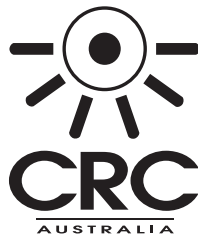


# Cooperative Research Centre for **Tropical Savannas Management** **Annual Report 2001-2**



Established and supported  
under the Australian  
Government's Cooperative  
Research Centres Program



# Mission

To achieve sustainable use  
and conservation of Australia's  
tropical savannas through excellence  
in collaborative research,  
communication and education

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ISSN 13274902

# Contents

Centre Objectives .....	1
Executive Summary, Highlights .....	2
Structure and Management .....	4
Cooperative Linkages .....	8
Research .....	13
Education and Training .....	22
Utilisation and Application of Research, Commercialisation, Links with Users .....	27
Staffing and administration .....	36
Publications .....	37
Public Presentations, Public Relations and Communication .....	43
Grants and awards .....	46
Performance Indicators .....	47
Abbreviations and Acronyms .....	50
Budget .....	52
Audit .....	67

## Tables

Table 1 Cooperative Linkages .....	19
Table 2 Student Research Details .....	25
Table 3 Consultancies and Research Contracts .....	29
Table 4 Centre Research Users and the Basis of Interaction .....	29
Table 5 Specified Personnel (Clauses 1.1 & 7) .....	36
Table 6 Public Relations and Communication - Media Coverage .....	44
Table 7 Presentations - Staff Outreach Activities .....	45
Table 8 Grants .....	46
Table 9 In-kind Contributions from Partners .....	50
Table 10 Cash Contributions .....	54
Table 11 Summary of Resources applied to Activities of Centre .....	56
Table 12 Allocation of Resources between Categories of Activities .....	56
Table 13 Professional Staff .....	58
Table 14 Summary of Staff Contributions .....	64
Table 15 Support Staff .....	64

## Figures

Figure 1 Organisational Structure .....	4
Figure 2 Number of Publications that acknowledge the CRC .....	48
Figure 3 Extent to which researchers are attracted to visit the Centre .....	48
Figure 4 Awards .....	48
Figure 5 Number of non-university or collaborative staff involved as supervisors .....	49
Figure 6 Media Recognition .....	49
Figure 7 Number of Postgraduate Students .....	49



# Centre Objectives

The Centre will provide up-to-date and scientifically sound information to underpin management of the tropical savannas for sustainable use and for conservation. It will develop scientific principles and conceptual knowledge about the ecological, economic and social functioning of landscapes for the benefit of Australia's tropical savannas and the people who use them.

The Centre will tie its studies into the broad context defined by governments, stakeholders, land users and the community. In addition to its basic research, it will facilitate better management by conducting research, development and learning experiences in participation with tropical savanna stakeholders.

In particular, the Centre will produce:

- management options, along with assessments of their benefits and costs;
- policy options, with analyses of their benefits and costs ;
- information packages and training in their use ;
- educational packages and access processes .

Achievement of the Objectives will be focused through the following Key Result Areas (KRAs) and their specific output targets.

## **1. Healthy landscapes—ecological, economic, and social**

- indicators and attributes of health;
- predictive models of landscape function and the impact of interventions.

## **2. Sustainable management systems**

- landscape monitoring systems and associated management tools and packages;
- management strategies for fire, grazing, tree clearing, restoration and decision support tools and packages;
- environmental management systems and codes of practice.

## **3. Viable and socially desirable regions**

- policy and management options for regional planning and development and associated guidelines and tools;
- regional strategies for multiple land use , restructuring and reinvigoration.

## **4. Productive and capable people**

- communication strategies and processes;
- learning packages and education strategies;
- knowledgeable and employable post-graduate researchers;
- participating staff are more skilled and knowledgeable and able to work in multidisciplinary teams using participative processes.

# Executive Summary, Highlights

The past year, 2001–2, was a year of transition for the CRC, witnessing both the successful conclusion of the first CRC's program and the start of some exciting new directions, as the CRC for Tropical Savannas Management. The continued enthusiastic support of partners and stakeholders, a successful Fifth Year Review and a further seven years of Commonwealth support for the Centre all testify to the success of the former CEO, John Childs, who retired in September 2001. He was succeeded in the role by Gordon Duff, previously Professor of Environmental Science at Deakin University, but with a long-standing association with the original CRC.

With the renewal of the CRC came some changes in management and leadership, including the establishment of four Themes, constructed around the CRC's Key Result Areas and Objectives (see page 4). These objectives are a response to industry, community and government requirements; each is addressed by more than one Theme, and all the CRC's new projects are designed to address a number of themes. This innovative approach differs from the more typical, hierarchical structure of programs and projects, and will lead to greater integration of the CRC's activities. As this report shows, the CRC's themes are already yielding some important outcomes for our partners and stakeholders.

Each Theme now has a full-time leader. Dr John Ludwig (Landscape Ecology and Health) was in place at the time of establishment of the new CRC. Dr Jill Landsberg (Industry and Community Natural Resource Management) started with the CRC in September 2001, and Dr Daniel Walker was appointed to lead the Regional Planning and Management Theme in October 2001. Professor Ian Falk took up his duties in May 2002, as leader of the Human Capability Development Theme.

Outcomes of the Tropical Savannas Management CRC, and the impact of these, 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 TS–CRC 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 TS–CRC has broken down the barriers across the savannas: between the states, between institutions, between stakeholders, and built strong linkages. The result is a TS–CRC 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 TS–CRC."*

The CRC received a favourable First Year Review by the Commonwealth in March 2002. The report noted:

*"This centre addresses an issue of great importance to the whole of the tropical north of Australia," and "The centre is assessed as having made excellent progress, building on the success of its predecessor."*

The Tropical Savannas Management CRC has always invested significantly in communication, networking and bridging gaps between sectors in the savannas. Several major events hosted or supported by the CRC during 2001–2 highlight this commitment. The *Fire and Heterogeneity in Savanna Landscapes* conference held in the July 2002 was a resounding success, attracting eminent researchers from across the north, other parts of Australia and overseas. The conference showcased many of the significant outcomes of the last CRC, and flagged some important future directions. The year also saw the publication of our most significant book to date, *Savanna Burning*, which has attracted widespread acclaim for presenting and integrating multiple perspectives on fire research and fire management in northern Australia. At the Darwin launch the Hon. Bob Collins described it as *"a bloody brilliant book!"*

Communication highlights also included a successful Indigenous Knowledge Conservation forum, held in March 2002. The *Australian* newspaper featured the CRC website among a list of top websites around the world.

While the scientific foundations of the CRC remain strong, the increasing engagement of researchers from new partner agencies adds an important dimension to the skill and knowledge base of the previous CRC. The contribution emerging from the University of Queensland will open up real opportunity to integrate research outcomes into policy and planning at a range of spatial scales, particularly regional. The North Australia Indigenous Land and Sea Management Alliance, also a core partner in the new CRC, presents us with new opportunities to work more closely with Aboriginal stakeholders. Outcomes that will be influenced by these partnerships include removing barriers to implement natural resource management imperatives, and building social capital in indigenous and other communities in the savannas. We have been comparatively successful in capturing skills not traditionally found in scientifically based research centres (e.g. social and economic analysis, regional-scale integration) but it will be an ongoing challenge to build and retain this relatively scarce and increasingly sought-after expertise.

Outcomes presented in this report once again demonstrate that in spite of, or perhaps because of, the vast landscapes and small population, collaboration is something at which we excel in northern Australia. The first year of the CRC for Tropical Savannas Management saw considerable progress towards our Mission: Achieving sustainable use and conservation of Australia's tropical savannas through excellence in collaborative research, education and communication.



***John Kerin***  
*Chair, Board of Management*



***Gordon Duff***  
*Chief Executive Officer*

# Structure & Management

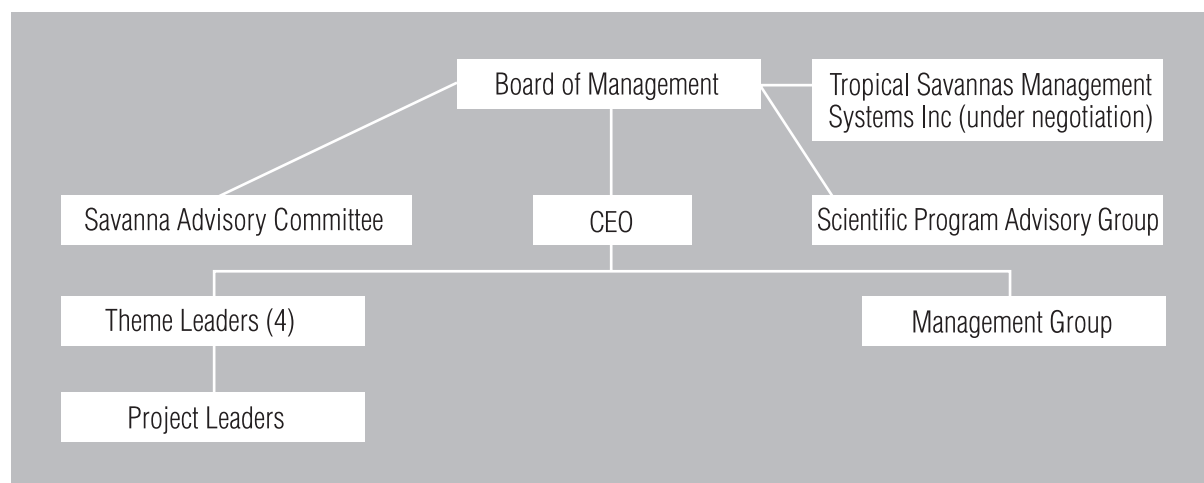
## STRUCTURE

The sustainable use and conservation of northern Australia is the focal point of the TS–CRC. The Centre is an unincorporated joint venture between the Commonwealth and the partner agencies listed below:

- Agriculture Western Australia (AGWEST)
- CSIRO
- Department of Conservation and Land Management (CALM WA)
- Director of National Parks
- James Cook University (JCU)
- Meat and Livestock Australia
- North Australian Indigenous Land & Sea Management Alliance (NAILSMA)
- Northern Territory of Australia
- Northern Territory University
- The State of Queensland
- The University Of Queensland (UQ)

As a result of the Business Plan provided to the Commonwealth in July 2001, the TS–CRC has adopted the organizational structure shown in Figure 1. This new structure has proven to be a sound framework for implementing the Centre’s strategic directions.

**FIGURE 1 TS-CRC ORGANISATIONAL STRUCTURE**



The TS–CRC has a clear strategic framework for the conduct of its scientific, educational and financial business.

Stakeholders are actively involved in the policy, strategic and operational decision making of the Centre through membership of the Board of Management and Savanna Advisory Committee.



## BOARD OF MANAGEMENT

The TS–CRC Board of Management plays an important leadership role. The Board must be analytical and decisive, while at the same time mindful of the need to consult with, understand and incorporate the needs of partner agencies and stakeholders.

Equal representation on the board between stakeholders and partner agencies is an important mechanism for ensuring that this leadership is provided and that the key result areas of the Centre are achieved.

The Board of Management met three times during the past year in Darwin (September 2001 and March 2002) and Kununurra (June 2002). These meetings were held consecutively with Savanna Advisory Committee Meetings.



*Board Members meet in Kununurra in June 2002. L-R Gordon Duff, Steve Morton, Rod Applegate (for Mike Burgess) John Kerin, Tom Stockwell, Greg Robbins, Craig Stewart, Charles Webb.*

Membership (as at 30 June 2002):

The independent chair of the board of management is the Hon. John Kerin.

### Representatives from the TS–CRC partner agencies

<b>Mr Mike Burgess</b>	Northern Territory of Australia, Darwin, NT
<b>Mr David Hartley</b>	State of Western Australia, Perth, WA
<b>Dr Steve Morton</b>	CSIRO, Canberra, ACT
<b>Dr Greg Robbins</b>	State of Queensland, Brisbane, Qld
<b>Prof. Charles Webb</b>	Universities, Darwin, NT
<b>Mr Peter Wellings</b>	Director of National Parks, Darwin, NT

### Stakeholder representation

<b>Ms Michele Bowe</b>	World Wide Fund for Nature (conservation sector), Darwin, NT
<b>Mr Joe Morrison</b>	North Australia Aboriginal Land and Sea Management Alliance, Darwin, NT
<b>Mr Rick Murray</b>	Australian Tourism Council (tourism industry), Darwin, NT
<b>Mr Darryl Pearce</b>	Chair of the Consultative Committee, Perth, WA
<b>Mr Craig Stewart</b>	Mount Isa Mines Ltd. (mining industry), Darwin, NT
<b>Mr Tom Stockwell</b>	North Australia Beef Research Council (pastoral industry), VRD, NT

### Replacements

During the past year Mr Joe Morrison replaced Mr Peter Cooke as the NAILSMA representative. Mr Craig Stewart replaced Dr Tony Milnes as the mining sector representative. Mr David Hartley replaced Dr Neil Burrows as the representative of Western Australia. Ms Michelle Bowe resigned from the Board and will be replaced by Ms Melissa Nursey–Bray in 2002–3 as the conservation sector representative.

## SAVANNA ADVISORY COMMITTEE

The TS–CRC conducts research, communication and education activities for a range of stakeholders involved in natural resource management in northern Australia. These stakeholders include Aboriginal and conservation interests and the pastoral, defence, mining, and tourism industries.

Stakeholders formally contribute to strategy and program development through the Savanna Advisory Committee. This Committee is established by, and reports to, the Board of Management.

The Committee met three times during the past year in Kununurra and Darwin.



Cheryl Amott

*The Savanna Advisory Committee, Kununurra, June 2002. L-R Jann Crase, Darryl Pearce, Sonia Tidemann, Paul Styles.*

### Membership (as at 30 June 2002)

<b>Mr Darryl Pearce (Chair)</b>	Indigenous Management Group, Perth, WA
<b>Mr Tony Law</b>	Department of Defence, Darwin, NT
<b>Ms Jann Crase</b>	Environment Centre, Darwin, NT*
<b>Mr Roger Landsberg</b>	Trafalgar Station, Charters Towers, Queensland (Pastoral Sector)
<b>Mr Ross Brunckhorst</b>	Pastoral Enterprises, Yeronga, Qld
<b>Dr Len Stephens</b>	Meat & Livestock Australia, Sydney, NSW
<b>Dr Laurie Corbett</b>	EWL Sciences Ltd, Darwin, NT
<b>Mr Paul Styles</b>	Tourism Council of Australia, Darwin, NT
<b>Mr Mark Horstman</b>	Kimberley Land Council, Derby, WA
<b>Dr Sonia Tidemann</b>	Batchelor College, Batchelor, NT
<b>Mr Paul Jenkins</b>	Indigenous Land Corporation, Adelaide, SA
<b>Ms Kerry O'Connor</b>	Queensland Conservation Council, Brisbane, Qld*

\* The Conservation sector has a membership rotating between Queensland, and the Northern Territory, depending on the location of the meeting.

## SCIENTIFIC PROGRAM ADVISORY GROUP

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The Scientific Program Advisory Group (SPAG) conducted its annual review of the Centre's program in August 2001. The review was carried out through a participative, interactive workshop with the management group, theme leaders, project leaders and staff of the TS-CRC.

SPAG was impressed with the progress made in the evaluation of the research program. SPAG found that the TS-CRC is rapidly evolving into a cohesive and functional group, with a well-defined framework and clearly identified goals (Key Result Areas). In its report, the group acknowledged the contribution of the departing CEO, Mr John Childs:

*"The SPAG acknowledges the exceptional leadership and management skills of Mr Childs in putting the TS-CRC in its present enviable position"*. (SPAG Report August 2001)

### Membership (as at August 2001)

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<b>Dr John Vercoe (Chair)</b>	Consultant and Centre Visitor, Rockhampton, Qld
<b>Prof. Jon Altman</b>	Centre for Aboriginal Economic Policy Research Australian National University, Canberra, ACT
<b>A/Prof. Jeff Coutts</b>	Rural Extension Centre, University of Queensland, Toowoomba, Qld
<b>Mr Barney Foran</b>	CSIRO Sustainable Ecosystems, Canberra, ACT
<b>Prof. Richard Hobbs</b>	Murdoch University, Perth, WA
<b>Dr Roy Powell</b>	Centre for Agricultural and Resource Economics, Armidale, NSW

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## MANAGEMENT GROUP

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The management group met six times during the year. The role of the management group is to:

- set strategic and tactical direction;
- implement the strategy statement;
- support the theme leaders and process;
- be a sounding board for strategies;
- monitor performance against the strategy statement; and
- develop strategies for project development.

### Membership (as at 30 June 2002)

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<b>Dr Alan Andersen</b>	CSIRO Sustainable Ecosystems, Darwin, NT
<b>Mr Rod Applegate</b>	NT Department of Infrastructure, Planning & Environment, Darwin, NT
<b>Prof. Gordon Duff</b>	CEO, TS-CRC, Darwin, NT
<b>Prof. Greg Hill</b>	Dean, Faculty of Science, IT & Education, NTU, Darwin, NT
<b>Mr David Epworth</b>	Balkanu Cape York Development Corporation, Cairns, Qld
<b>Prof. Ian Falk</b>	Leader, Human Capability Development Theme, NTU, Darwin, NT
<b>Dr Peter Jacklyn</b>	Communication coordinator, TS-CRC, Darwin, NT
<b>Dr Jill Landsberg</b>	Leader, Community & Industry Natural Resource Management Theme, QPWS, Cairns, Qld
<b>Dr John Ludwig</b>	Leader, Landscape Ecology & Health Theme, CSIRO SE, Atherton, Qld
<b>Ms Susanna Martin</b>	Business manager, TS-CRC, Darwin, NT
<b>Dr Paul Novelty</b>	Agriculture Western Australia, Kununurra, WA
<b>Dr Mick Quirk</b>	Burdekin Management Study leader, QDPI, Charters Towers, Qld
<b>Prof. Helen Ross</b>	School of Natural and Rural Systems Management, UQ, Gatton, Qld
<b>Dr Daniel Walker</b>	Leader, Regional Planning & Management Theme, CSIRO SE, Townsville, Qld
<b>Dr John Woinarski</b>	Wildlife Research, Parks & Wildlife Commission, Darwin, NT
<b>Dr Penny Wurm</b>	Higher Education Project Leader, TS-CRC, Darwin, NT

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# Cooperative Linkages

The Centre's partners comprise research organisations—CSIRO and the universities—government land-management agencies and groups representing Aboriginal land managers and pastoralists. These partners are both producers and users of research.

As shown in Table 1, all the Centre's projects involve links between different partners: the TS-CRC allows these partners to work together and learn from each other.

- **Links between jurisdictions across north Australia.** This allows different areas to learn from each other about common land management challenges. For example, *Project 1.2.2 Mammal status in northern Australia* involves links between the wildlife conservation agencies of the Northern Territory, Queensland, Western Australia and federal as well as James Cook University and Northern Territory University.
- **Links between different sectors.** These include conservation agencies and primary industry agencies which allows practices and strategies that take a whole-of-savannas approach to be developed. For example, *Project 2.1.2 Biodiversity on grazing lands* links conservation and research agencies with primary industry agencies and pastoral companies.
- **Links between researchers and research users.** This allows relationships to develop and learning to occur that ultimately enables research to be used effectively. For example *Project 2.3.3 Indigenous ecological knowledge for land management* links ethno-ecologists with traditional owners who want to conserve their own knowledge.

Because of these links, the projects also form the core of the Centre's utilisation and application of research strategy, allowing the production of practical research that can be used effectively. Many projects are actually a combination of more than one of these links that bridge cultures, for example *Project 2.4.1 Fire and savanna landscapes* links conservation, fire-management, indigenous and primary industry agencies and a range of land managers. Such links are difficult to create within a single agency that often can only focus on a particular sector or discipline, or be based in one jurisdiction. Thus the Centre's projects add value to the activities of partners rather than duplicate them.

## How linkages are developed and maintained

There is a strong motivation from our partners to create projects that form these links: they provide the opportunity to do useful research that addresses the common challenges of land management in north Australia and they overcome the lack of resources in single agencies to meet those challenges.

Numerous meetings within projects maintain links. The CRC Theme Leaders also play an important role in facilitating meetings and discussions between researchers and research users.

The Centre as a whole also organises meetings and workshops that bring staff together. For example:

- The February 2002 Communication Strategy Workshop also involved staff in shaping the communication strategy for the new Centre;
- SPAG meeting in August 2001;

The Centre also provides information resources that help staff maintain links:

- Eleven issues of the Centre's email newsletter *Topical Savannas* were sent out to over 300 staff and associates of the Centre across northern Australia. More than 60 issues have now been distributed. This newsletter is archived on the Centre's internal website (accessible to CRC researchers and staff only) and is linked to web-based information resources.



