



Clockwise from main image: Male wallaroos dispute, photo: Jenny Martin; Gouldian finch, photo: Stephen Garnett; Alaric Fisher holds a northern quoll; Sandstone towers at Broadmere Station, NT Gulf, photo: Alaric Fisher; Clearing in the Daly Basin, photo: Brooke Rankmoore; Alex Kutt with research trap.

## Narrow path between hope and despair: The north's environmental future

*John Woinarski led the Tropical Savannas CRC's various research programs on savanna biodiversity for more than 10 years. Here is a talk he gave to the Savannas Future Forum\* reflecting on the programs' achievements and challenges for the future. By John Woinarski and Alaric Fisher.*

There has been a substantial savanna biodiversity program for the lifetime of two iterations of the Tropical Savannas CRC (1996–2008). There were a number of general objectives: some were to increase our basic knowledge of the distribution and conservation status of savanna biota; others to investigate the impacts of a range of land management regimes on biodiversity. We worked to better incorporate biodiversity conservation considerations into land management planning and decision-making; and to develop robust techniques for assessing and monitoring biodiversity 'health'.

We also worked to provide information about biodiversity in useful forms to a wide array of land managers and other stakeholders.

Over the past 15 years, these objectives were largely achieved, resulting in a great increase in understanding and appreciation of the biodiversity of the tropical savannas, on lands of all tenures and across a wide range of stakeholder groups. Near-comprehensive databases of the known locations for vertebrate and plant species were compiled across the tropical

savannas. A large number of systematic biodiversity surveys addressed substantial gaps in this baseline information or, where they have resampled areas where historical data exists, been very important in highlighting changes in biota, particularly declines in the small mammal and bird fauna.

Research projects also clarified the impacts on biodiversity of grazing pressure from cattle; of clearing and fragmentation, and thickening or thinning, of vegetation cover; of the spread of introduced pasture grasses; and of changes in fire regimes. Robust biodiversity monitoring programs have been implemented in some areas, and we have a much greater understanding of the value, and inadequacies, of various surrogates and indices for biodiversity condition.

We have developed robust principles or guidelines for biodiversity-friendly land-management practices, and had substantial input to jurisdictional conservation planning and regional natural resource management plans.

Our projects have generally been collaborative efforts with Indigenous ranger groups, local landcare organisations, conservation agencies, non-government conservation organisations,

natural resource management regional bodies, and individual land managers. We have also attracted considerable complementary funding from many sources, including Land & Water Australia, Meat and Livestock Australia and the Natural Heritage Trust, and several ongoing projects will continue to address the objectives of the TS-CRC after its demise.

The wealth of biodiversity information and the effects of land management compiled during this program is now widely available to land managers and the general public via user-friendly websites such as Land Manager and Biodiversity Info-Net ([www.landmanager.org.au](http://www.landmanager.org.au)) and ([www.infonet.org.au](http://www.infonet.org.au)). Additionally, the program was associated with more than 200 scientific papers, reports and books relating to savanna biodiversity and sustainable land management, which have extended to a national and international audience.

**Critical juncture**

These achievements, and much other fine work by those both within and outside the CRC umbrella, have not secured the future for Australia’s tropical savanna biodiversity. Rather, we feel that we are now close to a critical juncture for this future. There is a narrow and diminishing path between hope and despair for the environmental future of northern Australia.

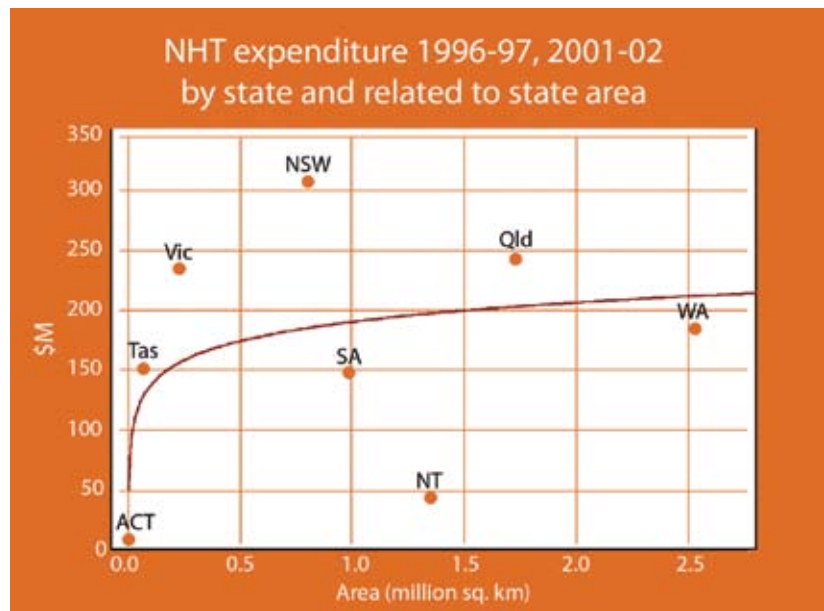
As development and degradation continue and accelerate, we may slide further down the familiar path of biodiversity decline followed over the past two centuries in our southern landscapes. Alternatively, we may recognise and embrace the opportunity to maintain and nurture our largely intact savanna landscapes and to better value and safeguard their magnificent biota.

