

Managing Pluralism in North Australian Natural & Cultural Resource Management: Reflections on a Decade of Cooperative Activity

Professor Gordon Duff, Peter Jacklyn, Jill Landsberg¹,
John Ludwig², Joe Morrison³, Daniel Walker² & Peter Whitehead⁴

CRC for Tropical Savannas Management, Darwin NT 0909; ¹ CRC for Tropical Savannas Management, & Queensland Department of Primary Industries & Fisheries; ² CRC for Tropical Savannas Management, & CSIRO Sustainable Ecosystems; ³ CRC for Tropical Savannas Management, & North Australia Indigenous Land & Sea Management Alliance; ⁴ CRC for Tropical Savannas Management, & Key Centre for Tropical Wildlife Management, Charles Darwin University

Authorship in alphabetical order

Abstract

The Tropical Savannas CRC is a joint venture of major organisations involved in land management in north Australian savannas. We foster cooperation among research providers and research users in order to support sustainable use and conservation of natural and cultural resources in tropical savannas. This paper is an overview of some important lessons about fostering cooperation and integration in this context. Collaboration (working in combination), not integration (combining parts into a whole), has been our major goal and achievement. While integration might seem a worthy ideal, complex challenges with diverse stakeholder views, values and aspirations seldom lend themselves to integrated solutions. There is a very real risk that integration across culturally diverse perspectives may devalue the position of the less empowered participants in the dialogue. Sustainable NCRM outcomes can also be achieved by embracing pluralism and respecting difference. There is a danger inherent in driving towards greater integration, if it demands consensus that proves fragile and ultimately compromises ownership and hence application of related research outputs. One outcome of collaboration, as opposed to integration, may well be that participants simply agree to differ.

For collaboration to be successful there must be some broadly shared aspirations. The strongly shared goal for all participants in the Tropical Savannas CRC is to achieve interactions with land and resources that are sustainable over the long term. But trust and respect amongst the participants are at least equally important issues. It follows that a collaborative research organisation must be able to act as an honest broker, resisting advocacy and valuing the trust of its stakeholders above all else. Investment of effort and resources in communication and networks must be at least equal to the investment that ensures the integrity and quality of the research. The organisation must nurture an environment in which people can learn from one another's experiences, understand each other's challenges, and



respect each other's choices. By identifying integration as a desired outcome, and failing to carefully qualify the intention, the organisation may actually lose sight of the benefits of diversity and pluralism.

INTRODUCTION

Context: Australia's tropical savannas

The tropical savannas are the grassy woodlands that cover most of the northern third of the Australian continent. The people who live here use the land in a great variety of ways and live in a range of situations from cities to small towns to remote stations and communities. With the exception of areas near the few cities, the savannas consist of largely uncleared vegetation supporting significant biological diversity. Compared with widespread salinity, soil and water deterioration and biodiversity loss evident in southern areas of Australia, the environment and biological diversity of our tropical savannas are far less degraded, a situation worth maintaining and improving.

Despite the savannas relatively intact nature, ecosystem change is accelerating and becoming conspicuous in parts of the landscape. In some areas, reduced grassy fuel loads and reduction in frequency and intensity of fire are leading to substantial losses in pasture productivity due to woody thickening (Lewis 2003). Elsewhere, the opposite problem prevails, with intense, frequent and extensive wildfires destroying woody vegetation in fire-sensitive habitats (Russell-Smith *et al* 2002), reducing biological diversity (Woinarski & Recher 1997) and significantly increasing greenhouse gas emissions. A mounting body of evidence is pointing to a widespread decline in biodiversity in the savannas, most noticeably amongst the bird (Franklin 1999) and mammal fauna (Woinarski *et al* 2001, Woinarski & Ash 2002).

There are increasing pressures to develop and intensify the use of natural resources in northern Australia. It is becoming evident that, over the next few decades, more and more pressure will be placed on northern Australia to develop land, and especially water resources, as systems in temperate Australia become relatively less productive and their exploitation more expensive and less sustainable (Morton *et al* 2002). Australia's savannas are therefore experiencing important changes, and our responses to those changes will have a significant influence on biological and cultural diversity, economy and society of northern Australia. A number of commentators have identified the next few decades as a critical period for the future of the north, and some important directions will be set in the next few years.