M. Wegmann

Cooperative links between sectors—children from local stations help check pit trap during a biodiversity survey in the Roper Valley, as part of their Katherine School of the Air classes

**TABLE 1 COOPERATIVE LINKAGES**

Project (No. Name, Location, Date Began)	Themes				Cooperative Linkages		
	LEH	NRM	RPM	HCD	Overseas Contacts	Land Managers/ Community	Other Australian Agencies
*T1.1.1 Savanna Form and Function, CSIRO SE, late '95	✓				University of Wageningen, The Netherlands NASA IGBP CSIR South Africa		Greenhouse Acc. CRC NTDIPE ANU NTDBIRD
1.1.1 Predicting outcomes of management, CSIRO SE, 2001	✓				Colorado State University, USA		Catchment Hydrology CRC CSIRO L&W AGO
1.1.3 Soil biota, nutrients and water in savannas, CSIRO SE & L&W, 2001	✓				University of Wurzburg, Germany		MLA QDPI
1.1.4 Savanna carbon dynamics, CSIRO SE, 2001	✓						NTU NTDBIRD QLD Nickel JCU ARC AGO
*T1.2.1 Water and Carbon exchange of savannas, NTU, late '95	✓				Environmentek, South Africa University of Botswana University of Virginia		NTDIPE PWCNT CSIRO L&W CSIRO SE PAWA CSIR
1.2.2 Mammal status in northern Australia, PWCNT, 2001	✓				Conservation International, USA		Parks Australia (North) EPA (Qld) JCU NTU CALM
*T2.1.1 Vertebrate Biogeography, PWCNT, late '95	✓					Various Stations in Central Queensland	CSIRO SE EPA (Qld) PWCNT ADF
2.1.2 Biodiversity on grazing lands, PWCNT, 2001		✓				Heytesbury Beef Roper River Landcare Group	NTDIPE NTDBIRD CSIRO SE QPWS EPA (Qld)
2.2.1 Beef industry best practice, NTU, 2001		✓				NABRC VRDCA Sturt Plateau Group NGRMG Cape River Management Group	QDPI QNRM NTDBIRD CSIRO SE MLA AGWEST

Project (No. Name, Location, Date Began)	Themes				Cooperative Linkages		
	LEH	NRM	RPM	HCD	Overseas Contacts	Land Managers/ Community	Other Australian Agencies
*T2.2.2-3 Grassland patterning and habitat suitability for granivorous birds Decline of Crimson and star finches in Queensland, QDEPA, late '95	✓					Traditional owners in Cape York Peninsula	EA NTU PWCNT EPA (Qld) NHT (CY) Birds Australia
2.2.3 Biodiversity Monitoring, PWCNT, 2001		✓				Heytesbury Beef Roper River Landcare Group	CSIRO SE QPWS EPA (Qld)
2.3.3 Indigenous ecological knowledge for land management, KLC, NLC, BCYDC 2002		✓				KALACC Balkanu	NHT NAILSMA KLC
*T2.4.1 Fire and savanna landscapes, BFCNT, late '95		✓			Indonesian Fire Managers (through ACIAR)  University of Stockholm  Japanese Space Development Agency (NASDA)  University of California, Irvine  NASA  European Space Agency  Texas A&M University  Indonesian Fire Managers	BFCNT VRD regional committee Sturt Plateau Best Practice Group Balkanu KAPA Jawoyn Assoc	CSIRO SE NTU JCU BFCNT Murdoch Uni EA ADF NLC PWCNT NTDBIRD  EPA (Qld) QNRM QFRA QPWS AGWEST CALM WA WA FESA DOLA WA RIRDC ERIN Melbourne Uni. WWF NAFNF AGO
2.1.4 FIREPLAN, BFCNT, 2002		✓			Indonesian Fire Managers	Pastoral Stations Northern Gulf Resource Management Group Cape York Peninsula Development Association Kimberley Fire Management Committee	CSIRO SE QPWS QDPI JCU MLA Ergon Energy  CALM AGWEST DOLA  ACIAR

Project (No. Name, Location, Date Began)	Themes				Cooperative Linkages		
	LEH	NRM	RPM	HCD	Overseas Contacts	Land Managers/ Community	Other Australian Agencies
*T3.1.1-2 Indicators of Landscape Health, and Land Condition Assessment, NTDIPE, late '95		✓				Heytesbury Beef Sturt Plateau Technical Group	NTDBIRD ADF  AGWEST CSIRO MIS CSIRO SE QDPI NTDIPE BFCNT  QNRM NLWRA
3.1.2 Innovation, social policy and adjustment – scoping study, UQ, 2001			✓				AgFORCE
3.1.3 Knowledge building, UQ, 2002			✓				
3.1.5 Modelling regional dynamics, CSIRO SE, 2002			✓				
3.1.7 Community benefits from tourism, CSIRO SE, 2002			✓				
3.2.1 Bioregional planning, UQ, 2001			✓				QNRM NTDIPE
3.2.2 Regional vegetation management, QNRM, 2001			✓				UQ
*T3.3.2 Fire and Rubbervine, CSIRO TAG, QDNR, late '98	✓		✓			Seventy Mile Range Catchment Group Mt Cooper Bushfire Brigade	EPA (Qld) JCU
3.3.3 Tourism, two laws and savanna lands, UQ, 2001			✓			Yanyuwa Community Coastcare	NTDBIRD  PWCNT
4.1.1 Provision of Higher Education				✓			JCU UQ Batchelor Institute
4.3.1 Communication Resources, NTU, JCU, 2001				✓			All Partner Agencies

Project (No. Name, Location, Date Began)	Themes				Cooperative Linkages		
	LEH	NRM	RPM	HCD	Overseas Contacts	Land Managers/ Community	Other Australian Agencies
*T4.3.5 Sustainable Grazing Management in the Burdekin, QDPI, late '98		✓				Various landholders in the catchment through QDPI extension Dalrymple Landcare Committee Upper Burdekin Landcare Groups BeefPlan producer group	CSIRO L&W CSIRO SE EPA (Qld) GBRMPA NTDIPE NHT MLA NTDBIRD QNRM

\* T denotes a transitional project from the earlier round TS–CRC that was finalised in 2001–2.



# Research

## THEME 1 LANDSCAPE ECOLOGY AND HEALTH

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**Leader Dr John Ludwig, CSIRO SE, Atherton, Qld**

### Summary

This has been a busy year for all Theme Leaders, developing their portfolio of projects. For Theme 1, the portfolio of projects is relatively complete, with four current projects producing new findings and with two new projects being developed to come on-line in 2002–3. The short titles for the four current projects include: 1.1.1 *Predicting outcomes of management*; 1.1.3 *Soil biota, nutrients and water in savannas*; 1.1.4 *Savanna carbon dynamics*; 1.2.2 *Mammal status in northern Australia*, and the two new projects coming on-line include: 1.2.1 *Savanna riparian health* and 1.1.5 *Impacts of exotic grasses*. All these projects aim to contribute to all Key Result Areas, particularly KRA 1, which is to achieve healthy savanna landscapes by developing a greater ecological, economic, and social understanding of how they function. Workshops and meetings were held to develop project goals, objectives, methods, deliverables, milestones, outcomes, and budgets. Workshops and field trips to engage stakeholders in project development also took place, for example those to the northern and southern Gulf of Carpentaria.

### Progress

The four current projects in Theme 1 with some key research findings for 2001–2 included the following.

#### **1.1.1 Predicting outcomes of management—Leaders: Drs John Gross and John Ludwig (CSIRO SE)**

This project is developing and using simulation-modelling tools to predict the outcomes of different savanna management options and strategies. A ‘Savanna’ simulation computer model was developed and used to predict the rate of woody thickening for paddocks in the VRD as influenced by combinations of fire and cattle grazing. The modelling was done in collaboration with Dr Mike Coughenour, from Colorado State University, USA. A ‘Flames’ simulation computer model, developed by Drs Garry Cook and Adam Liedloff was used to predict how different fire regimes affect savanna tree populations. The usefulness of this model was demonstrated to the Australian Greenhouse Office (AGO) for addressing questions of how different fire regimes influence carbon stocks and rates of carbon sequestration by savanna trees. AGO is now supporting fire-management studies in Arnhem Land that actively engage indigenous people and that complement the TS–CRC’s fire ecology and management project FIREPLAN.

#### **1.1.3 Soil biota, nutrients and water in savannas—Leaders: Drs Mike Webb (CSIRO L&W) and Garry Cook (CSIRO SE)**

A key finding for this year was that there were large differences in pasture biomass between cattle grazed and non-grazed (cattle excluded) treatments but surprisingly little difference in the nutrient stocks between these two treatments. These results were based on measurements made on the Wambiana grazing study near Charters Towers, Queensland. It appeared that nutrients in the grazed areas accumulated at the surface to a greater extent than in the areas not grazed by cattle. These findings suggested a greater turnover of nutrients in ungrazed areas and that nutrient turnover rate, rather than nutrient amount, is the key process in these savanna landscapes.

#### **1.1.4 Savanna carbon dynamics—Leaders: Drs Andrew Ash and Dick Williams (CSIRO SE)**

Using a National Carbon Accounting System (NCAS) protocol, a dedicated team sampled 20 trees of *Eucalyptus foelscheana* at Katherine Research Station, determining fresh and dry weights from the component parts of trees. Carbon stocks of savanna trees can now be estimated using regression relationships between dry weights and parameters such as tree diameter. Below-ground biomass was also sampled, using a NCAS protocol, resulting in estimates of carbon stocks in tree roots. Carbon stocks in soils were also determined.

This project also added value to a large international Free Air Carbon Dioxide Enrichment (FACE) experiment being conducted in a coastal tropical savanna located at Queensland Nickel’s Yabulu refinery north of Townsville. The CRC’s contribution was to measure the impact of elevated CO<sub>2</sub> and simulated grazing on soil carbon dynamics, and hence changes in soil carbon pools. By the end of June 2002, baseline (prior to treatment) and initial post-treatment sampling was completed.

### **1.2.2 Mammal status in northern Australia—Leader: Dr John Woinarski (PWCNT)**

This project is measuring the abundance of mammals at a series of sites for which prior survey data is available. Intensive fieldwork re-sampled mammals at more than 250 sites in the southern half of Kakadu National Park; sites that were previously sampled in 1988–90. Native mammals at more than 50 sites in central Queensland, previously sampled about 20 years ago, were re-sampled. These data are now being analysed to determine if mammals are really declining across our savannas. Data for other sites across northern Australia are also being collected.

The two newly developed (and developing) projects due to come online in 2002–3 include:

#### **1.2.1 Savanna riparian health—Leaders: Dr Michael Douglas (NTU) and Dr George Lukacs (JCU)**

This new project, approved by the Board to start in July 2002, was developed through a series of workshops and meetings in 2001–2 between riparian researchers from the Northern Territory, Queensland, and Western Australia, involving people in commonwealth, state and territory agencies, and universities. There are three main aims: (1) to develop an understanding of, and indicators for, savanna riparian health in relation to natural and threatening processes, (2) to develop and test practical management options that maintain savanna riparian health and, if necessary, restore health, and (3) to develop and disseminate best-practice guidelines for managing riparian systems in savannas. Seven activities are planned for 2002–3.



*Riverside or riparian systems are small in area but are a vital part of savanna landscapes—and will be the focus of a new TS–CRC project*

#### **1.1.5 Impacts of exotic grasses—Leaders: Dr Sam Setterfield (NTU & TS–CRC), Dr Tony Grice (CSIRO & Weeds CRC)**

This is a joint project between the TS–CRC and the Weed Management Systems CRC. Meetings and workshops between the two CRCs will be held in July, August and September 2002 to finalise objectives, methods, deliverables, milestones and budgets. The goal is to present this joint project submission to the TS–CRC Board of Management at its October meeting, with a planned start for January 2003. Some related research by students is already initiated and this research will be built into this project as it develops. The three major aims are: (1) to quantify water use, carbon assimilation, and nitrogen cycling process for key exotic tropical grasses in comparison to native savanna grasses; (2) to determine how these processes respond to different fire and grazing regimes; and (3) to develop practical options for managing exotic grasses that can be tested by simulation models. The development of these management options will strongly involve the Weed Management Systems CRC, and their collaborative connections with state and territory land-management agencies.

### **Highlights and Challenges**

There were a number of research highlights in 2001–2, but project leaders also faced a number of challenges in 2001–2 that continued into 2002–3. Some of the challenges included:

- Achieving a better understanding of the interface between vegetation, soil biota and processes such as nutrient cycling and water redistribution in savanna ecosystems so that better land-management options are developed to better maintain soil health and benefit the whole savanna ecosystem.
- Effectively gathering and integrating new CRC research findings on how savannas function, and then building this new understanding into predictive simulation tools so that we have confidence in model predictions and can test different savanna management options and guidelines. Another challenge is developing new savanna management models that address ecological, economic and social questions at enterprise and regional scales.

## Future directions

In 2002–3 work will continue with project leaders and other participants to meet the challenge of filling gaps in our knowledge about savanna ecosystems. There are plans to provide these researchers with a national and international overview of savanna research on landscape ecology and health. This overview will help to lead future directions in savanna research.

TS–CRC research findings in these areas will also be communicated to national and international audiences. In September 2002, research findings on the role of vegetation patches in retaining run-off and sediments on savanna hill slopes will be presented to a special ‘Chapman Conference’ on Eco-hydrology of semi-arid landscapes. This conference is being sponsored by the American Geophysical Union. A symposium has also been organised at ‘Ecology 2002’, a joint meeting of the Ecological Society of Australia and the New Zealand Ecological Society, which is being held in Cairns, 2–5 December, 2002.

A symposium is also under development on savannas for the World Congress of the International Association of Landscape Ecology, being held in Darwin in July 2003, which will have a number of presentations from TS–CRC researchers.

## THEME 2 INDUSTRY AND COMMUNITY NATURAL RESOURCE MANAGEMENT

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**Leader Dr Jill Landsberg, JCU/QPWS, Cairns/Mareeba, Qld**

### Summary

The overarching function of the Centre is to enable Australia to use the natural resources of the savanna lands in a wise and sustainable way. The particular objectives of Theme 2 are to produce management options within this context, along with assessments of their benefits and costs, while recognising that industries and their enterprises must be economically viable if savanna communities are to be sustained. Increasingly, this includes meeting market and societal standards of environmental responsibility and ecologically sustainable management.

Achievement of the Centre’s objectives is focused through four specific Key Result Areas:

1. Healthy landscapes;
2. Sustainable management systems;
3. Viable and socially desirable regions; and
4. Productive and capable people.

The KRA most relevant to Theme 2 is sustainable management systems, the specific output targets for which are:

- landscape-monitoring systems and associated management tools and packages;
- management strategies for fire, grazing, tree clearing, restoration and decision support tools and packages; and
- environmental management systems and codes of practice.

### Progress

The Theme’s portfolio of projects during 2001–2 focused on industry and community management of four key issues: fire, biodiversity, grazing, and indigenous ecological knowledge. The portfolio included transitional projects carried over from the previous CRC, new projects with budgets approved during 2001, and developing projects working toward budget approval during 2002.

#### T2.4.1 Fire and savanna landscapes—Leader: Dr Jeremy Russell-Smith (BFCNT)

This project drew to a successful conclusion with the 2001 publication of the book *Savanna burning: Understanding and using fire in northern Australia*, and the hosting of two important conferences in mid-2002. These were the international conference *Fire and Savanna Landscapes—Regional Lessons and Global Challenges*, in Darwin, and the *Fifth North Australia Fire Manager’s Workshop* in Timber Creek, NT. Development of a new fire project proceeded concurrently, with a number of CRC-hosted workshops and the dedicated effort of a steering group led by Rodd Dyer from the NTDFPIF.

#### **2.1.4 FIREPLAN—Leader: Dr Jeremy Russell-Smith (BFCNT)**

*FIREPLAN* builds on directions set in *T2.4.1 Fire and savanna landscapes*. The project will continue to assist with the development and implementation of regional fire-management initiatives, such as those established previously for Cape York, the Sturt Plateau and VRD region (NT), western Arnhem Land, and the Kimberley. It is anticipated that most of these projects will be extended, albeit with modified purposes, with renewed funding from the Natural Heritage Trust (NHT) and other sources. Major new regional initiatives will come on line, including fire and pastoral management in the Gulf region of north-west Queensland, the Barkly region of the Northern Territory, and eastern Indonesia. Core activities during 2001–2 included: establishing major regional fire-management projects in the Gulf (in partnership with MLA) and in eastern Indonesia (in partnership with ACIAR); establishing a review of fire-management practice on conservation reserves; establishing a PhD fire-management research program with ERGON Energy in north-west Queensland; supporting a community fire program in the Kimberley; promoting the use of remote sensing and associated GIS products as aids for improving fire management at property, regional and continental scales; and assisting generally with the development of, and attaining funding for, fire management and research programs of relevance to the savanna community.

#### **1.2.3 Biodiversity monitoring—Leader: Dr Alaric Fisher (PWCNT)**

There are two related biodiversity projects looking at monitoring and conserving biodiversity on pastoral lands. A significant goal of both projects is to have a broad geographic focus with study sites in both the Northern Territory and in northern Queensland, where pasture types, land-use regimes and land condition indices differ significantly. Alex Kutt of QPWS was appointed in April 2002 to lead the Queensland component of both projects.

The monitoring project seeks to establish whether widely used attributes of rangeland condition, such as perennial grass frequency, landscape function analysis or remotely sensed cover-change assessment, can serve as indicators for the status of biodiversity. Sample sites were chosen on a number of properties in the Victoria River District, (NT) using condition maps derived from satellite imagery. Sampling will be undertaken in the dry season of 2002. In Queensland, site selection began in the Dalrymple Shire.



*Project Leader Alaric Fisher surveys for sample sites from one of the few areas of high ground in his study area in the Roper River region*

#### **2.1.2 Biodiversity on grazing lands—Leader: Dr Alaric Fisher (PWCNT)**

The second project addresses how biodiversity values can be maintained outside reserves, particularly in pastoral lands where the major impacts on biodiversity are related to stocking pressure, waterpoint distribution and fire management. Within the Northern Territory, activity was concentrated in two areas:

1. a collaborative project with the Roper River Landcare Group which aims to document biodiversity values on pastoral leases in the region, and develop management strategies which will maintain these values; and
2. a research program in collaboration with Heytesbury Beef to incorporate biodiversity conservation issues into the Pigeon Hole R&D project, which will test the sustainable intensification of pastoral use in the Victoria River region.

In Queensland, activity focused on identifying potential 'reference' areas with histories of minimal grazing impact and developing links with land management groups and other natural resource management agencies.

#### **2.3.3 Indigenous ecological knowledge for land management—Leaders: Mark Horstman (KLC), Peter Cook (NLC) and Nick Smith (BCYDC)**

This project comprises three sub-regional activities in the Kimberley, central and western Arnhem Land, and Cape York Peninsula. In the Kimberley, the KLC Land+Sea Unit began the *Walangkarr Jirrkaliy* Healthy Country project, in the south-west Kimberley. Initial community meetings were held, and a project coordinator, Ms Sarah Yu, of the KLC Land+Sea Unit was appointed. The project aims to improve the management of the natural and cultural values of Walangkarr (ranges) and Jirrkaliy (creeks) in a sub-catchment of the lower Fitzroy River, and strengthen the role of the Traditional Owner communities in undertaking and forming partnerships for management.

In the Pine Creek Arnhem/Central Arnhem bioregions, Peter Cooke and Dean Yibarbuk worked to build organisational capacity for indigenous land management. They revised their original proposal to the TS–CRC in November 2001, to take advantage of a major NHT Bushcare grant, and position the TS–CRC component more effectively within the new, larger project. The project now focuses on the conservation of indigenous knowledge as a key element of capacity building in land management for the region.

In central Cape York Peninsula, Nick Smith is concentrating on *in situ* maintenance of traditional knowledge within the cultural groups of the region, as well as considering strategies for the *ex situ* preservation of knowledge and its use by others. Working relationships with traditional owner groups were established, and on-ground work included the collection and storage of ecological and limited cultural information, plus making practical arrangements for the provision of access to this and future information.

### **2.2.1 Beef Industry Best Practice-Leader: Mr Steve Tapsall, TS–CRC**

Project leader Stephen Tapsall was appointed in January 2002. The project has a strong industry focus, and operates under the direction of a steering committee comprising NABRC, the MLA and the TS–CRC. Detailed discussions were held with regional groups in Queensland, the Northern Territory and Western Australia to identify principles and practices that have widespread industry support. The project will use the Best Practice Process and be informed by TS–CRC knowledge of critical aspects of landscape health. Once Best Practices for a number of regions have been identified, documented, and formally agreed to by industry, they will form the basis for an industry code of practice.