**Key needs for the future**

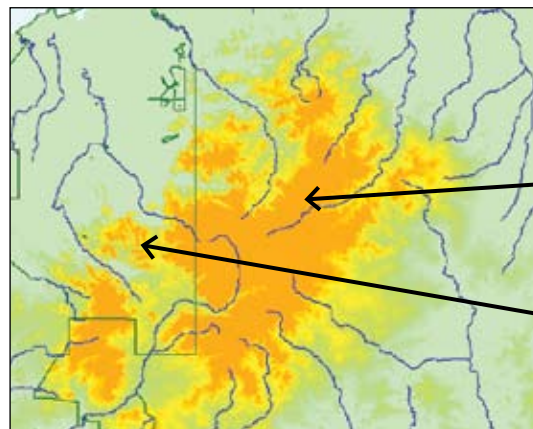
Following is an attempt to describe some key requirements to realise a future where savanna landscapes are valued and nurtured. These are far broader than a strict research agenda, but this reflects the essential need for a general change in attitude to how the savannas, and their biodiversity, are perceived, and to the national priorities for natural resource management.

*Correction of the distortion in the national environmental perspective and resourcing for environmental management*

The tropical savannas are alien to most Australians, inadequate attention is paid to their future by southern decision makers, and resourcing for environmental management is minuscule in relation to their size and significance for biodiversity. While low population density and limited capacity may be impediments to natural resources management, greater investment in maintaining relatively healthy systems will ultimately be



*Natural Heritage Trust expenditure: the graph shows the discrepancy between expenditure on environmental management and geographical area; the trend in spending in this graph and below is similar in the late 2000s.*



*Left, the difference in environmental spending between Kakadu and Arnhem Land in early 2000s*

*Arnhem Plateau: expenditure \$0.83/km²*

*Kakadu National Park: expenditure \$725/km²*

far more cost-effective than attempting to restore decimated landscapes and rescue species on the cusp of extinction.

*Systematic long-term land use planning that recognises and retains conservation values as the foundation of a sustainable future*

The integrity of the tropical savannas and the underlying ecological processes should be recognised as an essential component of the future of this region. Development should proceed only where it does not diminish this essence, and land use planning should be built around maintaining the connectivity and functioning of savanna landscapes.

*Broad-scale programs to staunch ongoing decline in biodiversity*

While a number of factors have been implicated in the insidious decline of some components of the savanna biota, a sustained research program is required to better elucidate the causes of decline, linked to carefully targeted management and a program of monitoring biodiversity and its responses to management intervention.

*Implementation of robust, landscape-scale biodiversity monitoring programs, linked to adaptive land management regimes*

There needs to be recognition that biodiversity monitoring

# The north's environmental future

→ **Pg. 15** should be a foundation for measuring environmental sustainability and a key component of adaptive land management, with adequate, long-term resourcing. The efficacy of land management interventions needs to be assessed by such monitoring programs across all land tenures.

## *Mitigation of the impacts on biodiversity of pastoral land use*

As the dominant land use in the tropical savannas and with virtually complete hegemony over many savanna ecosystems, impacts from pastoralism will continue to be critical to the long-term fate of savanna biodiversity—more so with continuing pressures to intensify pastoral production across this region.

These impacts must be mitigated through improved representation of productive landscapes in the protected area system; a combination of appropriate incentives and legislative requirements for the retention of biodiversity on pastoral lands; and tight regulation of land clearing and use of introduced pastures.

