres to the west (Yibarbuk et al. 2001), but without massive national parks infrastructure support. Studies of the status of exploited species indicate healthy and apparently resilient populations over recent decades (J.C. Altman, A.D. Griffiths, unpublished). If community-based natural resource management is cost-effective in the Maningrida region then this model may be worthy of enhanced resourcing, and adaptation and implementation in other parts of the Indigenous tropical savanna and possibly beyond.

Providing ecosystem services including carbon abatement and sequestration

Good standards of land management generate a number of public benefits that extend well off site. Healthy catchments that effectively trap nutrients and water will themselves be richer, but also protect values in adjoining streams, estuaries and coastal waters. Water quality is determined by the condition of catchments. The rich barramundi resource

exploited by non-Indigenous people and presently unavailable to Indigenous landowners is therefore dependent on those landholders maintaining good standards of catchment management. Johnston et al. (2002) have shown that peaks of airborne particulates from bushfire smoke are correlated with asthma presentations at Darwin Hospital, especially during the late dry season. Gaining greater control over fire regimes to reduce late dry season fires, even at sites distant from Darwin, may be necessary to protect the health of Darwin residents. Maintenance of air quality may be expedited by the restoration of burning practices that replicate Indigenous customary practices.

Research by the Darwin-based Tropical Savanna Management Cooperative Research Centre has demonstrated the potential commercial value of carbon abatement and sequestration that might emerge were Australia to ratify the Kyoto Protocol. The Arnhem Land Fire Abatement Project is in the process of being implemented in a large part of western Arnhem Land. This project seeks to extend contemporary Indigenous fire management regimes that focus on early dry season burning, from inhabited areas to unpopulated regions that currently experience destructive and carbon-releasing hot late dry season wildfires. It is estimated that a minimum 300,000 tonnes of carbon could be abated annually in this way, generating employment for community rangers and a suite of biodiversity conservation and environmental management benefits. While this innovative sunrise industry is in its infancy, and is contingent on ratification of the Kyoto Protocol, it has already attracted support from the Australian Greenhouse Office and a major corporate partner. Sequestration, the ability of the tropical savanna to act as a carbon sink, has even greater longer-term carbon trading potential, although much remains to be done to fully understand the carbon dynamics of these systems (Williams & Russell-Smith 2003).

Conclusion

In our view, Landcare and the application of Natural Heritage Trust funding in northern Australia needs radical rethinking, through active integration of biodiversity conservation with various forms of Indigenous 'on country' production. Such integration should not accept vaguely-specified outcomes from poorly-targeted incentives for improved practice to ameliorate damage from 'traditional' industries. Patterns of use should be explicitly designed to promote conservation by using indigenous resources in preference to replacing these resources with something else. We have presented a case that integrates biodiversity conservation with contemporary Indigenous natural resource management on Aboriginal land for both commercial and customary use.

Critics of such a progressive agenda may point to numerous obstacles, many of which we have identified. But a large number of these obstacles are either historical or reflect the values and interests of the dominant society—it is increasingly apparent that they have rarely been developed in conjunction with evidence-based economic, ecological or social analysis. Inflexible regulations, unthinkingly applied, have been particularly damaging in the past, but require little more than political and bureaucratic will to be replaced by systems that genuinely address the substance rather than the rhetoric of sustainability.

All the enterprises and conservation activity we have outlined are inherently labour intensive. Aboriginal people are chronically under-represented in the mainstream workforce in northern Australia. This situation is contributing to severe social and human health problems. The biophysical health of the country is suffering as well, because too few people are actively intervening to deal with a daunting array of new and old problems. Aboriginal people are well equipped, through a remarkable existing skills base, demonstrable commitment, and location, to address both opportunities and challenges in achieving a new level of sustainable and equitable management of resources. It will be unfortunate if opportunities to combine important national goals in biodiversity conservation, regional development, and addressing Indigenous marginalisation are not grasped. Landcare has a potentially significant role to play in securing sustainable Indigenous futures, but it will need to escape a preoccupation with dust, fences, and

mitigation of damage that should have been avoided in the first place. We show how it can, and must, meet the challenge.

References

Altman, J.C. 1982. 'Hunting buffalo in north-central Arnhem Land: A case of rapid adaptation among Aborigines', *Oceania,* 52 (4): 274–85.

—— 1987. *Hunter-Gatherers Today: An Aboriginal Economy in North Australia*, Australian Institute of Aboriginal Studies, Canberra.

—— (chairman) 1989. *The Aboriginal Arts and Crafts Industry: Report of the Review Committee*, Australian Government Publishing Service, Canberra.

—— 2001. 'Sustainable development options on Aboriginal land: The hybrid economy in the twenty-first century', *CAEPR Discussion Paper No. 226*, CAEPR, ANU, Canberra.

—— 2002. 'The political economy of a Treaty: Opportunities and challenges for enhancing economic development for Indigenous Australians', *The Drawing Board: An Australian Review of Public Affairs*, 3 (2): 65–8.

—— 2003. 'The eastern Kuninjku harvesting economy in the mid-wet season: 1980 and 2003 compared', Unpublished paper, CAEPR, ANU, Canberra.

—— and Cochrane, M. 2003. 'Innovative institutional design for sustainable wildlife management in the Indigenous-owned savanna', *CAEPR Discussion Paper No. 247*, CAEPR, ANU, Canberra.

Australian National Audit Office (ANAO) 2002. *The Management of Commonwealth National Parks and Reserves 'Conserving our Country'*, ANAO, Canberra.

Bawinanga Aboriginal Corporation (BAC) 2002. *Annual Report 2001–02*, BAC, Maningrida.