### **2.1.1 Grazing Land Management-Leaders: Dr Mick Quirk (QDPI) & Mr Bob Karfs (NTDIPE)**

This project is under development and focuses on the work government agencies undertake. It developed from disparate expressions of interest and a subsequent TS–CRC workshop where proponents and interested parties met to explore common and complementary interests. Several multi-jurisdictional activities were identified for further development, with the following set of objectives as a first approximation of project aims:

- facilitate/initiate/develop an ongoing process of Best Practice environmental management;
- extrapolate understanding of savanna grazing processes from data-rich to data-poor areas;
- facilitate management of risks associated with grazing (for which one output will be decision tools to test options for sustainable intensification);
- share information among project partners.

## **Highlights and Challenges**

Theme 2 fire projects have an extensive network of regional, state, national and international linkages. Both biodiversity projects have also been able to build on the many linkages established under the first phase of the TS–CRC, particularly in the Northern Territory. These linkages are currently being extended to Queensland, through the active involvement of staff from QPWS, EPA (Qld) and QNRM in locating and sampling sites using similar protocols.

For the ethno-ecology projects, a highlight as well as a key challenge in the early stages, was to encourage collegial relationships and establish common research directions. Managing fieldwork within the limitations on access to lands imposed by seasonal conditions and ceremonial requirements was a further challenge, but also an opportunity to develop more complex understandings. Developing linkages with other researchers can also be problematic because the collegial method of research is often at odds with the prescribed methodologies of prospective collaborators who have a preconceived notion of the role indigenous people will play in their research. Progress is being made in fields of common interest, such as fire and exotic pasture species research.

A highlight in building linkages was a workshop held in late March 2002 to clarify some of the issues surrounding conservation of indigenous knowledge. It attracted about 20 people from around Australia including those involved in on-ground indigenous knowledge conservation projects, anthropologists and linguists, GIS and computer database specialists, and multi-media specialists who had worked with Aboriginal communities.

There is also strong support for TS–CRC research from individual pastoralists, regional groups and pastoral companies. This is a challenge to researchers to ensure that expectations of results do not exceed their capacity to deliver with the available resources.

## Future directions

Common future directions for all projects in Theme 2 include:

- building stronger collaborative relationships between and among researchers from all CRC partners, and land managers from all sectors across the tropical savannas;
- developing self-sustaining systems of information and knowledge management that empower savanna managers to continue adaptive management beyond the life of the CRC; and
- ‘mainstreaming’ the involvement of indigenous communities in each of the current focus issues. This is already happening in parts of the fire project, but there is considerable scope to expand biodiversity and grazing research to include the needs and interests of indigenous communities, not in isolation as currently happens, but as an integral part of each activity area. An important part of expanding in these directions is building capacity for mutual understanding and appreciation in both western researchers and indigenous communities.

## THEME 3 REGIONAL PLANNING AND MANAGEMENT

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Theme Leader Dr Daniel Walker, CSIRO SE, Townsville, Qld

### Summary

Research in Themes 1 and 2 of the CRC evolved from the core research undertaken in the first CRC. By contrast, the research in the Regional Planning and Management theme brings a new set of research questions and skills that build on, but are different from, the foundations established in the first CRC. The new Theme is based on recognition of a need for research in regional analysis and planning (including social and economic research integration with biophysical insights) in seeking to fulfil the CRC’s mission in environmental protection, sustainable use and economic development, social development, and personal capacity building for Australia’s tropical savannas and its people.

Within this context the specific objective of Theme 3 is to achieve or restore healthy landscapes by accommodating a range of overlapping uses and needs within an economic, social and cultural context. This requires an understanding of the social and economic dynamics of savanna regions and of the inevitable interactions and trade-offs necessary to meet the needs of the environment, communities and regional economies. This understanding underpins the development of frameworks to allow sustainable planning and management to meet this complex mix of public and private needs, responsibilities, benefits and costs.

The first year for this new Theme involved refining a consensus on research priorities: building relationships and inducting new researchers into the TS–CRC; beginning a suite of foundation research projects that provide key benchmarks for further research and help refine the scope of the theme’s activities; and developing a suite of new activities.

### Progress

Theme 3 comprised four research projects in 2001–2, as follows.

#### 3.1.2 Innovation, social policy and adjustment— Leaders: Profs Helen Ross and Ockie Bosch (UQ)

This scoping study was conducted to identify research issues and locations for continuing research on regional planning and sustainable management of the tropical savannas. Work began with literature review and background statistical data collection on the biophysical and social characteristics of tropical savanna bioregions, social research conducted nationally which is pertinent to understanding the social dynamics of the tropical savannas, and previous savanna and rangeland regional studies. This was complemented by key interviews with



*Ockie Bosch and Helen Ross take a break during a visit to the northern Gulf region of Queensland*

selected researchers and public servants, to gain the benefits of others' understandings of emerging research requirements. Visits were made to the Desert Uplands and northern and southern Gulf regions as potential case study regions, and also to the Mitchell Grasslands region (Longreach, Winton, Barcaldine) towards a PhD study. Key opportunities for research in better information management were identified.

This scoping study fed into the two projects outlined below.

### **3.2.1 Bioregional planning—Leader: Prof. Geoff McDonald (UQ)**

This two-year project is reviewing regional natural resource management (NRM) planning practices across the tropical savannas. The project is evaluating the technical capacity of regional plans to deliver on stated sustainability objectives, thereby providing a benchmark for plan preparation and evaluation. Progress to date included preparing protocols and techniques for research and testing the concepts with key stakeholders. Completed work included the definition of the NRM regions, planning activities and contacts, a review of planning systems evaluation research and savanna health criteria and indicators. Requirements for ecological, economic and social criteria (and gaps) were also identified for application to regional NRM planning. An assessment of methods and protocols for field application were also prepared and tested.

### **3.2.2 Regional vegetation management—Leader: Dr Allan Dale (QNRM)**

The project is currently undertaking a participative evaluation of regional vegetation and water-resource planning in the Fitzroy and Burdekin regions of Queensland. The purpose of the evaluation, which focuses on participation, technical support and information, and planning integration at the regional scale, is to support the adaptive management of these regional resource use and allocation planning activities and to identify practical lessons for other jurisdictions in the tropical savannas. Good operational links and understandings were established with agency and community regional planners in the Burdekin and Fitzroy and evaluation methods and criteria were developed and negotiated with regional stakeholders. The main focus in early 2002 was ongoing observation of Regional Vegetation Management Committees, targeted interviews with participants and preliminary analysis of existing deficiencies and opportunities in that planning process. Later in 2002, the emphasis will shift towards the Water Resource Planning process as it becomes operational in the Burdekin Basin. In 2002–3 work will take place with key agency stakeholders for adaptive management of regional planning processes. Critical process lessons and findings were also shared with other savanna jurisdictions.

### **3.2.3 Tourism, two laws and savanna lands—Leader: Dr John Bradley (UQ)**

This study is an investigation of tourism, land-claim and management processes (including relevant legislation). During the course of the research, conducted in collaboration with the Yanyuwa people in the south-west Gulf of Carpentaria, the ways in which tourism development and land claims are articulated and made manifest across generations will be examined. Conflict with non-indigenous Australians will be explored through assessment of stakeholder' (e.g. mining, fishing, tourism, pastoralism, but more particularly Aboriginal) imperatives regarding the healthy and sustainable management of land, sea and natural resources in this region of the Gulf. Research will include inquiry into perceptions of conflicting land/sea interests, conflicting management strategies, miscommunication and correct consultation procedures. Attention will also be paid to issues of gender representation and age. Much of this will be framed by reference to previous ethno-ecological research as it has been established that this is still a key frame of reference for the indigenous people of the south-west Gulf country.

The suite of new projects developed for Theme 3 and approved by the Board are outlined below.

### **3.1.4 Integrating people, properties, policies and plans—Leaders: Profs Ockie Bosch and Helen Ross (UQ)**

This project will undertake social research and systems analysis towards understanding the 'between scale' relationships between regional (policies and plans) and property (people and properties) scales. This approach means the CRC can address an issue that emerged from previous regional studies: a lack of engagement between regional plans (and state/federal policies) and the drivers of on-ground action—private and some public landholders. This study is designed to provide a dynamic and integrative 'situation analysis' to inform its companion project, an interventionist one focused on knowledge building.

### **3.1.3 Knowledge building—Leaders: Profs Helen Ross and Ockie Bosch (UQ)**

The knowledge-building study will address the well-known disjunctures between science and management by facilitating a participatory learning and tool-development process that integrates the knowledge of landholders, agency managers and researchers. It comprises:

- relationship building and reaching agreement on an issue and goals;
- collation of all forms of data, information and experiential knowledge that could contribute to finding solutions and achieving the defined goals;
- making sense of these in a collaborative learning environment;
- capturing the ‘useable’ knowledge in user-friendly and accessible tools; and
- continuing refinement of the knowledge through implementation, monitoring and adaptive management.

The project will be conducted in partnership with the NGRMG, and will focus on integration and use of knowledge from landholders, scientists and agency staff at property level. It will identify ways of meeting NRM policy requirements alongside graziers’ livelihood needs, and identify ways of implementing regional plans and government policies on private and leasehold land.

### **3.1.5. Modelling regional dynamics—Leader: Dr Mark Stafford Smith (CSIRO SE)**

This one-year scoping study proposal is intended to underpin the development of a systems framework to facilitate understanding of how the social and economic resilience of rural communities and their capacity for change interacts with the economics and demography of land uses which form the context for change. Attributes considered might include community size and relationships with other communities, demography, wealth, access to services, employment base, etc. This framework would use ABS, BRS, the National Land & Water Audit and similar datasets and existing R&D outputs as well as expert opinion of the working group members, to predict the capacity of a range of case studies communities to respond to a range of defined economic, social and environmental pressures.

### **3.1.6 Regional Planning in the Northern Territory—Leader: Prof Geoff McDonald**

The Northern Territory Government is seeking to develop whole-of-government approaches to regional planning and management but in so doing recognises that the territory’s unique circumstances lead to unique requirements and opportunities. This project, which is still under development, will help to understand these requirements and opportunities and review the relevance of experience and models applied in other jurisdictions. It will assess the Territory’s needs and potential to adopt more integrated regional approaches to planning and development that are compatible with the Territory’s situation while meeting its particular needs.

### **3.1.7 Community benefits from tourism—Leaders: Dr Romy Greiner (CSIRO SE), Mr Mark Horstman (KLC)**

This project contains a series of coordinated activities that investigate avenues for improving community benefits from tourism across the tropical savannas. The common theme across activities is to help communities, agencies and tourist bodies to promote and manage tourism in a way that (1) provides necessary advantages for the people in savanna regions, (2) promotes sustainable tourism development and (3) complements broader regional development strategies.

The first study, in the Carpentaria Shire, elicits the willingness-to-pay of visitors for access to various natural resources, infrastructure and services and develops mechanisms and policies that can be implemented at the local government level and by regional tourism and planning agencies. The Carpentaria Shire Council and Gulf Savannah Tourism support this study.

The second study is designed to rapidly provide information to coordinate management actions by government, non-government, commercial and community agencies that will mitigate the adverse impacts, and improve the positive benefits, from tourism attracted by the Gibb River Road in the Kimberley. Its scope is intended to include a range of land tenures from Derby to the Wyndham–Kununurra turnoff, including the Mitchell Plateau road and cattle stations, communities, tourist attractors and side roads along the route. The study will be undertaken to coincide with the time of peak tourist activity (July–August) in a year when self-drive tourism is expected to be at record levels.



## Highlights and challenges

The development of new research was a key activity during the year. New research activities emerged from existing projects, and consultation with the Management Group, Savanna Advisory Committee and other stakeholder groups. In February, the TS–CRC ran workshops in Georgetown, Normanton and Cloncurry to enable discussion on how CRC research might be structured in the Gulf to meet the needs and aspirations of the stakeholder groups. This included discussion of components of issue-specific research projects (e.g. fire, grazing land management, analysis of the impact of legislation on NRM outcomes etc.) that might occur in the Gulf as well as broader consideration of issues that might lead to the development of new project proposals.

These meetings influenced the final structure of a number of key project areas across all three Themes (e.g. research in fire management) and resulted in completely new projects (e.g. community benefits from tourism) being established.

Another highlight was the interest senior Yanyuwa people took in the tourism project led by Dr John Bradley. The Yanyuwa people are demanding key involvement in the project and there is an exciting potential for this work to bring both younger and older community members together to work as a team.

## Future directions

Investment in research in Theme 3 in 2001–2 was lower than for Themes 1 and 2 but climbs in 2002–3 and 2003–4. The research undertaken in 2001–2 was designed as a foundation for the development of further projects, with one project only funded for that year. A number of research activities have now begun, and new activities instigated. At the same time projects and timelines were designed to maximise flexibility in later years so that opportunities emerging from synergies between new researchers brought into the CRC through this Theme and established research are exploited to maximise our contribution to the pursuit of viable and socially desirable savanna regions.

## THEME 4 HUMAN CAPABILITY DEVELOPMENT

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**Leader: Prof. Ian Falk, NTU, Darwin, NT**

The sustainable management of Australia's tropical savannas is dependent for its conduct and effectiveness on people. It is people that own property, farm, live, set fires, tour and conduct income-earning activities in the savannas. The ways in which people carry out these tasks in conjunction with their environments constitute savanna management. Understanding the science of savannas is crucial, but so is the dissemination of the science outcomes through the people of the savannas and policy-makers concerned with this field so that the science can make a difference.

Theme 4 aims to enhance the impact of the CRC's research outputs on policy, practice and research communities. To achieve these impacts, the Theme 4 program adopts a two-pronged approach. One is to use known information to shape and initiate the mechanisms and strategies of the CRC itself. The other is to conduct research to enhance the impacts and identify gaps. In essence, strategies to achieve this must focus on making links between research outputs, formal learning mechanisms (such as coursework, education and training packages of various kinds), and informal learning mechanisms for CRC research users who are policy personnel and land owners and managers.

Two current projects further the above aims, both in the very early stages. One is a project to identify gaps in, and develop the research component of, Theme 4 for the coming several years. This project is called the *Theme 4 Development Project*. The other project is called *Capacity Exchange*. Its purpose is to scope an area that was previously called *Indigenous capacity building*, with a view to building a collaborative research agenda on issues related to indigenous knowledge of country, and the issues and strategies around governance structures and relationships in indigenous and white sustainable land management.

The Higher Education and Communication Resources projects contribute significantly to Theme 4. Their progress and achievements are reported in the Education and Training section and the Utilisation and Application of Research Section on the following pages and in the Public Presentations, Public Relations and Communication section on page 43.

# Education & Training

## Summary

The objective of the Higher Education Project is to develop higher education programs that:

- meet the needs of TS–CRC stakeholders, by addressing gaps in the skills and qualifications of savanna managers (coursework postgraduate and research degree program);
- provide a structure through which outcomes of CRC research can be communicated to stakeholders (coursework postgraduate program).

The Higher Education Project focuses on both postgraduate research and postgraduate coursework programs. This dual focus has been unusual among CRC education programs, and was adopted in light of needs analyses undertaken during the early formulation of the first round of the TS–CRC.

- The Centre has supported PhD, Masters and Honours research with scholarships, operational funding, and/or training at NTU, JCU, ANU and now the University of Queensland.
- It has also funded and coordinated the development of the coursework Graduate Diploma & Master of Tropical Environmental Management (GD/MTEM) offered at NTU, with additional units being developed and offered at JCU. The original brief for the postgraduate program was to offer a course in flexible mode, available to savanna managers wherever they lived in northern Australia (or elsewhere).



*Ph.D. Student Ron Firth with a brush-tailed rabbit-rat (Conilurus penicillatus)*

A complementary and equally significant outcome of this process has been capacity building within regional universities, and the fostering of links between partner universities and between universities, regional agencies and other organisations. Staff from agencies and other organisations participate in the development and teaching of units in the coursework program, and also co-supervise research students. Now that UQ is also a TS–CRC partner it too will add to, and benefit from, this network of collaborations.

The Tropical Environmental Management (TEM) courses—Graduate Diploma, Masters, and soon also a Graduate Certificate—are fully articulated. A student may exit after completing 40 credit points with a Graduate Certificate (available from 2003), after 80 credit points with a Graduate Diploma or undertake a further 40 credit points to complete the Masters qualification, with at least 20 of those points comprising a research project. Students must take at least four of the total six core units to complete the Masters. These core 500-level units are:

- *Ecology & Management of Tropical Savannas* (TS–CRC unit now offered at NTU)
- *Managing Northern Rangelands* (TS–CRC Unit offered at NTU)
- *Flora & Fauna Survey Techniques* (NTU/CRC unit now offered at NTU)
- *Tropical Wetland Management* (NTU unit)
- *GIS Applications in Environmental Studies* (NTU unit)
- *Design & Analysis of Environmental Studies* (NTU unit)

The TS CRC also invested in two postgraduate units at JCU:

- *Indigenous environmental management in tropical Australia* (TS–CRC unit offered at JCU)
- *Environmental decision making in tropical Australia* (TS–CRC unit offered at JCU)

Electives may be then chosen from NTU undergraduate programs at 200-level or above, other NTU postgraduate programs or JCU TESAG postgraduate program. As UQ recently joined the TS-CRC we are working to include compatible electives at UQ as well.

## **Progress**

### **Postgraduate coursework**

We sought and received approval for offering a Graduate Certificate at NTU from 2003, which will provide another exit point from the TEM program. It also may attract students who have begun, but not completed a course, back into the program.

Course coordination for the TEM program was handed over to NTU. Dr Lindsay Hutley, recently appointed to the School of Biological, Environmental and Chemical Sciences at NTU, will now be the first point of contact for students inquiring about the program. This hand-over further ensures that the program will remain in the event that the TS-CRC closes. Responsibilities for 'behind the scenes' course management, such as marketing, ongoing evaluation and development of cross-institutional and international links will remain with the Higher Education Project.

The unit *SBI501 Managing Northern Rangelands* was taught for the first time in flexible mode at NTU in Semester 2, 2002. Evaluations indicated that the unit was an interesting, challenging and meaningful experience for students. The unit was the fruit of a number of collaborations. Expert advisers from a number of TS-CRC partners assisted in developing content, took part in teaching the unit as expert online tutors during semester, or accompanied the students during a week-long field trip to the Victoria River District. A spoken paper on the unit was presented at the Higher Education Research and Development Society of Australasia (HERDSA) 2001 Conference at the University of Newcastle.

Units continue to be evaluated annually at NTU and JCU, using a customised evaluation instrument. Results consistently indicated high satisfaction with the quality, relevance and currency of the units. During semester interactions between lecturers and students, online and in person, provided ample opportunities for qualitative feedback on individual units as well.

### **Undergraduate and other programs**

A new flexible unit, *EV3051 Environmental decision making in tropical Australia*, developed by Lynda Wallace at JCU, will be offered for the first time in Semester 2, 2002. Postgraduate coursework students identified this subject area as an area of priority for unit development. The unit will be taught using online learning materials and a residential at Cairns Campus.

The TS-CRC is contributing to three new undergraduate units at NTU: *SBI251 Flora & fauna survey techniques* (a customised second year-level version of *SBI502*), *SBI250 Tropical environments* and *SBI3 Tropical pests and invaders*. These units will be offered in the Bachelor of Environmental Science at NTU, using online learning materials and residential in Darwin. This program, with an emphasis on flexible mode, articulates with the TAFE Diploma in Lands Parks and Wildlife Management at NTU, which is also available fully externally. When complete, this program will provide an articulated, flexible, external curriculum from TAFE to Masters level.

We are currently working on a proposal for an Undergraduate Training and Research Opportunities Program. This program will provide placements and a modest stipend for promising undergraduate students at partner universities to undertake research placements with TS-CRC researchers. We plan to trial this program in the 2001-2 financial year.

Discussion began between NTU, CSIRO and TS-CRC about the development of an educational interface for the 'Flames' computer fire model.

### **Higher degree research students**

A number of PhD students have submitted their theses in the last 12 months. Hayder Khwaja (NTU), Colin Macgregor (JCU), and Grant Whiteman (JCU) have all had their theses accepted. Greg Calvert (JCU), Georgina Kelly (NTU), Chen Xiaoyong (NTU) and Myf Runcie (NTU) have all submitted and were in examination in June 2002. Congratulations to all.

We have a number of new PhD students who commenced in the 2001-2 financial year. Adele Vagg, Jenny Moffatt, Steve Johnson and Kath Seton have begun their candidatures at UQ. Anna Maria Van Doorn, a student from the University of Florida began her PhD with operational support from the TS-CRC.

A policy document outlining the TS–CRC’s support for higher degree by research students was developed and is now available on the CRC’s website in its Training and Education Section. Procedures on applying for scholarships or operational funding have been clarified and are also available online.