Savanna stakeholders

We define savanna stakeholders as the people who live and work in the savannas of Australia, and the members of the wider Australian and international communities who benefit directly and indirectly from the maintenance of healthy savanna landscapes, from thriving regional communities, and from conservation of the rich and significant biological diversity and cultural heritage that characterise and sustain these landscapes.

The people who live in the savannas are few in number, culturally diverse and widely dispersed, and interact with and value the landscape in many different ways. They range from those who consider that the apex of conservation practice is to establish landscapes without people, to others who regard landscapes that lack people committed to moving through them and using their resources as by definition unhealthy and at acute risk. Pastoralism is the most extensive market-based landuse in the tropical savannas, and pastoralists make an important contribution to natural resources management, as well as the maintenance of vibrant regional communities. Indigenous people own and occupy a large percentage of the savannas and in addition to mainstream economic activity, maintain a vigorous customary economy operating over equally large areas (Altman & Whitehead, 2003). Other significant stakeholders include those engaged in management of the conservation estate, tourism, mining and defence. Though some of these stakeholders are resident in the savannas, many live in cities on the savanna margins or capital cities remote from them. Non-resident stakeholders among the wider Australian and international communities generally live even further afield.

The role of the CRC for Tropical Savannas Management

The Tropical Savannas CRC is a joint venture of major organisations involved in land management in north Australian savannas, and is a partnership of research providers and research users. The research providers include all relevant State and Territory agencies, three universities and CSIRO. The research users include pastoralists, Indigenous homeland communities and Land Councils, conservation managers, the tourism and mining industries, and government planners and policy makers.

The Tropical Savannas CRC was founded in 1995, and was funded for a second, seven-year term in 2001. Its purpose is to help provide the knowledge and strategies vital for the wise management, sustainable use and considered conservation of this region of susceptible but relatively intact country. In so doing, the Centre's work is intended to benefit the region's people, economy, infrastructure and ecology, while avoiding the catastrophic consequences of misuse of natural resources so evident in southern Australia and in many tropical savannas throughout the world.

With the roll-out of NHT 2 and the National Action Plan for Salinity and Water Quality, the States and Commonwealth now require regional communities to take greater control of the integrated management of the natural resources in their regions (McDonald *et al* 2003). The challenges facing natural resource managers and planners in northern Australia are fundamentally different to those affecting temperate parts of the continent, where most of the NRM agenda is being set. Relative to temperate Australia, the savannas have a lower intensity of landuse, lower population density and a substantially greater proportion of Indigenous people in the population, and of Indigenous-owned and managed land. The CRC is playing an increasingly important role in laying the foundations for effective planning processes in northern Australia that will assist regional bodies to link on-ground activities to regional-scale outcomes (McDonald *et al* 2003).

Opportunities are emerging for novel and innovative approaches to natural resource use and management. For example, better fire management may be funded in the future through the recognition of the value of greenhouse gas mitigation and carbon

sequestration resulting from reduction in the extent and/or timing of savanna fires. This opportunity illustrates the general point that management of savanna landscapes depends on having people in those landscapes, which in turn depends on viable regional economies. Building sustainable regional economies, particularly in more remote Indigenous communities, will rely on developing different options additional to the current suite of more conventional economic activities.

Options for enhancing economic futures include customary (subsistence) use of wild animals and plants by Indigenous people, novel commercial uses of native species by both Indigenous and non-Indigenous people, connected activity such as ecotourism and Indigenous tourism, and maintenance of a range of ecosystem services and related options for stewardship of land and resources, using community-based governance structures currently in operation. An important feature of all of these forms of use is that they are non-exclusive: they can be added to or integrated with other forms of land management such as pastoralism.

Across much of the savannas, property rights and responsibilities for holders of pastoral leases are being re-evaluated as current leases expire. Over the next decade most leases in Queensland and WA savannas will have been reviewed. A unique opportunity exists to implement strategies for monitoring and maintaining biodiversity and sustainability of the resource base in the pastoral estate at a critical juncture in the future of the savannas.

Since its renewal, the Centre has focussed on increasing stakeholder engagement with emerging issues such as these. To do this we have given greater emphasis to working together to broadly defined goals than to combining parts into a whole. We have considered this emphasis more productive in the short to mid term because the experiences, values, aspirations, and expectations of our key stakeholders span such a wide range. A consequence of our approach is that the line between providers and users of research has sometimes blurred as both groups can learn from each other, which we take to be an important contribution to integration as we define it.