## *Secure long-term resourcing for conservation land management by Indigenous people*

Indigenous people manage large areas of the tropical savannas, including many of the areas of outstanding conservation significance. Much of this management responsibility has been formalised through the recent development of indigenous land management organisations and Indigenous Protected Areas, as well as joint management arrangements of conservation reserves, but the impediments of limited capacity, inadequate resourcing and insecure or short-term funding must be addressed. As in other tenures, it is important to link funding for environmental management to explicit outcomes and assess the efficacy of management through adequate monitoring.

## *Implementation of a carbon-trading scheme that rewards retention of native vegetation and application of benign fire management*

Active management of land to maintain or improve biodiversity values is most likely to occur if landholders receive a tangible benefit from doing so. One mechanism by which this could

occur is through carbon offset schemes, which may apply both to retaining native vegetation (which may otherwise be cleared for pastoral or agricultural development), and landscape-scale programs to reduce the frequency and severity of fires.

## *A strategy to safeguard the biota most susceptible to impacts of global climate change*

We have done little to address this threatening process during the savanna biodiversity project. While the direct effects of climate change may not be ameliorated, it is essential we understand the risks that it poses to savanna biodiversity, develop strategies to protect the most susceptible elements, and retain intact ecosystems over broad scales in order to maximise options for species' adaptation to these changes.

## *Development of research and management program for understanding and maintaining tropical savanna dynamics*

The dynamic nature of tropical savannas, both spatially and temporally, is important for many components of biodiversity. While we have been very good at studying pattern, we are less advanced in understanding these processes, and this needs to be addressed through 'big picture', long-term research.

## *Elaboration of international linkages to other tropical savannas*

There is a substantial opportunity to increase our understanding of tropical savannas through better communication and collaboration with researchers and land managers internationally, and we can also better contribute to better management of tropical savannas globally.

## **Acknowledgements**

*We gratefully acknowledge the participation of many staff, students, collaborators and volunteers in savanna biodiversity projects over the lifetime of the Tropical Savannas CRC. The CRC played a crucial role in advancing conservation of tropical savannas biodiversity, both through financial support and by facilitating communication and partnerships between a diverse array of agencies, organisations, researchers, land owners and managers. — John Woinarski.*

## Window to further information

\* Savannas Future Forum <[www.savanna.cdu.edu.au/news/futures\\_forum.html](http://www.savanna.cdu.edu.au/news/futures_forum.html)>

### **Research publications**

<[www.savanna.cdu.edu.au/publications/publications\\_from\\_r.html](http://www.savanna.cdu.edu.au/publications/publications_from_r.html)>

### **Monitoring Biodiversity Reports**

<[www.savanna.cdu.edu.au/publications/monitoring.html](http://www.savanna.cdu.edu.au/publications/monitoring.html)>

### **Biodiversity Publications**

<[www.savanna.cdu.edu.au/publications/managing\\_biodiversity.html](http://www.savanna.cdu.edu.au/publications/managing_biodiversity.html)>  
*The Nature of Northern Australia—Natural*

*values, ecological processes and future prospects*, Australian University Press:  
<[epress.anu.edu.au/nature\\_na\\_citation.html](http://epress.anu.edu.au/nature_na_citation.html)>

*Lost from our Landscape—Threatened species of the Northern Territory*

<[www.savanna.cdu.edu.au/publications/lost23.html](http://www.savanna.cdu.edu.au/publications/lost23.html)>

### **Sites of Conservation Significance in the NT**

<[www.nt.gov.au/nreta/environment/conservation/map.html](http://www.nt.gov.au/nreta/environment/conservation/map.html)>

### **Research projects**

<[www.savanna.cdu.edu.au/research/projects/conservation.html](http://www.savanna.cdu.edu.au/research/projects/conservation.html)>

### **PhD projects**

<[www.savanna.cdu.edu.au/education/phd\\_projects\\_2001\\_2007.html](http://www.savanna.cdu.edu.au/education/phd_projects_2001_2007.html)>

### **Mammal Decline**

<[www.savanna.org.au/all/decline\\_fauna.html](http://www.savanna.org.au/all/decline_fauna.html)>

### **Information for schools**

EnviroNorth: <[www.environorth.org.au/learn/savanna\\_walkabout/index.html](http://www.environorth.org.au/learn/savanna_walkabout/index.html)>