The TS–CRC is contributing to a consortium, initiated among Queensland universities and CRCs, reviewing opportunities for training for Higher Research Degree (HRD) students. The consortium aims to identify areas of common interest and concern, such as the accreditation of HRD student training. It also aims to pool resources (e.g. training programs already developed by consortium members), and identify remaining gaps in training. James Wheelan, the project officer coordinating the project from Griffith University, will present a final report from the project in 2002.

Now that NTU is responsible for the course coordination for the TEM program, there will be greater capacity to coordinate student support and management for TS–CRC funded students. We hope that an orientation kit, and invitations and support to attend key TS–CRC meetings, training opportunities and student-focused activities during their candidature will help TS–CRC funded students to take full advantage of the TS–CRC network to which they now belong.

### **Highlights and challenges**

The Higher Education Project provides a structure through which CRC research outcomes are communicated in-depth, directly to CRC stakeholders (see Table 2). In return, direct links to research projects ensure high quality and up-to-date content of units. The education project also provided extra resources for regional institutions, and filled a gap in courses available for savanna stakeholders. Finally, outputs of the project are products that will remain after the life of the CRC.

Collaborations between researchers, educators and students continued to be a source of professional development and reward for all concerned.

Intellectual property (IP) issues will be a challenge within the project. The intellectual property rights to the educational products are not easily measured. This is likely to become an issue if units are to be franchised for offering at other institutions. The complexities of measuring IP arise due to the gradational nature of in-kind partner contributions and TS–CRC contributions. This issue will be dealt with on a case-by-case basis as it arises.

### **Future directions**

Maintaining existing programs continues to be a priority. For coursework units, this includes ongoing integration of research outcomes and ongoing updating of content, and incorporation of the results of evaluations into learning materials. Also, online materials need repairs, such as solving inevitable technical problems at the site and ongoing checks of web links.

Promotion of the now-completed TS–CRC products is also a priority. These will be promoted among TS–CRC partners and stakeholders, as well as to overseas institutions. Overseas promotion will be strategic, with a focus on fostering and using existing international links with the CRC.

With its emphasis on online delivery, this course is at the cutting edge of educational technologies and teaching practice. Ongoing evaluation and quality audit of the learning materials and teaching methodologies ensure best practices of teaching staff and quality experiences for students. This will be carried out using customised evaluation instruments, the ongoing inclusion of upgrade and revision as project milestones, and proactive course advisory committees.

However, the Higher Education Project is also at a new beginning. With the completion of all core units and the availability of a number of electives available externally, the development of the TEM program is complete. We also began our intake of new higher research degree students, and students in the previous TS–CRC are now close to submission or have completed.

A future priority will be support for indigenous students. To date the TS–CRC has generally failed to attract, or provide for, indigenous students. We will develop a suite of targeted indigenous scholarships. We also need to investigate pathways for indigenous students to enter postgraduate studies.

The inclusion of multi-disciplinary themes in this round of the TS–CRC research effort may provide the basis of future multi-disciplinary coursework units or programs.

It is timely to look ahead at what the outcomes of the Higher Education Project should be in six years. This will be a priority in the coming year.

**TABLE 2 STUDENT RESEARCH DETAILS**

The symbols in Table 2 indicate:

+ new students, who commenced study with the new Tropical Savanna Management CRC

# continuing students, who commenced study with the earlier Tropical Savanna CRC, and who are still receiving funding

All other students in the table below are continuing students, nearing completion of their candidature, who previously received stipends and/or operational funding from the TS–CRC, but who did not receive operational funding in the 2001–2 financial year.

### PhD Students

Student	Project Title	Uni.	Supervisors	Start Date	Funding
A. Dee	Seasonal habitat use, food resources and Aboriginal perceptions of the feral pig <i>Sus scrofa</i> in the Arafura swamp	ANU	D. Rose (ANU) H. Nix (CRES) J. Woinarski (PWCNT) S. Morton (CSIRO) N. White (LaTrobe University)	1997	TS–CRC
M. Fegan #	Integrating GIS/RS for Environmental Monitoring	NTU	W. Ahmad (NTU) D. Williams (CSIRO) C. Devonport (NTU)	1999	TS–CRC
R. Firth #	Ecology and conservation status of the Brush-tailed Rabbit-rat ( <i>Conilurus penicillatus</i> )	NTU	R. Noske (NTU) J. Woinarski (PWCNT) T. Griffiths (NTU)	2001	TS–CRC Australian Geographic
W. Hillman #	Ecotourism in northern Australia—interpretive guided tours	JCU	R. Wilkinson (JCU)	1999	TS–CRC
J. Jackson #	Exotic grass species in tropical savannas of northern Australia	JCU	T. Grice (CSIRO) B. Jackes (JCU)	1998	TS–CRC JCU
S. Johnson +	Indigenous understandings of healthy savanna and perceptions of tourism in the Gulf Country	UQ	J. Bradley (UQ)	2001	TS–CRC APA
A. Kutt	Spatial patterns of distribution, abundance and diversity in the vertebrate fauna assemblages of the Desert Uplands bioregion, northern Queensland	JCU	J. Woinarski (PWCNT) S. Williams (JCU) C. Johnson (JCU)	1996	TS–CRC PWCNT QEPA
J. Moffatt +	Landholder-centric perceptions of sustainable development and associated institutional arrangements	UQ	Helen Ross (UQ) John Taylor (Rangelands Australia)	2001	TS–CRC APA
K. Pfitzner	The use of remotely sensed data, ancillary data and GIS technologies for the evaluation of the rehabilitation of two mine sites	NTU	W. Ahmad (NTU) R. Clifton (NTDME)	1997	TS–CRC
P. Ryan	Spatial and temporal variability in fire regime from three dominant land management practices (Aboriginal, pastoral and conservation reserves) in the North West Kimberley, Western Australia	NTU UQ	G Hill (NTU), W Ahmad (NTU) J Russell-Smith (BFC)	1997	TS–CRC BFC
K. Seton +	Blackfella Law, Whitefella Law, Where's the Emotion: Anthropology, Legal Pluralism and Aboriginal Relations to Country		J Bradley (UQ)	2001	TS–CRC UQPRS

## PhD Students

Student	Project Title	Uni.	Supervisors	Start Date	Funding
B. Sharp	The roles of fire and grazing in producing long-term landscape-scale vegetation change in an Australian tropical savanna	Oxford, UK	R. Whittaker (UO) D. Bowman (NTU)	2000	TS–CRC ARC
A. Vagg +	Integrating on-ground actions that contribute to regional and property goals for sustainable land management	UQ	Ockie Bosch (UQ) Helen Ross (UQ) Daniel Walker (CSIRO)	2001	TS–CRC
T. Vigilante #	An ecological study of the North Kimberley landscape	NTU	D. Bowman (NTU) N. Williams (NTU)	1998	TS–CRC APA AIATSIS
A. van Doorn +	Ecology, conservation and management of Purple-crowned Fairy-wren in the Victoria River District	Uni of Florida	J. Woinarski (PWCNT) B. Brook (KCTWM)	2001	TS–CRC KCTWM VRDCA
M. Watson #	Faunal responses to alteration in plant community structure in tropical savannas.	NTU	J. Woinarski (PWCNT) P Whitehead (NTU)	2001	TS–CRC
Yue Zhang #	Spatial patterning of resources for graminivoresædeveloping a model for habitat management	NTU	P. Whitehead (NTU) D. Pearson (NTU) C. Menges (NTU)	1999	TS–CRC NTU

## Masters Students

Student	Project Title	Uni.	Supervisors	Start Date	Funding
L. Valentine #	Faunal responses to alterations in plant community structure in tropical savannas of Northern Queensland	JCU	C. Johnson (JCU) L. Schwarzkopf (JCU) T. Grice (CSIRO)	2000	TS–CRC JCU Birds Aust. Normal Wettonhall Award

## Honours Students

Student	Project Title	Uni.	Supervisors	Start Date	Funding
N. Rossiter	Comparative ecophysiology and fire ecology of native and exotic savanna grasses	NTU	S Setterfield (NTU) L Hutley (NTU) M Douglas (NTU)	2001	TS–CRC
R. Lambie	Nutrient Cycling in cleared farmlands of the Central Upland region	UQ	S Schmidt (UQ) R Fensham (Qld Herbarium)	2001	TS–CRC UQ

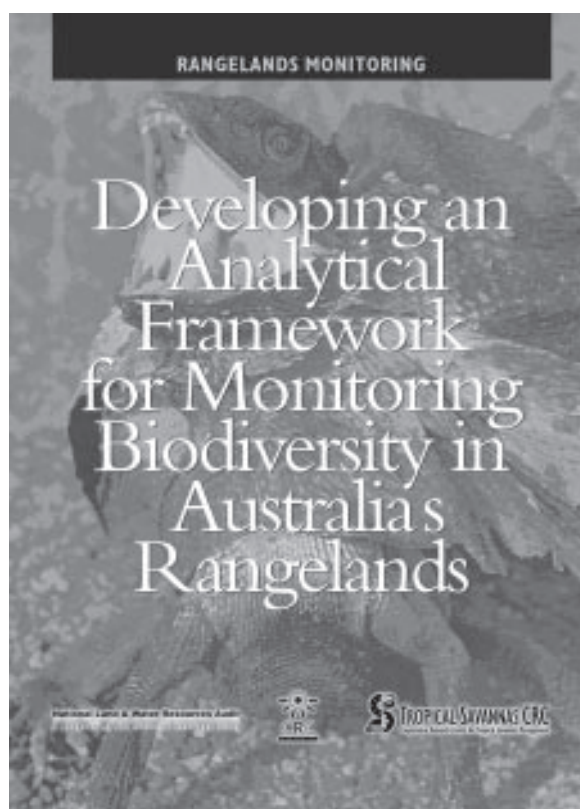
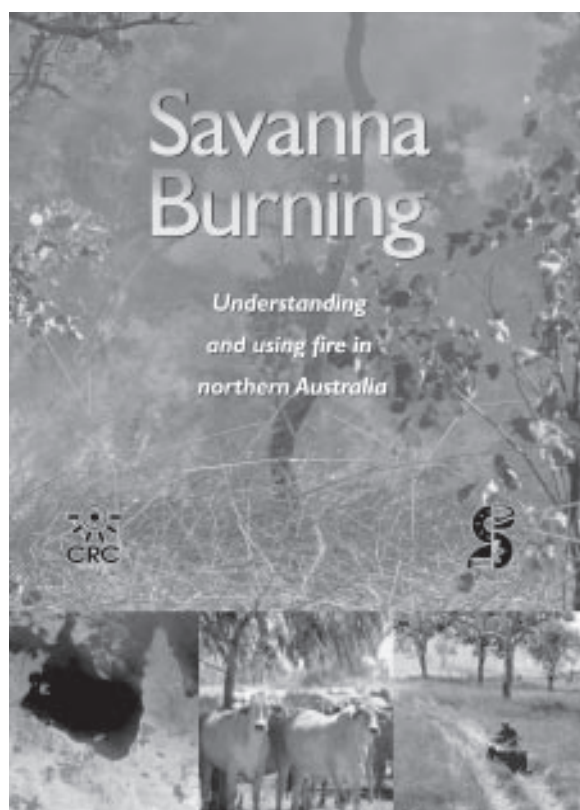
# Utilisation & Application of Research, Commercialisation & Links with Users

A major goal of the new Centre is to produce practical management options that land managers (such as pastoralists and Aboriginal communities) will use and to provide useful advice, that can be adopted, for policy makers and planners. The cultural gulfs that exist between these groups and researchers are such that this will not occur through publications and other information alone. As well as Education and Training programs (see previous section), an effective way to ensure that research is actually used is to establish healthy relationships between researchers and the various research users—relationships in which researchers and research users work together and learn from each other.

To do this we need to expand the network of relationships already established by the first Tropical Savannas CRC projects, Management Studies, workshops and meetings. This involved many researchers and research-using agency staff across the savannas, but only a few land managers, policy makers and planners. The new Centre's portfolio of projects will expand on this network as it brings together these other groups with researchers.

Apart from the cultural gulfs between research users and researchers, the other feature of land management in northern Australia is the common nature of the challenges faced, and the lack of information on these challenges. The Centre also needs to provide information resources on these common issues (such as fire management) to the Centre's network. Such information can be accessed by those people in partner organisations and land-management bodies who are more culturally familiar with the way this information is presented in books or on the internet and who can then disseminate this information further through their on-ground relationships with land managers.

These processes are driven by, and reinforced by the links created by the projects (see Table 1) and by the Theme structure and the Theme Leaders. The Industry and Community NRM Theme cultivates links with small and medium enterprises such as pastoral properties and Aboriginal communities; the Regional Planning and Management Theme cultivates links with regional planners and the Human Capability Development Theme develops learning and communication strategies and resources that help people work and learn together.



*Two of our publications for research users in 2001–2*

The changes in attitudes and practices that lie at the heart of the Centre's mission will often occur in remote locations between diverse types of people across the tropical north. The way these changes are influenced by communication resources and strategies is not well studied or well predicted—an adaptive approach is essential. Continual evaluation of our knowledge building strategies and tactics is needed.

### **Progress in 2001-2: Supporting Workshops, Conferences and Meetings**

Support for face-to-face meetings between researchers and research users are one of the main tasks of the Centre's communication and public outreach program. Numerous meetings and workshops were undertaken as part of individual Theme and project activities (see the Research reports on pages 13–21), and the Centre offered support for a number of conferences and workshops. These were:

- *Grazing Management in Wetlands and Riparian Habitats* at NTU on 2–4 October 2001. This workshop, organised by the NTU's Centre for Tropical Wetlands Management, brought together researchers and pastoralists to work out sustainable approaches to managing grazing in tropical savanna wetlands.
- *North West Pastoral Conference* in Kununurra in November 2001. This conference brought together more than 170 grazing researchers and pastoralists from across northern Australia to talk about the latest findings in natural resource management and Environmental Management Systems for the grazing industry.
- *Gulf Meetings with Theme Leaders* in Georgetown, Normanton and Cloncurry in February 2002. The Centre ran these workshops to enable discussion on how CRC research might be structured in the Gulf to meet the needs and aspirations of the stakeholder groups. This included discussion of issue-specific research projects (e.g. fire, grazing land management, analysis of the impact of legislation on NRM outcomes etc.) that might occur in the Gulf as well as a broader consideration of issues that might lead to the development of new project proposals.
- A *Communication Workshop* was held in Darwin in February 2002. This workshop brought together TS–CRC Theme and Project Leaders and key stakeholders and research users to help develop strategies for communication and utilization and application of research in the new Centre.
- An *Indigenous Technical Workshop* was held on 21 March 2002. The Northern Land Council's Caring for Country Unit organised this event which brought together around 20 people from around Australia to discuss strategies for indigenous knowledge conservation using different communications technology.

### **2001-2 Publications and Information Resources**

A number of significant information resources for tropical savanna research users were produced:

- The Centre's most significant publications to date, *Savanna Burning: Understanding and using fire in northern Australia* was launched in early 2002 in Queensland and the Northern Territory. This 144 page full-colour book brings together, for the first time, a comprehensive guide to fire management in northern Australia. Researchers, such as fire and wildlife ecologists, as well as research users such as pastoralists and fire officers wrote the book. Also supported by the MLA and Environment Australia, more 600 copies were sold or distributed.
- Considerable effort has gone into re-designing the Centre's website in 2001–2. The new site will be a more effective information and communication resource for tropical savannas' researchers and research users. It can be used as a searchable database of information on the tropical savannas and sections of the site are to be used in a stand-alone capacity by groups of research users and researchers. The new site will be launched in August 2002.
- The publication *A Framework for Monitoring Biodiversity in Australia's Rangelands* written for the NLWRA was produced and distributed to around 80 researchers and research users in various agencies.
- The first seamless map of the vegetation of the tropical savannas at the 1:2million and 1:1million scales was produced. Around 100 1:2M scale paper maps were distributed to various researchers and research users in Western Australia, the Northern Territory and Queensland.



**TABLE 3 CONSULTANCIES AND RESEARCH CONTRACTS**

Sector	Consultant	Project	Consultancy	Funding Source	Amount
2 Industry	J Ludwig (CSIRO) A Spain (CSIRO)	1.1.1	Cooperative ecological and mine-soil development studies at the Nabalco mine site	NABALCO	Commercial in confidence
2 Government	J Gross (CSIRO) C Roth (CSIRO)	1.1.1	Sustainable Grazing for a healthy Burdekin Catchment	MLA	\$67 000
1 Government	J Woinarski, NTPWC	2.1.1	Vertebrate Monitoring and Re-Sampling in Kakadu National Park (Stage 1 and 2)	Director of National Parks	\$122 000
1 Government	A Fisher, NTPWC	2.2.3	Incorporating Biodiversity Monitoring into Rangeland Condition Assessment	LWA	\$207 000
1 Government	P Cooke, NAILSMA	2.3.3	Ethno-ecological Knowledge in western and central Arnhem Land	EA	\$60,000
1 Government	M Horstman, NAILSMA	2.3.3	Ethno-ecological Knowledge in the Kimberley Region of Western Australia	EA	\$64,000
1 Government	J Childs (CRC) R Breckwoldt (RPM) P Bayliss (NTU) M Horstman (NAILSMA) D Epworth (NAILSMA)	4.4.1	Indigenous Information Needs in Australia's Rangelands	NLWRA	\$22 000

1. Consultancies administered by TS–CRC
2. Consultancies administered by TS–CRC Partner

**TABLE 4 CENTRE RESEARCH USERS AND THE BASIS OF INTERACTION**

Organisation	Represented on Board, Committees	Partner Agency	Collaborative Research	Information/ Research Exchange	Contract Research	Cooperative Training	Collaborative Grants	Contracted by Centre
<b>Pastoral Industry Sector</b>								
Meat and Livestock Australia	✓	✓	✓	✓	✓	✓	✓	
North Australian Beef Research Council	✓		✓	✓		✓		
Agforce Qld.				✓				
Kimberley Beef Research Committee				✓				
Kimberley Aboriginal Pastoralists Association			✓	✓				
NT Cattlemen's Association				✓		✓		
Heytesbury Beef			✓	✓				

Organisation	Represented on Board, Committees	Partner Agency	Collaborative Research	Information/ Research Exchange	Contract Research	Cooperative Training	Collaborative Grants	Contracted by Centre
<b>Conservation Interest Groups</b>								
World Wide Fund for Nature	✓		✓	✓				
Environment Centre of the NT	✓			✓		✓		
Kimberley Conservation Group				✓				
Queensland Conservation Council	✓			✓				
WA Conservation Council	✓			✓				
Australian Conservation Foundation				✓				
Birds Australia			✓	✓				
<b>Mining Industry Sector</b>								
MIM Group of Companies/McArthur River Mining Pty Ltd	✓			✓				
Earth, Water, Life Sciences Pty Ltd				✓				
Queensland Nickel			✓	✓				
Ergon Energy				✓				
NABALCO			✓		✓			
<b>Aboriginal Community Groups</b>								
Balkanu Cape York Dev. Corp.	✓		✓	✓				
Bawinaga Association, Arnhem Land			✓	✓				
Cape York Land Council			✓	✓		✓		
Kimberley Land Council	✓		✓	✓		✓		
Kimberley Aboriginal Law and Culture Centre			✓	✓				
Indigenous Land Corporation	✓			✓				
Northern Land Council	✓		✓	✓		✓		
NAILSMA	✓	✓	✓	✓				

Organisation	Represented on Board, Committees	Partner Agency	Collaborative Research	Information/ Research Exchange	Contract Research	Cooperative Training	Collaborative Grants	Contracted by Centre
Jawoyn Association				✓				
Yanyuwa Community				✓				
<b>Tourism Industry Sector</b>								
Northern Gateway Pty Ltd				✓				
Australian Tourism Council (NT)	✓			✓				
Tour Guides Assoc. of the NT				✓		✓		
Savannah Guides Ltd			✓	✓				
GLADA				✓				
Undara Experience				✓				
<b>Funding Agencies</b>								
ACIAR			✓	✓		✓		
LWA	✓			✓	✓			
Environment Australia (Biodiversity Group)				✓	✓			
Environment Australia (State of Environment)				✓				
Rural Industries Research Development Corporation				✓				
Bureau of Rural Sciences				✓				
Australian Research Council				✓				
Natural Heritage Trust				✓			✓	
<b>Government Agencies</b>								
Australian Defence Force	✓		✓	✓				
Bureau of Meteorology				✓				
Great Barrier Reef Marine Park Authority				✓				
Dept. Agriculture WA	✓	✓		✓				
WA DOLA Department of Land Administration			✓	✓		✓		
WA CALM	✓	✓		✓				