WHAT DO WE MEAN BY INTEGRATION?

A clear set of definitions of integration, placed in the NCRM context, is necessary to advance the debate about its importance. “Integration of community, traditional and other knowledge in policy and management” may be taken to mean policy makers and managers make appropriate use of community, traditional and other forms of knowledge. Alternatively, it could mean blending these forms of knowledge into some sort of shared view of the targets for NCRM, and setting a single path for reaching them. It would be foolish to challenge the former goal, but the latter demands closer examination. Synonyms for this view of integration include “amalgamation” and “assimilation”. It is prefaced on a common set of targets that can be reached so long as the right process is followed. We contend this view of integration may prove illusory in many instances. Genuine win-win resolutions to conflicting aspirations for country and resource access and use are probably rare. The lesson of history from resource

management outcomes in southern Australia and elsewhere is that the distribution of compromise is often asymmetrical and the less powerful interests mostly end up making the compromises.

This does not constitute an argument in favour of single-issue or single-sector approaches to natural resource management, but rather the reverse. Take fire management in the savannas as an example. In this superficially straightforward NRM issue, complex interactions exist among sectoral interests, values and knowledge frameworks, even if fire management is being addressed at the scale of a single property, such as a national park, a pastoral station or a clan estate.

Fire is arguably the best understood and accessible tool at the disposal of north Australian land managers (Dyer *et al* 2002). However, the goals of fire management and resultant strategies will differ considerably amongst stakeholders depending on whether motivations are ecological, cultural or economic. Nor are these drivers discrete—cultural and economic considerations may well overlap on the Aboriginal estate, if fire is being used to manipulate traditional food resources in conjunction with a pastoral enterprise. Protection of property or human life on national parks may conflict with biodiversity conservation. Savanna fires are often extensive, and therefore likely to cross from one land tenure or estate to another, so single fire events may encounter a range of differing aspirations. What constitutes sensible management on one tenure may cross a fenceline and become an economic or biodiversity disaster on another. Hence, an integrated fire management strategy at a regional scale that fails to take account of multiple and often competing values will fail, or at least meet the needs of only a subset of stakeholders. Which is better integrated? a strategy that blends views and practice to emphasise the goals of some rather than all interests, or an alternative that achieves the goals of all at some level, even if some interests regard some of those outcomes as undesirable

Integration of widely differing disciplines also carries a risk. The temptation for natural scientists seeking to place their work in a multi-disciplinary framework is to attempt to shape the social science component into tractable questions that can be analysed under an existing scientific paradigm. The scientific answers may be robust but address questions only loosely related to the interests of managers and policy-makers. Researchers are loath to stray too far from the accepted norms of intellectual rigour as defined by a given disciplinary framework, and many are tempted to criticise the products of other knowledge systems as unscientific, or at least as failing to address questions framed in a scientific setting. Hence, a research framework to underpin the integration of triple bottom line outcomes remains elusive.

For all these challenges, the notions of ecology, economics and society are all constructed in a Western knowledge framework, and an even greater challenge is presented by the need to engage with non-Western ways of knowing, specifically systems of Traditional or Indigenous knowledge (IK) (Berkes *et al.* 2000). This engagement must start with recognition of the value and significance of IK, but must also accommodate the fact that knowledge is *dynamic*. Many well-meaning, non-Indigenous observers assume that IK is static and locked in a pre-European milieu. Indigenous knowledge can and does accommodate recent learning and modern technology (such as satellite imagery applied to fire or weed management).

The argument in favour of the application of IK is two-fold. Knowledge that is actively used will be kept alive. The application of Indigenous Knowledge is therefore an important vehicle for its conservation, which in itself is an important and increasingly urgent outcome. The utility of applied knowledge can be more easily demonstrated to agencies charged with the responsibility for NCRM. If knowledge is demonstrably used to manage natural and cultural resources more sustainably, its value becomes more widely recognised and its exponents become more fully engaged in collaborative processes. The risk inherent in seeking to integrate Western and Indigenous knowledge systems, for whatever reason, emerges with the likelihood of the dominant paradigm (in most instances, Western science) emerging as the single framework, even if modified by its brush with alternative paradigms—a consensual discipline. The consequence is the alienation of the less vocal, poorly-resourced or less politically influential participants in the venture. Disenfranchising important stakeholders in the name of integration would be a perverse but plausible outcome.