Bowman, D.J.M.S. and Robinson, C.J. 2002. 'The getting of the *Nganabbarru*: observations and reflections on Aboriginal buffalo hunting in northern Australia', *Australian Geographer,* 33 (2): 191–206.

—— Price, O., Whitehead, P.J. and Walsh, A. 2001. 'The 'wilderness effect' and the decline of *Callitris intratropica* on the Arnhem Land Plateau, northern Australia', *Australian Journal of Botany,* 49: 665–72.

Cronon, W. (ed.). 1995. *Uncommon Ground: Toward Reinventing Nature*, Norton, New York.

Environment Australia 1999. Australian Guidelines for Establishing the National Reserve System, URL http://www.ea.gov.au/parks/nrs/sciguide/index.html.

Griffiths, A.D., Philips, A. and Godjuwa, C. (in press). 'Harvest of *Bombax ceiba* for the Aboriginal arts industry, central Arnhem Land, Australia', *Biological Conservation*.

Hoegh-Guldberg, H. 2002. The Indigenous Art and Craft Market: A Preliminary Assessment for the Cultural Ministers Council Statistics Working Group, Cultural Ministers Council Statistics Working Group, Canberra.

Johnston, F.H., Kavanagh, A., Bowman, D.M.J.S. and Scott, R.K. 2002. 'Exposure to bushfire smoke and respiratory illness', *Australian Medical Journal,* 176, 535–38.

O'Dea, K. 1984. 'Marked improvement in carbohydrate and lipid metabolism in diabetic Australian Aborigines after temporary reversion to traditional lifestyle', *Diabetes,* 33, 596–603.

Palmer, L. 2001. *Indigenous Interests in Safari Hunting and Fishing Tourism in the Northern Territory: Assessment of Key Issues*, Cooperative Research Centre for Sustainable Tourism, Griffith University, Queensland.

Pardon, L.G., Brook, B.W., Griffiths, A.D. and Braithwaite, R.W. 2003. 'Determinants of survival for the northern brown bandicoot (*Isoodon macrourus*) under a landscape-scale fire experiment', *Journal of Animal Ecology,* 72, 106–15.

Rowley, C.D. 1970. *The Destruction of Aboriginal Society—Aboriginal Policy and Practice, vol. 1*, Australian National University Press, Canberra.

Russell-Smith, J., Ryan, P.G., Klessa, D., Waight, G. and Harwood, R. 1998. 'Fire regimes, fire-sensitive vegetation and fire management of the sandstone Arnhem Plateau, monsoonal northern Australia', *Journal of Applied Ecology,* 35: 829–46.

—— Ryan, P.G. and Cheal, D. 2002. 'Fire regimes and the conservation of sandstone heaths in monsoonal northern Australia: frequency, interval, patchiness', *Biological Conservation,* 104: 91–106.

Storrs, M. 2003. 'Caring for Country', Unpublished conference paper presented to the *Seizing Our Economic Future: Indigenous Economic Development Forum*, Northern Territory Government, Alice Springs, 6–7 March 2003 (www.indigenousforums.nt.gov.au).

Taylor, J. 2003. 'Indigenous economic futures in the Northern Territory: The demographic and socioeconomic background', *CAEPR Discussion Paper No. 246*, CAEPR, ANU, Canberra.

Webb, G.J.W., Whitehead, P.J. and Manolis, S.C. 1987. 'The management of crocodiles in the Northern Territory of Australia', in G.J.W. Webb, S.C. Manolis and P.J. Whitehead (eds), *Wildlife Management: Crocodiles and Alligators*, Surrey Beatty and Sons, Sydney, 107–28.

Whitehead, P.J. 1999. 'Is it time to fill the north's empty landscapes?', *Savanna Links,* September/October 1999: 6–7.

—— 2000. 'The clever country: where cows manage wildlife', in R. Dixon (ed.), *Business as Usual? Local Conflicts and Global Challenges*, NARU, ANU, Darwin, 155–68.

—— 2002. 'Land management: The next frontier', Presentation to the Northern and Central Land Councils workshop 'Preparing for the Australian National Audit Office's performance audit of Northern Territory land councils and the Aboriginal Benefit Account', 12–13 February, University House, Canberra.

——, Griffiths, A.D., Gorman, J., Wightman, G., Massarella, H. and Altman, J.C. 2002. 'Small scale commercial plant harvests by Indigenous communities', A report for the RIRDC/Land and Water Australia/FWPRDC Joint Venture Agroforestry Program. Key Centre for Tropical Wildlife Management, Darwin (in review).

——, Woinarski, J.C.Z., Franklin, D. and Price, O. 2003. 'Landscape ecology, wildlife management and conservation in northern Australia: linking policy, practice and capability in regional planning', in J. Bissonette and I. Storch (eds), *Making the Match*, Island Press, New York, 227–59.

Williams, R. and Russell-Smith, J. 2003. 'Carbon trading in Savannas: Economic opportunities, science and policy pathways', Unpublished conference paper presented to the *Seizing Our Economic Future: Indigenous Economic Development Forum*, Northern Territory Government, Alice Springs, 6–7 March 2003 (www.indigenousforums.nt.gov.au).

Woinarski, J.C.Z., Whitehead, P.J., Bowman, D.M.J.S. and Russell-Smith, J. 1992. 'Conservation of mobile species in a variable environment: The problem of reserve design in the Northern Territory, Australia', *Global Ecology and Biogeography Letters,* 2: 1–10.

Yibarbuk, D.M., Whitehead, P.J., Russell-Smith, J., Jackson, D., Godjuwa, C., Fisher, A., Cooke, P., Choquenot, D. and Bowman, D.J.M.S. 2001. 'Fire ecology and Aboriginal land management in central Arnhem Land, northern Australia: A tradition of ecosystem management', *Journal of Biogeography,* 28: 325–44.