Organisation	Represented on Board, Committees	Partner Agency	Collaborative Research	Information/ Research Exchange	Contract Research	Cooperative Training	Collaborative Grants	Contracted by Centre
<b>Government Agencies</b>								
NT Power and Water Authority			✓	✓				
NT Bushfires Council			✓	✓		✓		
NT Department of Business, Industry and Resource Development	✓	✓	✓	✓				
NT Parks & Wildlife Commission	✓		✓	✓				
ERIN				✓				
CSIRO Sustainable Ecosystems	✓	✓	✓	✓		✓		
CSIRO Land & Water			✓	✓				
CSIRO Mathematical & Information Sciences			✓	✓				
CSIRO Climate and Atmosphere				✓				
Queensland Department of Primary Industries	✓	✓	✓	✓		✓		
Queensland Department of Natural Resources and Mines		✓	✓	✓		✓		
Queensland Parks and Wildlife Service			✓	✓				
Queensland EPA		✓		✓				
Australian Greenhouse Office				✓				
North Australia Rural Fire Managers' Forum				✓				
National Land and Water Resources Audit				✓	✓			
Western Australia Fire and Emergency Services Authority				✓				
Parks Australia (North)	✓	✓	✓	✓	✓			
Queensland Fire and Rescue Authority			✓	✓				
NT Dpt. of Infrastructure, Planning & Environment	✓	✓	✓	✓				

Organisation	Represented on Board, Committees	Partner Agency	Collaborative Research	Information/ Research Exchange	Contract Research	Cooperative Training	Collaborative Grants	Contracted by Centre
<b>Government agencies</b>								
Western Australia Water and Rivers Commission				✓			✓	
<b>Cooperative Research Centres</b>								
CRC for the Conservation and Management of Marsupials				✓				
CRC for Tropical Rainforest Ecology and Management				✓				
CRC for Tropical Aboriginal Health				✓		✓		
CRC for Sustainable Sugar Production				✓				
CRC for Freshwater Ecology				✓				
CRC for Cotton				✓				
CRC for Sustainable Tourism				✓				
CRC for Catchment Hydrology				✓				
CRC for Greenhouse Accounting			✓	✓				
<b>Community Groups and Professional Bodies</b>								
Victoria River District Conservation Association			✓	✓		✓		
Desert Uplands Build-Up & Development Strategy Committee				✓				
Fletcher Creek Catchment Landcare Group				✓				
Dalrymple BeefPlan Producer Group			✓					
Seventy Mile Range Catchment Group			✓	✓				
Sturt Plateau Best Practice Group			✓	✓				
Northern Gulf Resource Management Group			✓	✓				

Organisation	Represented on Board, Committees	Partner Agency	Collaborative Research	Information/ Research Exchange	Contract Research	Cooperative Training	Collaborative Grants	Contracted by Centre
<b>Community Groups and Professional Bodies</b>								
Kimberley Fire Management Committee			✓	✓				
Cape River Management Group			✓	✓				
Cape York Peninsula Development Assoc.			✓	✓				
VRD Regional Bushfire Council Committee (NT)			✓	✓				
Mt Cooper Bushfire Brigade			✓	✓				
Sturt Plateau Technical Group				✓				
Roper River Landcare Group			✓	✓				
Coastcare				✓				
Burdekin Rangelands Strategy Implementation Group				✓				
Upper Burdekin Landcare Group			✓	✓				
Dalrymple Landcare Committee			✓	✓				
<b>Educational Institutions</b>								
Centre for Indigenous Natural & Cultural Resource Management (NTU)				✓		✓		
University of Western Sydney				✓				
James Cook University		✓	✓	✓		✓		
University of Queensland	✓	✓	✓	✓		✓		
Curtin University				✓				
Northern Territory University	✓	✓	✓	✓		✓		
University of Melbourne			✓	✓				
Australian National University	✓		✓	✓		✓		

Organisation	Represented on Board, Committees	Partner Agency	Collaborative Research	Information/ Research Exchange	Contract Research	Cooperative Training	Collaborative Grants	Contracted by Centre
<b>Educational Institutions</b>								
Central Queensland University				✓				
Key Centre for Tropical Wildlife Management (NTU)				✓				
Murdoch University	✓							
Batchelor Institute				✓		✓		
South Australian Museum				✓				
<b>International Collaboration</b>								
Colorado State University			✓					
University of Virginia			✓					
Indonesian Government Agricultural Agencies			✓			✓		
<b>Educational Institutions</b>								
University Botswana			✓					
NASA			✓	✓				
University of Wurzburg			✓					
Texas A&M University			✓					
University of London				✓				
Royal Botanic Gardens, Kew				✓				
Conservation International, USA				✓				
Environmentek, South Africa				✓				
IGBP				✓				
University of Wageningen				✓				
CSIR, South Africa				✓				
Japanese Space Development Agency			✓	✓				
University of California				✓				
European Space Agency				✓				

# Staffing & Administration

The head office of the TS–CRC is at the Northern Territory University, Darwin, with a second office at James Cook University, Townsville and support in Western Australia from the Department of Agriculture, Western Australia, at Kununurra.

The Darwin Office has six staff: the Chief Executive Officer; Communication Coordinator; Business Manager; Assistant to the CEO; Communication Assistant and Assistant to the Business Manager. The Townsville Office has one staff member: the Publications & Web Manager.

The former CRC director Mr John Childs retired in September 2001. Prof. Gordon Duff was appointed CEO, taking up his appointment in January 2002. Three new Research Theme Leaders were appointed during the year: Dr Jill Landsberg, QPWS, in September 2001; Dr Daniel Walker, CSIRO SE in October 2001; and Prof. Ian Falk in May 2002. Dr John Ludwig, CSIRO SE, was re-appointed theme leader for 2001–2.

**TABLE 5 SPECIFIED PERSONNEL**

<b>Title and Name</b>	<b>Contributing Organisation</b>	<b>% of total working time in CRC</b>	<b>Role in Centre</b>
<b>Prof. G Duff</b>	CRC	42	CEO (current)
<b>J R Childs</b>	CRC	33	CEO (retired)
<b>P Jacklyn</b>	CRC	100	Communication Coordinator
<b>S Martin</b>	CRC	100	Business Manager
<b>J Ludwig</b>	CRC/CSIRO	100	Theme Leader 1
<b>J Landsberg</b>	CRC/QLD	83	Theme Leader 2
<b>D Walker</b>	CRC/CSIRO	75	Theme Leader 3
<b>I Falk</b>	CRC/NTU	16	Theme Leader 4



# Publications

All authors affiliated with the TS-CRC unless in multi-authored papers with mixed affiliations. In this case, only underlined authors affiliated with TS-CRC.

\*Indicates invited presentation

## REFEREED PAPERS

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Bastin, G.N., Ludwig, J.A., Eager, R.W., Chewings, V.H. & Liedloff, A.C. (in press), 'Indicators of landscape function: comparing patchiness metrics using remotely-sensed data from rangelands', *Ecological Indicators*, vol. 1.

Chen, X., Eamus, D. and Hutley, L. B. 2002, 'Seasonal patterns of soil carbon dioxide efflux from a wet-dry tropical savanna of northern Australia', *Australian Journal of Botany*, 50:43-51.

Dawes-Gromadzki, T.Z. 2002, 'Soggy rolls and stakes: a recipe for the rapid assessment of subterranean wood-feeding termites (*Isoptera*) in a tropical savanna', *Records of the South Australian Museum*.

Dawes-Gromadzki, T.Z. (in press), 'Trophic trickles rather than cascades: conditional top-down and bottom-up dynamics in an Australian chenopod shrubland', *Austral Ecology*.

Dawes-Gromadzki, T.Z. & Spain, A.V. (in press), 'Seasonal patterns in the activity and species richness of surface-foraging termites (*Isoptera*) at paper baits in a tropical Australian savanna', *Journal of Tropical Ecology*.

Dostine, P.L., Johnson, G. C., Franklin, D. C., Zhang, Y., and Hempel, C. 2001, 'Seasonal use of savanna landscapes by the Gouldian finch, *Erythrura gouldiae*, in the Yinberrie Hills area, Northern Territory', *Wildlife Research*, 28, 445-458.

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# Public Presentations, Public Relations & Communication

In the longer term, the sustainable management practices and policies that are used in the tropical savannas need the support of the broader, mostly urban, community. To effectively raise awareness of the tropical savannas in this community requires considerable resources, and ultimately will need to involve the primary and secondary education system. In the short term, however, some sections of the broader community can be targeted effectively.

The Centre's job can also be made easier if it has a profile in the broader community, taking care that this is not done at the expense of relationships between researchers and research users.



The Centre's website is a major pathway to raising awareness about the tropical savannas, with about 20,000 hits per week

## PRESENTATIONS

- The former Federal Minister for the Environment, Senator Robert Hill, officially launched the Tropical Savannas Management CRC on September 12, 2001 at NTU, Darwin. The event was attended by representatives of our partners and stakeholders.
- The Hon. Mike Reynolds, Queensland Minister for Emergency Services, launched the Centre's book, *Savanna Burning: understanding and using fire in north Australia*, at the Rural Fire Brigades Association Meeting in Townsville on 15 March, 2002. The event attracted media coverage in print, radio and TV.
- Former Northern Territory Senator Bob Collins launched the fire book, *Savanna burning: understanding and using fire in northern Australia*, in Darwin on Friday, 10 May. The event attracted media coverage in print, radio and TV.
- Various public outreach activities from staff (see Table 7, page 45).

## DISPLAYS

- Various displays of the Centre's activities were shown at local events that would attract audiences interested in sustainable land use and conservation.
- July 2001—Royal Darwin Show
- 12 September 2001—Launch of Centre, by Senator Robert Hill
- 18–21 September 2001—14th Australia and New Zealand Climate Forum
- 8–9 November 2001—North Australian Beef Industry Conference, Kununurra WA
- 15–16 May 2002—North Queensland Field Days, Townsville

## PUBLIC RELATIONS AND COMMUNICATION

- Numerous media articles about the Centre's activities and outputs were distributed—many of these were in smaller newsletters that reach communities of research users (see Table 6, page 44).
- The quarterly newsletter *Savanna Links* reaches around 3000 people across northern Australia interested in the tropical savannas. It also helps raise awareness of the tropical savannas in the broader community. Two issues of the natural history lift-out *Tropical Topics*, produced by EPA (Qld) were distributed with *Savanna Links*—these appeal to a broad audience interested in natural history.

- The Centre's website continues to be a major pathway to raise awareness about the tropical savannas with tens of thousands of hits a month. The site is being updated with more general information about the tropical savannas, such as a Frequently Asked Questions section.
- Support was provided for the Frogwatch site <www.frogwatch.org.au> which allows people to track the spread of the cane toad across northern Australia and lets people check on the status and distribution of the many native frogs of the north.
- A popular science-writing workshop was held in August 2001. This allowed researchers, students and other staff to develop writing skills for communicating with a broad audience.

**TABLE 6 PUBLIC RELATIONS AND COMMUNICATION: MEDIA COVERAGE**

<b>Topic/subject</b>	<b>Television</b>	<b>Radio</b>	<b>Print</b>	<b>Online</b>	<b>Stakeholder</b>
Termites	1	3	2		1
Biodiversity, grazing & monitoring		1			2
NABIC Conference					8
Flames Model	1	1		1	
New CRC & projects	1	2	1		2
Eureka Prize Winner					1
Royal Darwin Show	1		1		
Healthy Landscapes					1
TS-CRC Miscellaneous					3
Satellite Imagery					3
More Than Can Be Said					1
GLM Package					1
Savanna Conservation: Fauna	1	2	1		3
Savanna Careers		1		1	
Education Package					1
Ord Bonaparte Scheme		1			
Caring for Country					1
Northern Alliance					1
Grazing Management		1	1		2
Ants & Minesite Rehab.			1		
Beef EMS					1
New Map Maker					1
Indigenous Knowledge					1
Conferences					3
Ian Falk Appointment					1
CRC Students' Research		1			2
Greenhouse issues/savannas		1	1		
Fire Studies to Expand					1
Fire Book	2	6	2	7	8
Fire and Riparian Rubbervine					1
Tourism: who benefits					2
Fire abatement project (ALFA)					1
<b>Total</b>	<b>7</b>	<b>20</b>	<b>10</b>	<b>9</b>	<b>53</b>



Table 6 does not include extensive regional and national media coverage of the Free-Air Carbon Dioxide Enrichment Facility (FACE) Opening Ceremony at the Yabulu Nickel Refinery that was officially opened by Senator Ian MacDonald in October 2001.

**TABLE 7 PRESENTATIONS: STAFF OUTREACH ACTIVITIES**

Outreach Type	Pastoral Industry Sector	Conservation Interest Groups	Mining Industry Sector	Aboriginal Community Groups	Tourism Industry Sector	Researchers	General Public
Workshop	1	1		1		5	
Seminar	1	1			3	8	
Fieldtrip							1
Open Day	2		1				1
<b>Total</b>	<b>4</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>13</b>	<b>2</b>



*Savanna Explorer is the most popular section of the Centre's website, and a web forum will be introduced later this year*

# Grants & Awards

**TABLE 8 GRANTS**

Researcher	Research Project	Title of Grant	Funding Source	Amount	Period of Award
1 T Start (CALM WA)	2.3.1	WA Water & River Contribution	Water and River Commission	\$5500	2002
2 R Karfs (NTLPE)	3.1.1	VegMachine: Extending integrated rangeland monitoring information to industry	MLA	\$605,000	2002–6
2 M Quirk (QDPI)	4.3.5	Development of a grazing land-management program for northern Australia	MLA	\$300,000	2000–2
2 M Quirk (QDPI)	4.3.5	Practical grazing management guidelines for Dalrymple Shire	NHT	\$32,000	2001–2

1. Grants administered by TS–CRC
2. Grants administered by TS–CRC Partner

## AWARDS

Congratulations to Natalie Rossiter, NTU, who was a TS–CRC supported Honours student in 2001. She studied the eco-physiology of gamba grass. Natalie attained a first-class Honours and a Chancellor’s medal for academic excellence.

# Performance Indicators

## QUALITY AND RELEVANCE OF THE RESEARCH PROGRAM

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- Figure 1 Number of Publications that acknowledge the CRC
- Figure 2 Extent to which researchers are attracted to the Centre
- Figure 3 Awards and invited papers

## STRATEGY FOR UTILISATION AND COMMERCIALISATION OF RESEARCH OUTPUTS

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- Researchers participating in education and extension project activities, see Figure 4 Number of non-university or collaborative staff involved as supervisors.
- The Centre is in the process of setting up an incorporated entity to manage the Centre's contracts and intellectual property.
- Figure 5 Media recognition focused on outlets for stakeholders (ie newsletters etc. used by land managers, conservation managers and other research user groups).
- Easily accessible research findings and information, through outlets such as *Savanna Links*, and the TS-CRC website. TS-CRC has published three books, the first two targeting stakeholder groups.

Dyer, R., Jacklyn, P., Partridge, I., Russell-Smith, J., Williams, R.J. (eds) 2002, *Savanna burning: understanding and using fire in northern Australia*, Tropical Savannas Management Cooperative Research Centre, Darwin.

Johnson, A. 2002, *North Australian grassland fuel guide*, Tropical Savannas Management Cooperative Research Centre, Darwin.

Whitehead, P.J., Woinarski, J., Fisher, A., Fensham, R., & Beggs, K., (eds) 2001, *Developing an analytical framework for monitoring biodiversity in Australia's rangelands: a report by the Tropical Savannas CRC for the National Land and Water Resources Audit*, Tropical Savannas Management Cooperative Research Centre, Darwin.

## EDUCATION AND TRAINING

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- A record number of 37 students are currently enrolled in the Graduate Diploma and Master of Tropical Environmental Management (MTEM) courses. This compares favourably with the projected target of 100 MTEM students for this term of the TS-CRC.
- Five postgraduate scholarships have been awarded which is in line with the target of 25 stipulated for the TS-CRC's term.
- See Figure 6, postgraduate student numbers.

## COLLABORATIVE ARRANGEMENTS

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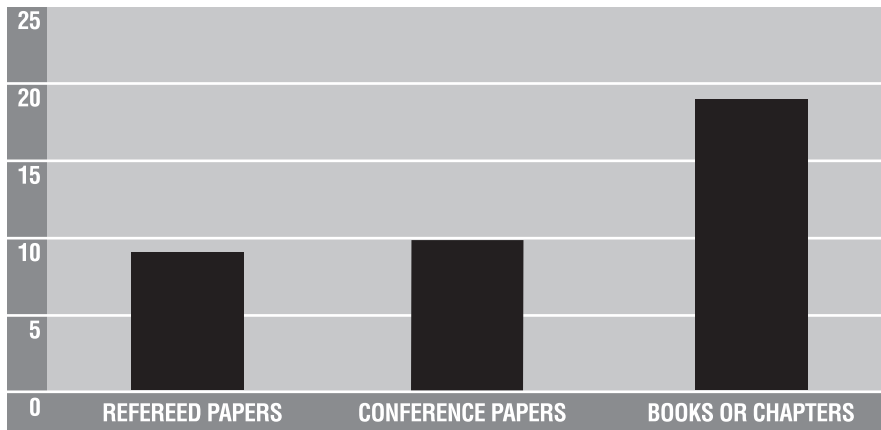
- Research projects are 100% multi-agency.

## RESOURCES, MANAGEMENT STRUCTURE AND PERFORMANCE EVALUATION

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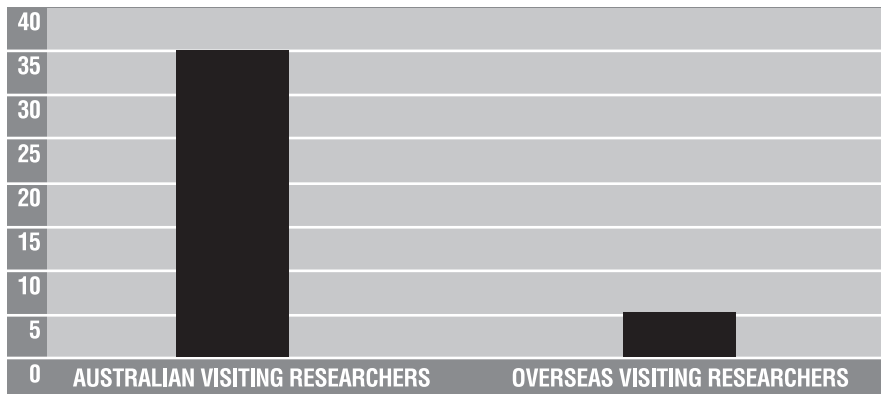
- Effective and efficient project management system
- Resources committed in accordance with the Commonwealth's agreement under direction of the Board of Management, taking into account input from the Savanna Advisory Committee and the Management Group.