COLLABORATION AND CAPACITY FOR ENGAGEMENT

Achieving effective ongoing collaboration in working towards practical NCRM goals may be desirable, but it is also difficult. The nature of the challenge can be illustrated by considering the situation of Indigenous stakeholders in the savannas.

Indigenous people play important roles across many sectors in the savannas (e.g. pastoralism, tourism, biodiversity conservation, customary land use) and do not necessarily wish to be treated as a distinctive sectoral interest. However, Indigenous people are placed to resume a distinct and critical role in the active management of savanna landscapes to meet national goals in maintenance of biodiversity and ecosystems services (Morrison 2003). We return to these issues later in this paper. But any role will be dependent on mechanisms for Indigenous people to be fully engaged in planning and implementation of natural resource management strategies at all scales. Moreover, and irrespective of the resource use in question, there is an obligation to work with Traditional Owners with Native Title interests at particular sites that may be under management by another interest with quite different objectives to achieve full and equitable engagement. Yet achieving genuine engagement with enough Indigenous people to represent the full diversity of roles they play is no easy matter.

This example illustrates a broader and fundamental obligation to build capacity of all participants in a resource management issue to work effectively together. Capacity development is an essential step to equitable collaboration. Models for building capacity may vary, but a minimum set of requirements is:

- genuine collaboration between all interests, including regulatory agencies and communities;
- a high degree of support from and participation by the community;
- close coordination of the process;
- an ability to work within the norms dictated by a community's culture and processes;
- and

- sufficient resourcing to ensure that no interest groups are financially excluded from full participation.

It follows that capacity development must be a deliberate and strategic process of community participation and action where interests work together to:

- mobilise existing skills, resources and commitment to build and improve networks;
- reframe problems;
- use community assets in new ways;
- develop new and innovative approaches and skills.

The obligation to build capacity to interact effectively is particularly acute in the sparsely populated and infrastructure-poor savannas. Whatever the specific goal of a particular exercise in integration, to be productive and credible it must involve interactions among people who are equipped to articulate their interests in terms that can be understood by others. They must also be equipped to clearly understand other views put to them, and to respond in an informed and considered way. The CRC therefore places particular emphasis on its communication and education programs as an essential contribution to true collaboration.

COLLABORATION, NETWORKS AND RELATIONSHIPS

As an organisation, we have explored various mechanisms for bridging sectoral and disciplinary divides for nearly ten years. Case studies have yielded some useful insights and generated some even more useful networks and collaborations. The most successful have involved drawing a range of disciplines and actors from different sectors together to work towards sustainable NCRM at a tractable spatial scale. But we contend their main success has been in building relationships, rather than achieving an integrated, multi-disciplinary and multi-sector framework for sustainable NCRM (URS 2001).

The CRC has also had some outstanding successes in building multidisciplinary project teams, with the mandate, resources and mechanisms to include both research providers and research users. As a result, the CRC has proved instrumental in changing NCRM outcomes in specific instances. But these instances are small in area and few in number relative to the scale of NCRM challenges in the savannas. Far more valuable and sustainable than specific NCRM outcomes have been the wide-reaching communication networks and relationships that these activities have established. Low population density and widely dispersed researchers and managers present challenges, but paradoxically may also confer an advantage. Because there are so few people there is also a reduced resistance to engagement across sectoral, jurisdictional and cultural boundaries. The self-evident benefits of cooperation provide a strong incentive for overcoming ignorance, prejudice or bureaucratic obstacles to collaborative endeavors striving for common, or at least complementary, goals.

COLLABORATION IN ACTION

The Tropical Savannas CRC has taken these insights into capacity-building and networks and developed the following initiatives to foster effective collaboration.

- *Building research capacity through judicious integration* Northern Australia is characterised by a small number of widely separated researchers representing most disciplines relevant to integrated NCRM. The Centre, through its partners and whole of northern Australia charter of responsibility, brings these researchers together from across jurisdictions and industry sectors to develop research projects with an integrated, whole-of-savannas perspective and with the critical mass of expertise necessary to address priority issues and needs.
- *Building networks of relationships between researchers and research users.* The Centre's projects are also developed by collaborating with the potential users of the research. The projects form the nucleus of networks of relationships between researchers and research users that link people across disciplines, jurisdictions, industry sectors and cultures. These networks are strengthened by regular meetings and workshops. For example, the Centre supports a regular forum of northern fire managers which has helped build up a network of fire control officers and researchers across north Australia.
- *Building capacity and improving access to information, educational and learning processes.* The Centre uses its networks to bring together research findings and local knowledge to create useful NCRM information resources and tools for the people who have a stake in the tropical savannas. By linking students with researchers and by developing educational resources the Centre enhances the way people learn about the savannas and its cultures. The CRC also builds capacity by raising awareness of tropical savanna NCRM issues in the broader community of stakeholders. Specifically, the following outputs are produced by the Centre. These outputs are 'integrated' in the sense that they draw on knowledge across cultures, sectors, disciplines and jurisdictions.
 - *Management options, along with assessments of their benefits and costs.* For example, options for managing biodiversity on pastoral lands that take account of the cost to the producer and the benefits for native fauna.
 - *Policy options, with analyses of their benefits and costs.* For example, analyses of regional planning strategies with economic, environmental and social factors included.
 - *Information resources and tools and training in their use.* For example, books on fire management and web-based remote sensing of fire tools that work across a range of spatial scales, including a whole-of-savannas perspective.
 - *Educational packages and access processes.* For example courses on tropical savanna management that are available on-line for remote users.

CRC outcomes were independently evaluated in an extensive Impact Assessment prepared by URS Australia (formerly Dames and Moore NRM), completed in November 2001. The report had this to say about the Centre and its program:

"Our [URS'] interactions with stakeholders have been universally positive.

The TSCRC is having a major impact on the life and economy within the Australian tropical savannas (and beyond) . The quantified beneficial impacts of many of the projects compare favourably to the estimated size of the total investment."

"The TSCRC has broken down the barriers across the savannas—between the states, between institutions, between stakeholders, and built strong linkages. The result is a TSCRC community across the savannas where people of different groups now consider themselves colleagues, who want to collaborate to capture the greater benefits that they now know are there. This is a marked change from the situation pertaining before the TSCRC."

It would be courageous in the extreme to claim to have established a faultless collaborative framework, and even if such a thing existed, to claim that such a framework will ultimately solve the raft of sustainable NCRM challenges that we face. Nor would we claim that the framework, as it exists, is well-integrated and readily described and characterised. However, we have had some successes, and it is worth noting the relatively simple strategies that we believe have contributed strongly to these.

Firstly, participants, funders and stakeholders must be prepared to invest heavily (some would argue disproportionately) in order to support interpersonal interaction and engagement. This is expensive in terms of both time and resources, particularly where the distances involved are large. Funders also need to be aware that true collaboration is difficult if the outputs of the activity are defined prior to commencement of negotiations with all participants, so projects need to have the capacity, and resources, to develop the engagement of all stakeholders. Milestones and timeframes need to be adjusted accordingly.

Establishment of interpersonal relationships must be followed through with an ongoing commitment to communication and capacity-building. Taking externally funded activities into account, almost half the resources at the Tropical Savannas CRC's disposal are invested in the communication of existing knowledge as opposed to the generation of new knowledge (ie research). The investment includes conventional dissemination strategies (e.g. publications, internet, development of educational materials and packages) as well as the establishment and maintenance of networks. While this investment derives from our particular circumstance and may be unusually large, we observe that too often, communication is under-resourced even in well integrated research or NCRM implementation projects.

A specific strategy that will pay dividends in the medium term is to expose research students to a range of inputs, from other disciplines and other sectors, as part of their research training experience. A condition for Tropical Savannas CRC funding support for postgraduate students is that co-supervisors be engaged from outside the university sector. Similar approaches are used in other CRC's and similar organisations. We have had no reports of this condition resulting in a lessening of disciplinary rigour of candidates' projects, and we are seeing a generation of graduates emerging with a more holistic appreciation of the complexities of NCRM.

CONCLUSION

Successful collaboration requires some broadly shared aspirations. But trust and respect amongst the participants are at least equally important issues. It follows that a collaborative research organisation must be able to act as honest broker, resisting advocacy and valuing the trust of its stakeholders above all else. Investment of effort and resources in communication and cultivation of relationships and networks must be at least equal to the investment that ensures the integrity and quality of the research. The organisation must nurture an environment in which people can learn from one another's experiences, understand each other's challenges, and respect each other's choices. By advocating integration too strongly as an end in itself, the organisation may actually lose sight of its obligations to its clients and the benefits of diversity and pluralism.