**FIGURE 2 NUMBER OF PUBLICATIONS THAT ACKNOWLEDGE THE CRC**

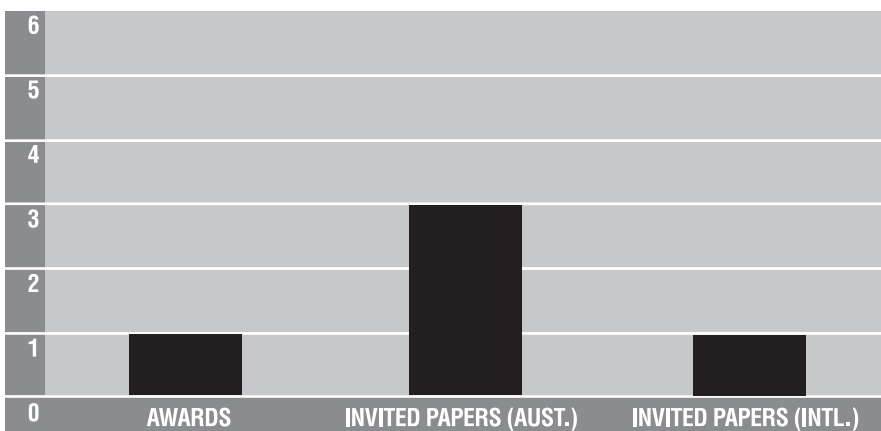


Numbers do not include publications in press

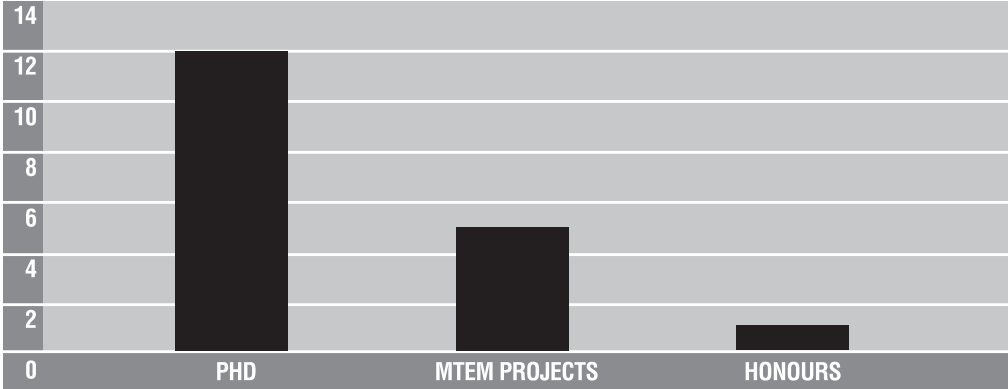
**FIGURE 3 EXTENT TO WHICH RESEARCHERS ARE ATTRACTED TO VISIT THE CENTRE**



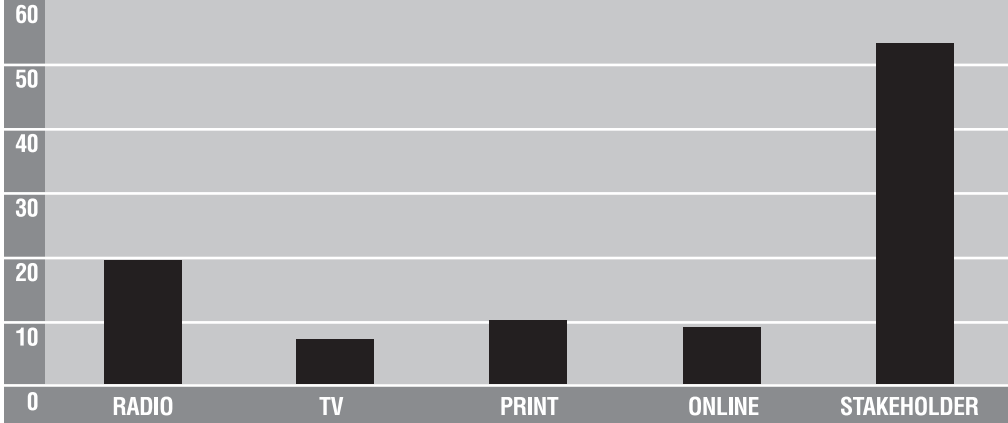
**FIGURE 4 AWARDS AND INVITED PAPERS**



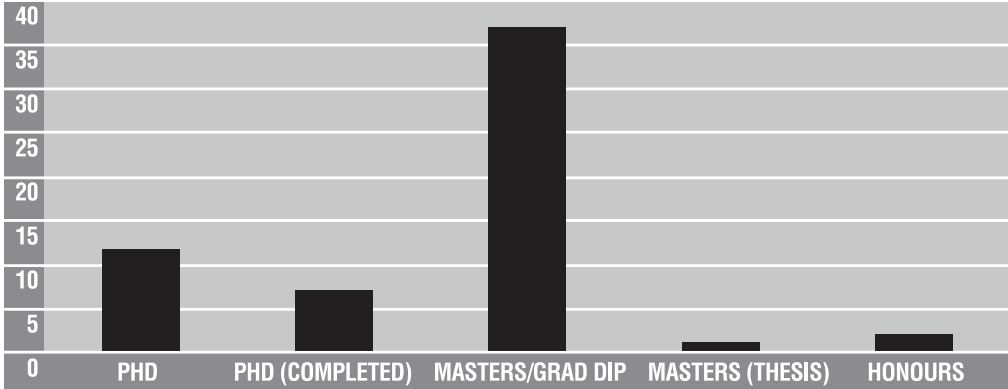
**FIGURE 5 NON-UNIVERSITY OR COLLABORATIVE STAFF INVOLVED AS SUPERVISORS**



**FIGURE 6 MEDIA RECOGNITION**



**FIGURE 7 NUMBER OF POSTGRADUATE STUDENTS**



# Abbreviations & Acronyms

ABS	Australian Bureau of Statistics
ACIAR	Australian Centre for International Agricultural Research
ACF	Australian Conservation Foundation
ADF	Australian Defence Force
AGO	Australian Greenhouse Office
AGSO	Australian Geological Survey Organisation
AGWEST	Department of Agriculture Western Australia
AHC	Australian Heritage Commission
AIATSIS	Australian Institute of Aboriginal and Torres Strait Islander Studies
ANIC	Australian National Insect Collection
ANU	Australian National University
APA	Australian Postgraduate Award
ARC	Australian Research Council
AUSLIG	Australian Surveying and Land Information Group
AVHRR	Advanced Very High Resolution Radiometer
BCYDC	Balkanu Cape York Development Corporation
BFCNT	Bushfires Council of the Northern Territory
BRS	Bureau of Rural Sciences
CAEPR	Centre for Aboriginal Economic Policy Research at ANU
CALM WA	Department of Conservation and Land Management, Western Australia
CRES	Centre for Resource and Environmental Studies (ANU)
CSIR	Council for Scientific and Industrial Research (South Africa)
CSIRO	Commonwealth Scientific Industrial Research Organisation
CSIRO C&A	Commonwealth Scientific Industrial Research Organisation, Division of Climate and Atmosphere
CSIRO L&W	Commonwealth Scientific Industrial Research Organisation, Division of Land and Water
CSIRO MIS	Commonwealth Scientific Industrial Research Organisation, Division of Mathematics and Information Sciences
CSIRO SE	Commonwealth Scientific Industrial Research Organisation, Sustainable Ecosystems
CSIRO TERC	Commonwealth Scientific Industrial Research Organisation, Tropical Ecosystems Research Centre
CYP2010	Cape York Peninsula 2010
DoD	Department of Defence
DOLA WA	Department of Land Administration Western Australia
DPI (Qld)	Queensland Department of Primary Industries
DU	Desert Uplands
EA	Environment Australia
EPA (Qld)	Queensland Environmental Protection Agency
ERIN	Environmental Resources Information Network
GD/MTEM	Graduate Diploma and Master of Tropical Environmental Management
GIS	Geographic Information System
GLADA	Gulf Local Authorities Development Association Inc.
GLM	Grazing Land Management
HERDSA	Higher Education Research and Development Society of Australasia
HRD	Higher Research Degree
IGBP	International Geosphere Biosphere Program
IT	Information Technology
JCU	James Cook University

KALACC	Kimberley Aboriginal Law and Culture Centre
KAPA	Kimberley Aboriginal Pastoralists Association
KCTWM	Key Centre for Tropical Wildlife Management
KLC	Kimberley Land Council
KRA	Key Result Area
LaTrobe	LaTrobe University
LFA	Landscape Function Analysis
LWA	Land & Water Australia
MODSIM	International Congress on Modelling and Simulation
MIM	Mount Isa Mines
MLA	Meat and Livestock Australia
MTEM	Masters of Tropical Environmental Management
NABRC	North Australian Beef Research Council
NAILSMA	North Australian Indigenous Land & Sea Management Alliance
NAP	North Australia Program
NAFMF	North Australia Fire Managers' Forum
NASA	National Aeronautics and Space Administration (US)
NASDA	Japanese Space Development Agency
NCAS	National Carbon Accounting System
NGRMG	Northern Gulf Resource Management Group
NHT	Natural Heritage Trust
NLC	Northern Land Council
NLWRA	National Land and Water Resources Audit
NOAA	National Oceanic and Atmospheric Administration (USA)
NRIC	National Resource and Information Centre, part of the Bureau of Rural Sciences
NRM	Natural Resource Management
NTDBIRD	Northern Territory Department of Business, Industry & Resource Development
NTDIPE	Northern Territory Department of Infrastructure, Planning and Environment
NTDME	Northern Territory Department of Mines and Energy
NTU	Northern Territory University
PAN	Parks Australia North
PACRIM	Pacific Rim
PWCNT	Parks and Wildlife Commission of the Northern Territory
QFRA	Queensland Fire and Rescue Authority
QNRM	Queensland Department of Natural Resources & Mines
QPWS	Queensland Parks and Wildlife Service
REC	Rural Extension Centre, a joint venture between UQ and QDPI
RIRDC	Rural Industries and Research Development Corporation
SOE	State of the Environment
TCA	Tourism Council of Australia
TEM	Tropical Environmental Management
TESAG	Tropical Environment Studies and Geography (JCU)
TS-CRC	Tropical Savannas Management Cooperative Research Centre
UQ	University of Queensland
VRD	Victoria River Downs
VRD CA	Victoria River District Conservation Association
WA FESA	Western Australia Fire and Emergency Services Authority
WA WRC	WA Waters and Rivers Commission
WWF	World Wide Fund for Nature

# Budget

**TABLE 9 IN-KIND CONTRIBUTIONS FROM PARTNERS (DOLLARS IN \$'000S)**

	EXPENDITURE		CUMULATIVE TOTAL TO DATE		Year 2 2002/2003		Year 3 2003/2004		Year 4 2004/2005	
	Actual	Agr'mt	Actual	Agr'mt	Budget	Agr'mt	Budget	Agr'mt	Budget	Agr'mt
<b>CORE PARTICIPANTS</b>										
<b>NORTHERN TERRITORY UNIVERSITY</b>										
Salaries	355.2	636.0	355.2	636.0	636.0	636.0	636.0	636.0	636.0	636.0
Capital										
Other	967.9	967.0	967.9	967.0	967.0	967.0	967.0	967.0	967.0	967.0
<b>Total</b>	<b>1,323.1</b>	<b>1,603.0</b>	<b>1,323.1</b>	<b>1,603.0</b>	<b>1,603.0</b>	<b>1,603.0</b>	<b>1,603.0</b>	<b>1,603.0</b>	<b>1,603.0</b>	<b>1,603.0</b>
<b>JAMES COOK UNIVERSITY</b>										
Salaries	82.8	85.0	82.8	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Capital										
Other	310.2	271.0	310.2	271.0	271.0	271.0	271.0	271.0	271.0	271.0
<b>Total</b>	<b>393.0</b>	<b>356.0</b>	<b>393.0</b>	<b>356.0</b>	<b>356.0</b>	<b>356.0</b>	<b>356.0</b>	<b>356.0</b>	<b>356.0</b>	<b>356.0</b>
<b>UNIVERSITY OF QUEENSLAND</b>										
Salaries	142.3	215.0	142.3	215.0	215.0	215.0	215.0	215.0	215.0	215.0
Capital										
Other	357.2	435.0	357.2	435.0	435.0	435.0	435.0	435.0	435.0	435.0
<b>Total</b>	<b>499.5</b>	<b>650.0</b>	<b>499.5</b>	<b>650.0</b>	<b>650.0</b>	<b>650.0</b>	<b>650.0</b>	<b>650.0</b>	<b>650.0</b>	<b>650.0</b>
<b>CSIRO</b>										
Salaries	712.8	725.0	712.8	725.0	725.0	725.0	725.0	725.0	725.0	725.0
Capital										
Other	1,244.5	1,069.0	1,244.5	1,069.0	1,069.0	1,069.0	1,069.0	1,069.0	1,069.0	1,069.0
<b>Total</b>	<b>1,957.3</b>	<b>1,794.0</b>	<b>1,957.3</b>	<b>1,794.0</b>	<b>1,794.0</b>	<b>1,794.0</b>	<b>1,794.0</b>	<b>1,794.0</b>	<b>1,794.0</b>	<b>1,794.0</b>
<b>DIRECTOR OF NATIONAL PARKS</b>										
Salaries	68.7	64.0	68.7	64.0	64.0	64.0	64.0	64.0	64.0	64.0
Capital										
Other	53.5	50.0	53.5	50.0	50.0	50.0	50.0	50.0	50.0	50.0
<b>Total</b>	<b>122.2</b>	<b>114.0</b>	<b>122.2</b>	<b>114.0</b>	<b>114.0</b>	<b>114.0</b>	<b>114.0</b>	<b>114.0</b>	<b>114.0</b>	<b>114.0</b>
<b>STATE OF QUEENSLAND</b>										
Salaries	499.9	590.0	499.9	590.0	590.0	590.0	590.0	590.0	590.0	590.0
Capital										
Other	1,101.2	1,498.0	1,101.2	1,498.0	1,498.0	1,498.0	1,498.0	1,498.0	1,498.0	1,498.0
<b>Total</b>	<b>1,601.1</b>	<b>2,088.0</b>	<b>1,601.1</b>	<b>2,088.0</b>	<b>2,088.0</b>	<b>2,088.0</b>	<b>2,088.0</b>	<b>2,088.0</b>	<b>2,088.0</b>	<b>2,088.0</b>
<b>NORTHERN TERRITORY OF AUSTRALIA</b>										
Salaries	651.2	438.0	651.2	438.0	438.0	438.0	438.0	438.0	438.0	438.0
Capital										
Other	1,002.7	665.0	1,002.7	665.0	665.0	665.0	665.0	665.0	665.0	665.0
<b>Total</b>	<b>1,653.9</b>	<b>1,103.0</b>	<b>1,653.9</b>	<b>1,103.0</b>	<b>1,103.0</b>	<b>1,103.0</b>	<b>1,103.0</b>	<b>1,103.0</b>	<b>1,103.0</b>	<b>1,103.0</b>



PROJECTED EXPENDITURE						GRAND TOTAL		
Year 5 2005/2006		Year 6 2006/2007		Year 7 2007/2008		Total 7 Yrs	Agr'mt 7 Yrs	Difference 7 Yrs
Budget	Agr'mt	Budget	Agr'mt	Budget	Agr'mt			
636.0	636.0	636.0	636.0	636.0	636.0	4,171.2	4,452.0	-280.8
967.0	967.0	967.0	967.0	967.0	967.0	6,769.9	6,769.0	0.9
<b>1,603.0</b>	<b>1,603.0</b>	<b>1,603.0</b>	<b>1,603.0</b>	<b>1,603.0</b>	<b>1,603.0</b>	<b>10,941.1</b>	<b>11,221.0</b>	<b>-279.9</b>
85.0	85.0	85.0	85.0	85.0	85.0	592.8	595.0	-2.2
271.0	271.0	271.0	271.0	271.0	271.0	1,936.2	1,897.0	39.2
<b>356.0</b>	<b>356.0</b>	<b>356.0</b>	<b>356.0</b>	<b>356.0</b>	<b>356.0</b>	<b>2,529.0</b>	<b>2,492.0</b>	<b>37.0</b>
215.0	215.0	215.0	215.0	215.0	215.0	1,432.3	1,505.0	-72.7
435.0	435.0	435.0	435.0	435.0	435.0	2,967.2	3,045.0	-77.8
<b>650.0</b>	<b>650.0</b>	<b>650.0</b>	<b>650.0</b>	<b>650.0</b>	<b>650.0</b>	<b>4,399.5</b>	<b>4,550.0</b>	<b>-150.5</b>
725.0	725.0	725.0	725.0	725.0	725.0	5,062.8	5,075.0	-12.2
1,069.0	1,069.0	1,069.0	1,069.0	1,069.0	1,069.0	7,658.5	7,483.0	175.5
<b>1,794.0</b>	<b>1,794.0</b>	<b>1,794.0</b>	<b>1,794.0</b>	<b>1,794.0</b>	<b>1,794.0</b>	<b>12,721.3</b>	<b>12,558.0</b>	<b>163.3</b>
64.0	64.0	64.0	64.0	64.0	64.0	452.7	448.0	4.7
50.0	50.0	50.0	50.0	50.0	50.0	353.5	350.0	3.5
<b>114.0</b>	<b>114.0</b>	<b>114.0</b>	<b>114.0</b>	<b>114.0</b>	<b>114.0</b>	<b>806.2</b>	<b>798.0</b>	<b>8.2</b>
590.0	590.0	590.0	590.0	590.0	590.0	4,039.9	4,130.0	-90.1
1,498.0	1,498.0	1,498.0	1,498.0	1,498.0	1,498.0	10,089.2	10,486.0	-396.8
<b>2,088.0</b>	<b>2,088.0</b>	<b>2,088.0</b>	<b>2,088.0</b>	<b>2,088.0</b>	<b>2,088.0</b>	<b>14,129.1</b>	<b>14,616.0</b>	<b>-486.9</b>
438.0	438.0	438.0	438.0	438.0	438.0	3,279.2	3,066.0	213.2
665.0	665.0	665.0	665.0	665.0	665.0	4,992.7	4,655.0	337.7
<b>1,103.0</b>	<b>1,103.0</b>	<b>1,103.0</b>	<b>1,103.0</b>	<b>1,103.0</b>	<b>1,103.0</b>	<b>8,271.9</b>	<b>7,721.0</b>	<b>550.9</b>

	EXPENDITURE		CUMULATIVE TOTAL TO DATE		Year 2		Year 3		Year 4	
	2001–2002		Actual	Agr'mt	2002/2003		2003/2004		2004/2005	
	Actual	Agr'mt			Budget	Agr'mt	Budget	Agr'mt	Budget	Agr'mt
<b>CORE PARTICIPANTS</b>										
<b>AGRICULTURE OF WA</b>										
Salaries	188.3	135.0	188.3	135.0	135.0	135.0	135.0	135.0	135.0	135.0
Capital										
Other	282.4	296.0	282.4	296.0	296.0	296.0	296.0	296.0	296.0	296.0
<b>Total</b>	<b>470.7</b>	<b>431.0</b>	<b>470.7</b>	<b>431.0</b>	<b>431.0</b>	<b>431.0</b>	<b>431.0</b>	<b>431.0</b>	<b>431.0</b>	<b>431.0</b>
<b>CALM WA</b>										
Salaries	101.2	94.0	101.2	94.0	94.0	94.0	94.0	94.0	94.0	94.0
Capital										
Other	162.6	174.0	162.6	174.0	174.0	174.0	174.0	174.0	174.0	174.0
<b>Total</b>	<b>263.8</b>	<b>268.0</b>	<b>263.8</b>	<b>268.0</b>	<b>268.0</b>	<b>268.0</b>	<b>268.0</b>	<b>268.0</b>	<b>268.0</b>	<b>268.0</b>
<b>NAILSMA</b>										
Salaries	241.6	220.0	241.6	220.0	220.0	220.0	220.0	220.0	220.0	220.0
Capital										
Other	495.5	433.0	495.5	433.0	433.0	433.0	433.0	433.0	433.0	433.0
<b>Total</b>	<b>737.1</b>	<b>653.0</b>	<b>737.1</b>	<b>653.0</b>	<b>653.0</b>	<b>653.0</b>	<b>653.0</b>	<b>653.0</b>	<b>653.0</b>	<b>653.0</b>
<b>TOTAL CORE IN-KIND CONTRIBUTIONS</b>										
Salaries	3,044.0	3,202.0	3,044.0	3,202.0	3,202.0	3,202.0	3,202.0	3,202.0	3,202.0	3,202.0
Capital										
Other	5,977.7	5,858.0	5,977.7	5,858.0	5,858.0	5,858.0	5,858.0	5,858.0	5,858.0	5,858.0
<b>Total</b>	<b>9,021.7</b>	<b>9,060.0</b>	<b>9,021.7</b>	<b>9,060.0</b>	<b>9,060.0</b>	<b>9,060.0</b>	<b>9,060.0</b>	<b>9,060.0</b>	<b>9,060.0</b>	<b>9,060.0</b>
<b>SUPPORTING PARTICIPANTS</b>										
<b>NABRC</b>										
Salaries	30.3	28.0	30.3	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Capital										
Other	26.9	24.0	26.9	24.0	24.0	24.0	24.0	24.0	24.0	24.0
<b>Total</b>	<b>57.2</b>	<b>52.0</b>	<b>57.2</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>
<b>TOTAL SUPPORTING IN-KIND CONTRIBUTIONS</b>										
Salaries	30.3	28.0	30.3	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Capital										
Other	26.9	24.0	26.9	24.0	24.0	24.0	24.0	24.0	24.0	24.0
<b>Total</b>	<b>57.2</b>	<b>52.0</b>	<b>57.2</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>
<b>TOTAL IN-KIND CONTRIBUTIONS</b>										
Total Salaries	3,074.3	3,230.0	3,074.3	3,230.0	3,230.0	3,230.0	3,230.0	3,230.0	3,230.0	3,230.0
Total Capital										
Total Other	6,004.6	5,882.0	6,004.6	5,882.0	5,882.0	5,882.0	5,882.0	5,882.0	5,882.0	5,882.0
<b>Grand Total (T1)</b>	<b>9,078.9</b>	<b>9,112.0</b>	<b>9,078.9</b>	<b>9,112.0</b>	<b>9,112.0</b>	<b>9,112.0</b>	<b>9,112.0</b>	<b>9,112.0</b>	<b>9,112.0</b>	<b>9,112.0</b>

I, Prof. Gordon Duff, hereby certify, to the best of my knowledge, that the multipliers as stated in Schedule 4 of the Commonwealth Agreement have been applied consistently.