We therefore contend that integration in the sense of amalgamation or assimilation is not necessarily a desirable outcome. Sustainable NCRM outcomes can also be achieved by embracing pluralism and respecting difference. This may be the antithesis of what many people mean by integration, particularly integration as a concept that derives from a "research push" rather than "stakeholder pull". There is a danger inherent in driving towards greater integration, if it demands consensus that proves fragile and ultimately compromises ownership and hence application of related research outputs. One outcome of collaboration, as opposed to consensus integration, may well be that participants simply agree to differ, at the same time recognising the validity of alternative values and aspirations.

The reality is that we can rarely identify a single unambiguously "best" solution to a complex problem in resource or land management. Adaptive management, to which most resource managers and their organizations claim commitment, is most robust when it is built around collaborative exploration of alternative paths to sustainability and jointly refining practice, not about claiming to have found the one "true" path. Embracing different views and treating them as legitimate is an indispensable part of adaptive management, which is in turn critical to the integrated management of complex savanna systems. It is at this level that integration is likely to most productive and lead to robust advances in practice. Seeking to force integration too early and demanding superficial consensus is an entirely unsustainable approach.

REFERENCES

- Altman, J.C. and Whitehead, P.J., 2003, Caring for Country and Sustainable Indigenous Development: Opportunities, constraints and innovation. CAEPR Working Paper No. 20/2003, Centre for Aboriginal Economic Policy Research, ANU.
- Berkes F., Colding, J. & Folke, C. 2000 Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications* **10** 1251–1262.
- Dyer, R. Jacklyn, P. Partridge, I. Russell-Smith J. & Williams R. (Eds) 2002 *Savanna burning: Understanding and using fire in northern Australia* Tropical Savannas Management Cooperative Research Centre, Darwin

- Fensham R.J. and Fairfax R.J. 2003 Assessing woody vegetation cover change in north-west Australian savanna using aerial photography. *International Journal of Wildland Fire* in press
- Franklin, D.C., 1999, Evidence of disarray amongst granivorous bird assemblages in the savannas of northern Australia, a region of sparse human settlement. *Biological Conservation* 90 53–68
- Lewis D. 2002 *Slower than the eye can see: environmental change in the Victoria River District since European settlement*. . Tropical Savannas CRC, Darwin.
- McDonald, GT, McAlpine, CA, Taylor BM & Vagg, AR 2003, *Evaluating Regional Plans in Tropical Savanna Regions: A guide for regional planners and reviewers*, Report to the Tropical Savannas CRC, Darwin.
- Morrison, J 2003, 'Caring for Country: Indigenous people managing country with particular emphasis on northAustralia', in *Proceedings of National Landcare Conference*, Darwin.
- Morton, S., Bourne, G., Cristofani, P., Cullen, P., Possingham, H., and Young, M., 2002, *Sustaining our Natural Systems and Biodiversity: an independent report to the Prime Minister's Science, Engineering and Innovation Council*. CSIRO and Environment Australia, Canberra.
- Russell-Smith, J., Start, T., & Woinarski, J.C.Z. 2002, 'Effects of fire in the landscape', in *Savanna burning: Understanding and using fire in northern Australia* (eds) R. Dyer, P. Jacklyn, I. Partridge, J. Russell-Smith & R.J. Williams, Tropical Savannas Management Cooperative Research Centre, Darwin, pp. 29–49.
- URS (2001) *Impact Assessment of the Tropical Savannas Cooperative Research Centre* Final Report to the Tropical Savannas CRC, Darwin
- Woinarski, J.C.Z. & Ash, A.J., 2002, 'Responses of vertebrates to pastoralism, military land use, and to landscape position, in a tropical savanna woodland in northern Australia', *Austral Ecology*, 27(3): 311–324.
- Woinarski, J.C.Z. and Recher H.F., 1997, 'Impact and response: A review of the effects of fire on the Australian avifauna', *Pacific Conservation Biology*, Vol.3, pp.183–205.
- Woinarski, J.S.Z., Milne, D.J. & Wanganeen, G., 2001, 'Changes in mammal populations in relatively intact landscapes of Kakadu National Park, Northern Territory, Australia', *Austral Ecology*, vol.26, pp.360–370; in Sattler and Creighton, 2002.