PROJECTED EXPENDITURE						GRAND TOTAL		
Year 5 2005/2006 Budget Agr'mt		Year 6 2006/2007 Budget Agr'mt		Year 7 2007/2008 Budget Agr'mt		Total 7 Yrs	Agr'mt 7 Yrs	Difference 7 Yrs
135.0	135.0	135.0	135.0	135.0	135.0	998.3	945.0	53.3
296.0	296.0	296.0	296.0	296.0	296.0	2,058.4	2,072.0	-13.6
<b>431.0</b>	<b>431.0</b>	<b>431.0</b>	<b>431.0</b>	<b>431.0</b>	<b>431.0</b>	<b>3,056.7</b>	<b>3,017.0</b>	<b>39.7</b>
94.0	94.0	94.0	94.0	94.0	94.0	665.2	658.0	7.2
174.0	174.0	174.0	174.0	174.0	174.0	1,206.6	1,218.0	-11.4
<b>268.0</b>	<b>268.0</b>	<b>268.0</b>	<b>268.0</b>	<b>268.0</b>	<b>268.0</b>	<b>1,871.8</b>	<b>1,876.0</b>	<b>-4.2</b>
220.0	220.0	220.0	220.0	220.0	220.0	1,561.6	1,540.0	21.6
433.0	433.0	433.0	433.0	433.0	433.0	3,093.5	3,031.0	62.5
<b>653.0</b>	<b>653.0</b>	<b>653.0</b>	<b>653.0</b>	<b>653.0</b>	<b>653.0</b>	<b>4,655.1</b>	<b>4,571.0</b>	<b>84.1</b>
3,202.0	3,202.0	3,202.0	3,202.0	3,202.0	3,202.0	22,256.0	22,414.0	-158.0
5,858.0	5,858.0	5,858.0	5,858.0	5,858.0	5,858.0	41,125.7	41,006.0	119.7
<b>9,060.0</b>	<b>9,060.0</b>	<b>9,060.0</b>	<b>9,060.0</b>	<b>9,060.0</b>	<b>9,060.0</b>	<b>63,381.7</b>	<b>63,420.0</b>	<b>-38.3</b>
28.0	28.0	28.0	28.0	28.0	28.0	198.3	196.0	2.3
24.0	24.0	24.0	24.0	24.0	24.0	170.9	168.0	2.9
<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>369.2</b>	<b>364.0</b>	<b>5.2</b>
28.0	28.0	28.0	28.0	28.0	28.0	198.3	196.0	2.3
24.0	24.0	24.0	24.0	24.0	24.0	170.9	168.0	2.9
<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>52.0</b>	<b>369.2</b>	<b>364.0</b>	<b>5.2</b>
3,230.0	3,230.0	3,230.0	3,230.0	3,230.0	3,230.0	22,454.3	22,610.0	-155.7
5,882.0	5,882.0	5,882.0	5,882.0	5,882.0	5,882.0	41,296.6	41,174.0	122.6
<b>9,112.0</b>	<b>9,112.0</b>	<b>9,112.0</b>	<b>9,112.0</b>	<b>9,112.0</b>	<b>9,112.0</b>	<b>63,750.9</b>	<b>63,784.0</b>	<b>-33.1</b>

**TABLE 10 CASH CONTRIBUTIONS (DOLLARS IN \$'000S)**

	EXPENDITURE		CUMULATIVE TOTAL TO DATE		Year 2 2002/2003		Year 3 2003/2004	
	Year 1 2001–2002		Actual	Agr'mt	Budget	Agr'mt	Budget	Agr'mt
	Actual	Agr'mt						
<b>PARTNERS</b>								
Northern Territory University	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
James Cook University	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
University of Queensland	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
CSIRO	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Director of National Parks	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
State of Queensland	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Northern Territory of Australia	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture WA	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
CALM WA	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
NAILSMA	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
MLA	120.0	120.0	120.0	120.0	120.0	120.0	110.0	110.0
<b>Total Cash from Participants</b>	<b>520.0</b>	<b>520.0</b>	<b>520.0</b>	<b>520.0</b>	<b>520.0</b>	<b>520.0</b>	<b>510.0</b>	<b>510.0</b>
<b>OTHER CASH</b>								
Non-participants	14.6		14.6	0.0				
External Grants	268.8	100.0	268.8	100.0	200.0	200.0	300.0	300.0
Contract Research	5.3		5.3	0.0				
Commercialisation	21.2		21.2	0.0				
Education	6.4		6.4	0.0				
Interest	71.3	10.0	71.3	10.0	10.0	10.0	10.0	10.0
CRC GRANT	2,436.0	2,436.0	2,436.0	2,436.0	3,000.0	3,000.0	3,282.0	3,282.0
<b>Total Cash Contribution (T2)</b>	<b>3,343.6</b>	<b>3,066.0</b>	<b>3,343.6</b>	<b>3,066.0</b>	<b>3,730.0</b>	<b>3,730.0</b>	<b>4,102.0</b>	<b>4,102.0</b>
Cash Carried Over from Previous Year	737.7	400.0	737.7	400.0	1,158.4			
Less Unspent Balance	1,158.4		1,158.4	0.0	573.4			
<b>TOTAL CASH EXPENDITURE (T3)</b>	<b>2,922.8</b>	<b>3,466.0</b>	<b>2,922.8</b>	<b>3,466.0</b>	<b>4,315.0</b>	<b>3,730.0</b>	<b>4,102.0</b>	<b>4,102.0</b>
<b>ALLOCATION OF CASH EXPENDITURE BETWEEN HEADS OF EXPENDITURE</b>								
<b>Core Activities</b>								
Salaries	1,817.5	2,253.0	1,817.5	2,253.0	2,754.0	2,425.0	2,666.0	2,666.0
Capital	24.3	22.0	24.3	22.0				
Other	922.9	1,191.0	922.9	1,191.0	1,180.0	1,305.0	1,436.0	1,436.0
Total Cash Expenditure Core Activities	2,764.7	3,466.0	2,764.7	3,466.0	3,934.0	3,730.0	4,102.0	4,102.0
<b>External Grants</b>								
Salaries	39.9		39.9	0.0	250.0			
Capital								
Other	118.2		118.2	0.0	131.0			
<b>Total Cash Expenditure External Grants</b>	<b>158.1</b>	<b>0.0</b>	<b>158.1</b>	<b>0.0</b>	<b>381.0</b>			
<b>Total Expenditure All Activities</b>	<b>2,922.8</b>	<b>3,466.0</b>	<b>2,922.8</b>	<b>3,466.0</b>	<b>4,315.0</b>	<b>3,730.0</b>	<b>4,102.0</b>	<b>4,102.0</b>

**Notes**

1. Capital expenditure: Acquisition of Video Conferencing Equipment
2. Unspent balance of \$1,158.4mil includes \$0.293mil unspent external funds.

PROJECTED EXPENDITURE								GRAND TOTAL		
Year 4 2004/2005		Year 5 2005/2006		Year 6 2006/2007		Year 7 2007/2008		Total 7 Yrs	Agr'mt 7 Yrs	Difference 7 Yrs
Budget	Agr'mt	Budget	Agr'mt	Budget	Agr'mt	Budget	Agr'mt			
50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	350.0	350.0	0.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	70.0	70.0	0.0
25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	175.0	175.0	0.0
30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	210.0	210.0	0.0
25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	175.0	175.0	0.0
30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	420.0	420.0	0.0
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	700.0	700.0	0.0
30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	210.0	210.0	0.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	70.0	70.0	0.0
20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	140.0	140.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	350.0	350.0	0.0
<b>330.0</b>	<b>330.0</b>	<b>330.0</b>	<b>330.0</b>	<b>330.0</b>	<b>330.0</b>	<b>330.0</b>	<b>330.0</b>	<b>2,870.0</b>	<b>2,870.0</b>	<b>0.0</b>
								14.6	0.0	14.6
300.0	300.0	300.0	300.0	400.0	400.0	500.0	500.0	2,268.8	2,100.0	168.8
								5.3	0.0	5.3
								21.2	0.0	21.2
								6.4	0.0	6.4
10.0	10.0	10.0	10.0	10.0	10.0	0.0	0.0	121.3	60.0	61.3
3,282.0	3,282.0	2,500.0	2,500.0	2,100.0	2,100.0	1,600.0	1,600.0	18,200.0	18,200.0	0.0
<b>3,922.0</b>	<b>3,922.0</b>	<b>3,140.0</b>	<b>3,140.0</b>	<b>2,840.0</b>	<b>2,840.0</b>	<b>2,430.0</b>	<b>2,430.0</b>	<b>23,507.6</b>	<b>23,230.0</b>	<b>277.6</b>
<b>3,922.0</b>	<b>3,922.0</b>	<b>3,140.0</b>	<b>3,140.0</b>	<b>2,840.0</b>	<b>2,840.0</b>	<b>2,430.0</b>	<b>2,430.0</b>	<b>23,671.8</b>	<b>23,630.0</b>	<b>41.8</b>
2,549.0	2,549.0	2,041.0	2,041.0	1,846.0	1,846.0	1,580.0	1,580.0	15,253.5	15,360.0	-106.5
								24.3	22.0	2.3
1,373.0	1,373.0	1,099.0	1,099.0	994.0	994.0	850.0	850.0	7,854.9	8,248.0	-393.1
3,922.0	3,922.0	3,140.0	3,140.0	2,840.0	2,840.0	2,430.0	2,430.0	23,132.7	23,630.0	-497.3
								289.9	0.0	289.9
								0.0	0.0	0.0
								249.2	0.0	249.2
								<b>539.1</b>	<b>0.0</b>	<b>539.1</b>
<b>3,922.0</b>	<b>3,922.0</b>	<b>3,140.0</b>	<b>3,140.0</b>	<b>2,840.0</b>	<b>2,840.0</b>	<b>2,430.0</b>	<b>2,430.0</b>	<b>23,671.8</b>	<b>23,630.0</b>	<b>41.8</b>

**TABLE 11 SUMMARY OF RESOURCES APPLIED TO ACTIVITIES OF CENTRE**

	EXPENDITURE		CUMULATIVE TOTAL TO DATE		Year 2		Year 3	
	2001–2002		Actual	Agr'mt	2002/2003		2003/2004	
	Actual	Agr'mt			Budget	Agr'mt	Budget	Agr'mt
Grand Total (Inkind) From Table 1 (T1)	9,078.9	9,112.0	9,078.9	9,112.0	9,112.0	9,112.0	9,112.0	9,112.0
Grand Total (Cash Expenditure) From Table 2 (T3)	2,922.8	3,466.0	2,922.8	3,466.0	4,315.0	3,730.0	4,102.0	4,102.0
Total Resources Applied To Activities Of Centre (T1 + T3)	12,001.7	12,578.0	12,001.7	12,578.0	13,427.0	12,842.0	13,214.0	13,214.0
<b>ALLOCATION OF TOTAL RESOURCES APPLIED TO ACTIVITIES OF CENTRE BETWEEN HEADS OF EXPENDITURE</b>								
Total Salaries (Cash and In-kind)	4,931.7	5,483.0	4,931.7	5,483.0	6,234.0	5,655.0	5,896.0	5,896.0
Total Capital (Cash and In-kind)	24.3	22.0	24.3	22.0				
Total Other (Cash and In-kind)	7,045.7	7,073.0	7,045.7	7,073.0	7,193.0	7,187.0	7,318.0	7,318.0

**TABLE 12 ALLOCATION OF RESOURCES BETWEEN CATEGORIES OF ACTIVITIES**

PROGRAM	RESOURCE USAGE			
	(1) \$ Cash	\$ In-kind	(2) Contributed Staff	Cash-funded Staff
Research	1,795.6	8,370.4	31.9	16.5
Education	175.9	393.6	1.5	1.3
External Communications	327.8	183.7	0.7	2.0
Administration	610.0	131.2	0.5	1.7
Commercialisation/Technology Transfer	13.5	0.0	0.0	0.1
<b>Total</b>	<b>2,922.8</b>	<b>9,078.9</b>	<b>34.6</b>	<b>21.6</b>

(1) Cash from all Programs, including CRC program

(2) Person years, Professional staff

PROJECTED EXPENDITURE								GRAND TOTAL		
Year 4 2004/2005 Budget Agr'mt		Year 5 2005/2006 Budget Agr'mt		Year 6 2006/2007 Budget Agr'mt		Year 7 2007/2008 Budget Agr'mt		Total 7 Yrs	Agr'mt 7 Yrs	Difference 7 Yrs
9,112.0	9,112.0	9,112.0	9,112.0	9,112.0	9,112.0	9,112.0	9,112.0	63,750.9	63,784.0	-33.1
3,922.0	3,922.0	3,140.0	3,140.0	2,840.0	2,840.0	2,430.0	2,430.0	23,671.8	23,630.0	41.8
13,034.0	13,034.0	12,252.0	12,252.0	11,952.0	11,952.0	11,542.0	11,542.0	87,422.7	87,414.0	8.7
5,779.0	5,779.0	5,271.0	5,271.0	5,076.0	5,076.0	4,810.0	4,810.0	37,997.7	37,970.0	27.7
								24.3	22.0	2.3
7,255.0	7,255.0	6,981.0	6,981.0	6,876.0	6,876.0	6,732.0	6,732.0	49,400.7	49,422.0	-21.3

**TABLE 13 PROFESSIONAL STAFF (LISTING BY ORGANISATION)**
**Key R:** Research **E:** Education **C:** Commercialisation **A:** Administration

Name	Initial	Main Activity	Total % of time	Theme 1	Theme 2	Theme 3	Theme 4	Total % on Research	Commer- cialisation	Admin- istration
				Land- scape Ecology & Health	Ind. & Comm. National Resource Mgt.	Regional Planning & Mgt.	Human Capability Dev.			
				(R)	(R)	(R)	(E)			
<b>% Spent on Research Program</b>										
<b>CENTRE PERSONNEL</b>										
<b>CRC-FUNDED</b>										
Ludwig	J	R	50.0	50.0				50.0		
Landsberg	J	R	41.0		41.0			41.0		
Walker	D	R	38.0			38.0		38.0		
O'Donnell	K	E	100.0				100.0	100.0		
Jacklyn	P	E	100.0				100.0	100.0		
Falk	I	E	8.0				8.0	8.0		
Martin	S	A	100.0					0.0	10.0	90.0
Duff	G	A	42.0					0.0		42.0
Childs	J	A	33.0					0.0		33.0
<b>SUB-TOTAL</b>			<b>512.0</b>	<b>50.0</b>	<b>41.0</b>	<b>38.0</b>	<b>208.0</b>	<b>337.0</b>	<b>10.0</b>	<b>165.0</b>
<b>IN-KIND</b>										
Ludwig	J	R	50.0	49.0			1.0	50.0		
Landsberg	J	R	42.0		42.0			42.0		
Walker	D	R	37.0			37.0		37.0		
Falk	I	E	8.0				8.0	8.0		
<b>SUB-TOTAL</b>			<b>137.0</b>	<b>49.0</b>	<b>42.0</b>	<b>37.0</b>	<b>9.0</b>	<b>137.0</b>	<b>0.0</b>	<b>0.0</b>
<b>TOTAL</b>			<b>649.0</b>	<b>99.0</b>	<b>83.0</b>	<b>75.0</b>	<b>217.0</b>	<b>474.0</b>	<b>10.0</b>	<b>165.0</b>
<b>CORE PARTNERS</b>										
<b>NORTHERN TERRITORY UNIVERSITY</b>										
<b>CRC-FUNDED</b>										
Wurm	P	E	100.0				100.0	100.0		
Hutley	L	R	70.0	70.0				70.0		
Tapsall	S	R	25.0		25.0			25.0		
<b>SUB-TOTAL</b>			<b>195.0</b>	<b>70.0</b>	<b>25.0</b>	<b>0.0</b>	<b>100.0</b>	<b>195.0</b>	<b>0.0</b>	<b>0.0</b>
<b>IN-KIND</b>										
Hutley	L	R	28.0	28.0				28.0		
Ahmad	A	R	27.0	27.0				27.0		
Devonport	C	R	27.0	7.0	5.0		15.0	27.0		
Whitehead	P	R	20.0	20.0				20.0		
Jackson	W	E	15.0				15.0	15.0		
Bowman	D	R	13.0		13.0			13.0		
O'Grady	A	R	10.0	10.0				10.0		
Noske	R	R	7.0	7.0				7.0		
Shaw	G	E	20.0				20.0	20.0		
Griffiths	A	E	17.0	7.0			10.0	17.0		
Christian	K	E	10.0				10.0	10.0		
Douglas	M	E	10.0				10.0	10.0		
McGuinness	K	E	10.0				10.0	10.0		
Pearson	D	E	10.0				10.0	10.0		
Setterfield	S	E	10.0				10.0	10.0		
Williams	G	E	10.0				10.0	10.0		
White	B	E	5.0				5.0	5.0		
Hill	G	A	10.0					0.0		10.0
Webb	C	A	7.0					0.0		7.0
<b>SUB-TOTAL</b>			<b>266.0</b>	<b>106.0</b>	<b>18.0</b>	<b>0.0</b>	<b>125.0</b>	<b>249.0</b>	<b>0.0</b>	<b>17.0</b>
<b>TOTAL</b>			<b>461.0</b>	<b>176.0</b>	<b>43.0</b>	<b>0.0</b>	<b>225.0</b>	<b>444.0</b>	<b>0.0</b>	<b>17.0</b>



Name	Initial	Main Activity	Total % of time	Theme 1	Theme 2	Theme 3	Theme 4	Total % on Research	Commer- cialisation	Admin- istration
				Landscape Ecology & Health	Ind. & Comm. National Resource Mgt.	Regional Planning & Mgt.	Human Capability Dev.			
				(R)	(R)	(R)	(E)			
				% Spent on Research Program				(C)	(A)	
<b>JAMES COOK UNIVERSITY</b>										
<b>IN-KIND</b>										
Hill	R	E	10.0				10.0	10.0		
Johnson	J	R	10.0		10.0			10.0		
Krockenberger	A	R	10.0	10.0				10.0		
Waycott	M	R	10.0		10.0			10.0		
Jackes	B	R	5.0		2.5		2.5	5.0		
Luly	L	R	5.0	5.0				5.0		
Walkinson	R	R	5.0		5.0			5.0		
Schwarzkopf	L	R	5.0	5.0				5.0		
King	D	R	4.0		4.0			4.0		
Palmer	N	A	2.0					0.0		2.0
<b>SUB-TOTAL</b>			<b>66.0</b>	<b>20.0</b>	<b>31.5</b>	<b>0.0</b>	<b>12.5</b>	<b>64.0</b>	<b>0.0</b>	<b>2.0</b>
<b>TOTAL</b>			<b>66.0</b>	<b>20.0</b>	<b>31.5</b>	<b>0.0</b>	<b>12.5</b>	<b>64.0</b>	<b>0.0</b>	<b>2.0</b>
<b>UNIVERSITY OF QUEENSLAND</b>										
<b>CRC Funded</b>										
Taylor	B	R	50.0			50.0		50.0		
McAlpine	C	R	40.0			40.0		40.0		
<b>SUB-TOTAL</b>			<b>90.0</b>	<b>0.0</b>	<b>0.0</b>	<b>90.0</b>	<b>0.0</b>	<b>90.0</b>	<b>0.0</b>	<b>0.0</b>
<b>IN-KIND</b>										
Bradley	J	R	60.0			60.0		60.0		
McDonald	G	R	25.0			25.0		25.0		
Bosch	O	R	20.0			20.0		20.0		
Ross	H	R	20.0			20.0		20.0		
Schmidt	S	R	20.0	20.0				20.0		
<b>SUBTOTAL</b>			<b>145.0</b>	<b>20.0</b>	<b>0.0</b>	<b>125.0</b>	<b>0.0</b>	<b>145.0</b>	<b>0.0</b>	<b>0.0</b>
<b>TOTAL</b>			<b>235.0</b>	<b>20.0</b>	<b>0.0</b>	<b>215.0</b>	<b>0.0</b>	<b>235.0</b>	<b>0.0</b>	<b>0.0</b>
<b>DIRECTOR OF NATIONAL PARKS</b>										
<b>IN-KIND</b>										
Kennett	R	R	40.0	20.0	20.0			40.0		
Turner	A	R	10.0	10.0				10.0		
<b>TOTAL</b>			<b>50.0</b>	<b>30.0</b>	<b>20.0</b>	<b>0.0</b>	<b>0.0</b>	<b>50.0</b>	<b>0.0</b>	<b>0.0</b>
<b>CSIRO</b>										
<b>CRC-FUNDED</b>										
Dawes-Gromadzki	T	R	100.0	100.0				100.0		
Leidloff	A	R	100.0	100.0				100.0		
Mcmanus	I	R	54.0	27.0	27.0			54.0		
Lowe	L	R	40.0	40.0				40.0		
Radford	I	R	25.0		25.0			25.0		
Tapsall	S	R	25.0		25.0			25.0		
Wanganeen	C	R	22.0	22.0				22.0		
Nicholas	D	R	15.0			15.0		15.0		
Whiteman	L	R	15.0			15.0		15.0		
Whiting	M	R	15.0	15.0				15.0		
Eager	R	R	10.0	10.0				10.0		
Hodgen	M	R	10.0		10.0			10.0		
Joyce	S	R	10.0	10.0				10.0		
Stokes	C	R	10.0	10.0				10.0		
Kemei	J	R	5.0	5.0				5.0		
<b>SUB-TOTAL</b>			<b>456.0</b>	<b>339.0</b>	<b>87.0</b>	<b>30.0</b>	<b>0.0</b>	<b>456.0</b>	<b>0.0</b>	<b>0.0</b>

Name	Initial	Main Activity	Total % of time	Theme 1	Theme 2	Theme 3	Theme 4	Total % on Research	Commer- cialisation	Admin- istration
				Landsc ape & Health	Ind. & Comm. National Resource Mgt.	Regional Planning & Mgt.	Human Capability Dev.			
				(R)	(R)	(R)	(E)			
				% Spent on Research Program					(C)	(A)
<b>IN-KIND</b>										
Andersen	A	R	80.0	80.0				80.0		
Cook	G	R	80.0	79.0			1.0	80.0		
Eager	R	R	50.0	50.0				50.0		
Grice	T	R	50.0		50.0			50.0		
Hertog	T	R	50.0	50.0				50.0		
Lowe	L	R	50.0	50.0				50.0		
Williams	R	R	50.0	49.0			1.0	50.0		
Post	D	R	40.0	40.0				40.0		
Webb	M	R	40.0	40.0				40.0		
Gross	J	R	25.0	25.0				25.0		
Wanganeen	G	R	25.0	25.0				25.0		
Henderson	A	R	20.0	20.0				20.0		
Greiner	R	R	18.0			18.0		18.0		
Ash	A	R	15.0	15.0				15.0		
Hodgen	M	R	15.0	15.0				15.0		
Nicholas	M	R	15.0		15.0			15.0		
Stewart	L	R	15.0	15.0				15.0		
Whiteman	L	R	15.0		15.0			15.0		
Joyce	S	R	10.0	10.0				10.0		
Macleod	N	R	10.0	10.0				10.0		
Stafford-Smith	M	R	10.0	5.0		5.0		10.0		
Stokes	C	R	10.0	10.0				10.0		
Mayocchi	C	R	6.0			6.0		6.0		
Kemei	J	R	5.0	5.0				5.0		
Roth	C	R	5.0			5.0		5.0		
<b>SUB-TOTAL</b>			<b>709.0</b>	<b>593.0</b>	<b>80.0</b>	<b>34.0</b>	<b>2.0</b>	<b>709.0</b>	<b>0.0</b>	<b>0.0</b>
<b>TOTAL</b>			<b>1,165.0</b>	<b>932.0</b>	<b>167.0</b>	<b>64.0</b>	<b>2.0</b>	<b>1,165.0</b>	<b>0.0</b>	<b>0.0</b>
<b>AGRICULTURE WA</b>										
<b>IN-KIND</b>										
Craig	A	R	100.0		100.0			100.0		
Hadden	D	R	40.0			40.0		40.0		
Price	K	R	30.0				30.0	30.0		
Osborne	S	R	30.0			30.0		30.0		
Novelly	P	R	30.0			30.0		30.0		
Price	P	R	20.0				20.0	20.0		
Hartley	D	A	5.0					0.0		5.0
<b>SUB-TOTAL</b>			<b>255.0</b>	<b>0.0</b>	<b>100.0</b>	<b>100.0</b>	<b>50.0</b>	<b>250.0</b>	<b>0.0</b>	<b>5.0</b>
<b>TOTAL</b>			<b>255.0</b>	<b>0.0</b>	<b>100.0</b>	<b>100.0</b>	<b>50.0</b>	<b>250.0</b>	<b>0.0</b>	<b>5.0</b>
<b>CALM WA</b>										
<b>CRC-FUNDED</b>										
Handasyde	T	R	100.0	100.0				100.0		
<b>SUB-TOTAL</b>			<b>100.0</b>	<b>100.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>100.0</b>	<b>0.0</b>	<b>0.0</b>
<b>IN-KIND</b>										
Start	A	R	88.0	88.0				88.0		
Fuller	P	R	5.0	5.0				5.0		
<b>SUB-TOTAL</b>			<b>93.0</b>	<b>93.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>93.0</b>	<b>0.0</b>	<b>0.0</b>
<b>TOTAL</b>			<b>193.0</b>	<b>193.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>193.0</b>	<b>0.0</b>	<b>0.0</b>

Name	Initial	Main Activity	Total % of time	Theme 1	Theme 2	Theme 3	Theme 4	Total % on Research	Commer- cialisation	Admin- istration
				Landscape Ecology & Health	Ind. & Comm. National Resource Mgt.	Regional Planning & Mgt.	Human Capability Dev.			
				(R)	(R)	(R)	(E)			
				<b>% Spent on Research Program</b>						
<b>STATE OF QUEENSLAND</b>										
<b>CRC-FUNDED</b>										
McCallum	B	R	100.0			100.0		100.0		
Allen	P	R	38.0	38.0				38.0		
Kutt	A	R	50.0		50.0			50.0		
<b>SUB-TOTAL</b>			<b>188.0</b>	<b>38.0</b>	<b>50.0</b>	<b>100.0</b>	<b>0.0</b>	<b>188.0</b>	<b>0.0</b>	<b>0.0</b>
<b>IN-KIND</b>										
Bushell	JJ	R	100.0			100.0		100.0		
O'Reagain	P	R	100.0	10.0		90.0		100.0		
Taylor	B	R	36.0			36.0		36.0		
Latch	P	R	25.0	10.0	15.0			25.0		
Johnson	P	R	25.0	25.0				25.0		
Lorimer	M	R	20.0	10.0	10.0			20.0		
Whitehead	M	R	15.0	5.0	10.0			15.0		
Morrison	A	R	15.0	15.0				15.0		
Lyons	P	R	10.0			10.0		10.0		
Campbell	S	R	10.0			10.0		10.0		
Dale	A	R	10.0			10.0		10.0		
Ksiksi	T	R	10.0			10.0		10.0		
Rolfe	JJ	R	10.0			10.0		10.0		
Morgan	G	R	10.0		10.0			10.0		
King	S	R	10.0		10.0			10.0		
Garnett	S	R	10.0		10.0			10.0		
King	S	R	10.0	10.0				10.0		
Kemp	J	R	10.0	10.0				10.0		
Fry	P	R	7.0			7.0		7.0		
Voller	P	R	5.0			5.0		5.0		
Mullins	J	R	5.0			5.0		5.0		
McKenzie	J	R	5.0			5.0		5.0		
McDougall	M	R	5.0			5.0		5.0		
Linnane	M	R	5.0			5.0		5.0		
Johnston	T	R	5.0			5.0		5.0		
Hinrichsen	L	R	5.0			5.0		5.0		
Allen	R	R	5.0	5.0				5.0		
Day	K	R	5.0			5.0		5.0		
Hewitt	R	R	5.0			5.0		5.0		
Shepherd	B	R	5.0		5.0			5.0		
McCosker	J	R	5.0			5.0		5.0		
Williams	P	R	5.0			5.0		5.0		
Johnston	T	R	5.0			5.0		5.0		
Jefferys	A	R	3.0			3.0		3.0		
Quirk	M	A	65.0		40.0		20.0	60.0		5.0
Robbins	G	A	5.0					0.0		5.0
Hoey	W	A	5.0					0.0		5.0
<b>SUB-TOTAL</b>			<b>591.0</b>	<b>100.0</b>	<b>110.0</b>	<b>346.0</b>	<b>20.0</b>	<b>576.0</b>	<b>0.0</b>	<b>15.0</b>
<b>TOTAL</b>			<b>779.0</b>	<b>138.0</b>	<b>160.0</b>	<b>446.0</b>	<b>20.0</b>	<b>764.0</b>	<b>0.0</b>	<b>15.0</b>

Name	Initial	Main Activity	Total % of time	Theme 1	Theme 2	Theme 3	Theme 4	Total % on Research	Commer- cialisation	Admin- istration
				Landscape Ecology & Health	Ind. & Comm. National Resource Mgt.	Regional Planning & Mgt.	Human Capability Dev.			
				(R)	(R)	(R)	(E)			
				<b>% Spent on Research Program</b>						
<b>NORTHERN TERRITORY OF AUSTRALIA</b>										
<b>CRC-FUNDED</b>										
Yates	C	R	100.0		100.0			100.0		
Richardson	K	R	100.0		100.0			100.0		
Lynch	D	R	100.0		100.0			100.0		
Fisher	A	R	50.0	25.0	25.0			50.0		
Russell-Smith	J	R	30.0		30.0			30.0		
Brock	C	R	24.0	12.0	12.0			24.0		
Dyer	R	R	23.0	23.0				23.0		
Risler	J	R	16.0	8.0	8.0			16.0		
<b>SUB-TOTAL</b>			<b>443.0</b>	<b>68.0</b>	<b>375.0</b>	<b>0.0</b>	<b>0.0</b>	<b>443.0</b>	<b>0.0</b>	<b>0.0</b>
<b>IN-KIND</b>										
Allan	G	R	100.0		100.0			100.0		
Edwards	A	R	100.0		100.0			100.0		
Woinarski	J	R	75.0	64.0	10.0		1.0	75.0		
Russell-Smith	J	R	60.0		60.0			60.0		
Karfs	R	R	50.0		49.0		1.0	50.0		
Telfer	D	R	50.0		50.0			50.0		
Hodges	R	R	40.0		40.0			40.0		
Applegate	R	R	32.0		29.0	2.0	1.0	32.0		
Kean	L	R	30.0	30.0				30.0		
Dyer	R	R	27.0	26.0			1.0	27.0		
Roeger	L	R	25.0		25.0			25.0		
Brennan	K	R	20.0		20.0			20.0		
Fisher	A	R	20.0	9.0	10.0		1.0	20.0		
Hempel	C	R	20.0		20.0			20.0		
Lewis	M	R	20.0	20.0				20.0		
Milne	D	R	20.0	20.0				20.0		
Hooper	D	R	15.0	15.0				15.0		
Jolly	P	R	10.0	10.0				10.0		
Morrison	J	R	10.0		10.0			10.0		
Smith	I	R	5.0			5.0		5.0		
Cowley	R	R	3.0		3.0			3.0		
MacDonald	N	R	2.0		2.0			2.0		
<b>SUB-TOTAL</b>			<b>734.0</b>	<b>194.0</b>	<b>528.0</b>	<b>7.0</b>	<b>5.0</b>	<b>734.0</b>	<b>0.0</b>	<b>0.0</b>
<b>TOTAL</b>			<b>1,177.0</b>	<b>262.0</b>	<b>903.0</b>	<b>7.0</b>	<b>5.0</b>	<b>1,177.0</b>	<b>0.0</b>	<b>0.0</b>

		Main Activity	Total % of time	Theme 1 Landscape Ecology & Health	Theme 2 Ind. & Comm. National Resource Mgt.	Theme 3 Regional Planning & Mgt.	Theme 4 Human Capability Dev.	Total % on Research	Commercialisation	Administration
				(R)	(R)	(R)	(E)		(C)	(A)
				% Spent on Research Program						
<b>NAILSMA</b>										
<b>CRC FUNDED</b>										
Smith	N	R	50.0		50.0			50.0		
Banens	Y	R	40.0		40.0			40.0		
Garde	M	R	30.0		30.0			30.0		
Cooke	P	R	25.0		25.0			25.0		
<b>SUB-TOTAL</b>			<b>145.0</b>	<b>0.0</b>	<b>145.0</b>	<b>0.0</b>	<b>0.0</b>	<b>145.0</b>	<b>0.0</b>	<b>0.0</b>
<b>IN-KIND</b>										
Yibarbuk	D	R	100.0		100.0			100.0		
Cooke	P	R	75.0		70.0	5.0		75.0		
Salmon	M	R	60.0		60.0			60.0		
Flinders	C	R	40.0		40.0			40.0		
Oliver	B	R	20.0		20.0			20.0		
Epworth	D	R	17.0		10.0			10.0		7.0
Horstman	M	R	15.0		10.0	5.0		15.0		
Banens	Y	R	10.0		10.0			10.0		
White	I	R	10.0		10.0			10.0		
Garde	M	R	10.0		10.0			10.0		
<b>SUB-TOTAL</b>			<b>357.0</b>	<b>0.0</b>	<b>340.0</b>	<b>10.0</b>	<b>0.0</b>	<b>350.0</b>	<b>0.0</b>	<b>7.0</b>
<b>TOTAL</b>			<b>502.0</b>	<b>0.0</b>	<b>485.0</b>	<b>10.0</b>	<b>0.0</b>	<b>495.0</b>	<b>0.0</b>	<b>7.0</b>
<b>SUPPORTING PARTNERS</b>										
<b>NABRC</b>										
<b>IN-KIND</b>										
Stockwell	T	R	15.0		10.0			10.0		5.0
Stoate	J	R	10.0		10.0			10.0		
Maclean	S	R	10.0		10.0			10.0		
Jansen	R	R	10.0		10.0			10.0		
Cox	L	R	10.0		10.0			10.0		
<b>TOTAL</b>			<b>55.0</b>	<b>0.0</b>	<b>50.0</b>	<b>0.0</b>	<b>0.0</b>	<b>50.0</b>	<b>0.0</b>	<b>5.0</b>
<b>CTRC funded total</b>			<b>2,129.0</b>	<b>665.0</b>	<b>723.0</b>	<b>258.0</b>	<b>308.0</b>	<b>1,954.0</b>	<b>10.0</b>	<b>165.0</b>
<b>In kind total</b>			<b>3,458.0</b>	<b>1,205.0</b>	<b>1,319.5</b>	<b>659.0</b>	<b>223.5</b>	<b>3,407.0</b>	<b>0.0</b>	<b>51.0</b>
<b>Grand Total</b>			<b>5,587.0</b>	<b>1,870.0</b>	<b>2,042.5</b>	<b>917.0</b>	<b>531.5</b>	<b>5,361.0</b>	<b>10.0</b>	<b>216.0</b>

**TABLE 14 SUMMARY OF STAFF CONTRIBUTIONS**

**Key R:** Research **E:** Education **C:** Commercialisation **A:** Administration

	Total	(R)	(R)	(R)	(E)	Total % (R)	(C)	(A)
<b>CORE PARTNERS</b>								
Total In-Kind	34.0	12.1	12.7	6.6	2.2	33.6	0.0	0.5
Total Funded by CRC	21.3	6.7	7.2	2.6	3.1	19.5	0.1	1.7
<b>TOTAL</b>	<b>55.5</b>	<b>18.7</b>	<b>19.9</b>	<b>9.2</b>	<b>5.5</b>	<b>53.3</b>	<b>0.1</b>	<b>2.1</b>
<b>SUPPORTING PARTNERS</b>								
Total In-Kind	0.6	0.0	0.5	0.0	0.0	0.5	0.0	0.1
Total Funded by CRC								
<b>TOTAL</b>	<b>0.6</b>	<b>0.0</b>	<b>0.5</b>	<b>0.0</b>	<b>0.0</b>	<b>0.5</b>	<b>0.0</b>	<b>0.1</b>
Grand Total In-Kind	34.6	12.1	13.2	6.6	2.2	34.1	0.0	0.5
Grand Total Funded by CRC	21.3	6.7	7.2	2.6	3.1	19.5	0.1	1.7
<b>GRAND TOTAL</b>	<b>56.1</b>	<b>18.7</b>	<b>20.4</b>	<b>9.2</b>	<b>5.5</b>	<b>53.8</b>	<b>0.1</b>	<b>2.2</b>
Proportion of Staff in Each Activity	100%	33%	36%	17%	11%	97%	0%	3%

Differences due to rounding

**TABLE 15 SUPPORT STAFF**

<b>IN-KIND</b>		<b>CRC-FUNDED</b>	
<b>Organisation</b>	<b>Person Yrs</b>	<b>Organisation</b>	<b>Person Yrs</b>
JCU	0.24	NTU	0.60
PARKS	0.46	JCU	0.40
AgWEST	0.05	UQ	0.24
CALM	0.05	Centre Personnel	2.34
QLD	0.12	<b>Grand Total</b>	<b>3.58</b>
NT	0.03		
NAILSMA	0.10		
<b>Grand Total</b>	<b>1.05</b>		

# Audit



Chartered Accountants

ABN: 30 692 879 009

GPO Box 1616

Darwin NT 0801

Australia

Telephone: 61 8 8982 9000

18 Smith Street

Darwin NT 0800

Australia

Facsimile: 61 8 8941 0238

**Auditor's report to the parties to the Cooperative Research Centre for Tropical Savannas Management, being the Commonwealth of Australia, Northern Territory University, James Cook University of North Queensland, University of Queensland, the Commonwealth Scientific and Industrial Research Organisation, Director of National Parks, the State of Queensland, Northern Territory of Australia, the Department of Agriculture (WA), the Department of Conservation and Land Management (WA), the North Australian Indigenous Land and Sea Management Alliance and Meat and Livestock Australia Limited.**

## **Scope**

We have audited the financial information of the Cooperative Research Centre for Tropical Savannas Management as set out in Tables 9 to 16 of the Annual Report [being the tables showing in-kind and cash contributions for each party to the CRC, and cash expenditure] for the year ended 30 June 2002. The parties to the Cooperative Research Centre are responsible for the preparation and presentation of the financial information. The parties to the Cooperative Research Centre have determined that the accounting policies used are appropriate to meet the requirements of the Agreement between the Commonwealth of Australia and the parties in relation to the Cooperative Research Centre for Tropical Savannas Management ("the Agreement"). We have conducted an independent audit of the financial information in order to express an opinion on it to the parties to the Cooperative Research Centre for Tropical Savannas Management.

The financial information has been prepared for the parties to the Cooperative Research Centre for Tropical Savannas Management for the purposes of fulfilling their annual reporting obligations under clause 14.1 of the Agreement and for distribution to the Cooperative Research Centre Secretariat, the Department of Industry, Science and Resources, representing the Commonwealth of Australia. We disclaim any assumption of responsibility for any reliance on this report or on the financial information to which it relates to any person other than those mentioned above, or for any purpose other than that for which it was prepared.

Our audit has been conducted in accordance with Australian Auditing Standards to provide reasonable assurance as to whether the financial information is free of material misstatement. Our procedures include examination, on a test basis, of evidence supporting the amounts and other disclosures in the financial information, and the evaluation of accounting policies and significant accounting estimates. These procedures have been undertaken to form an opinion as to whether in all material respects, the financial information is presented fairly in accordance with Australian accounting concepts and standards, and the requirements of the Agreement, including Clauses 4 (Contributions), 5(1), 5(2), 5(3) (Application of Grant and Contributions), 9(1), 9(5) (Intellectual Property) and 12(2) (Financial Provisions), so as to present a view of the sources of funding and the application of funding of the Cooperative Research Centre for Tropical Savannas Management which is consistent with our understanding of its financial activities during the year and its financial position.

We have not performed any audit procedures upon the estimates or budgets for future periods included in the financial information and therefore, do not express any opinion on them.

The audit opinion expressed in this report has been formed on the above basis.

## Qualification

The multipliers adopted by the Cooperative Research Centre to value in-kind contributions have a sound and reasonable basis and each partner's components of the Researcher's Contributions for the year under report has been provided at least to the value for that year committed in the Budget as specified in the Agreement. However, the Researcher's allocations of the budgetary resources between Heads of Expenditure has varied from the allocation in the budget by \$100,000 and/or 20% without prior approval from the Commonwealth in the following areas:

**TABLE 16 HEADS OF EXPENDITURE**

Heads of Expenditure	Amount committed (\$,000)	Amount provided (\$,000)
<b>Cash contributions</b>		
Salaries	2253.0	1857.4
Other	1191.0	1041.1
<b>In-kind contributions</b>		
Salaries	3230.0	3074.3
Other	5882.0	6004.6

## Qualified Audit opinion

In our opinion, except for the effects on the financial information of the matter referred to in the qualification paragraph, the financial information presented in Tables 9 to 16 presents fairly the sources of funding, the application of funding and the financial position of the Cooperative Research Centre for Tropical Savannas Management for the year ended 30 June 2002 in accordance with Australian accounting concepts and applicable Accounting Standards and the requirements of the Agreement.

KPMG



Devendra N Patel Partner

Place: Darwin

Date: 10 September 2002