



# SAVANNA LINKS

Cooperative Research Centre for the Sustainable Development of Tropical Savannas

ISSUE 15

JULY–SEPT. 2000

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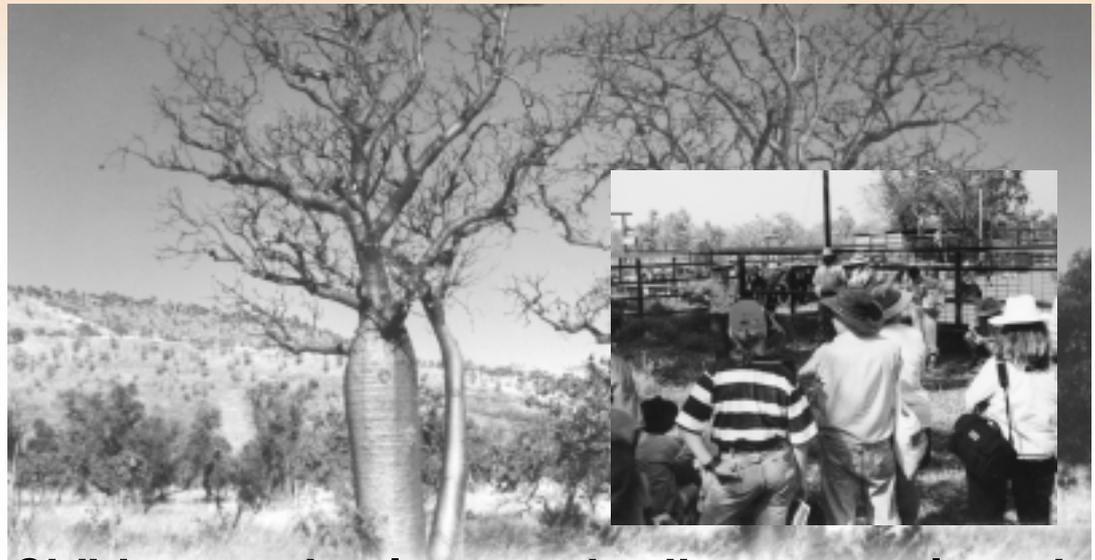
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## Striking a balance in the grasslands —*production and conservation*

In August the first conference to address production, land use and conservation across the grassy landscapes of northern Australia took place in Katherine. It called for increased cooperation and communication among all savanna stakeholders.

Regional forums might be a way to achieve this. By Kate O'Donnell

**T**he conference, organised by the TS–CRC largely funded by Bushcare and supported by various land-management agencies, brought together land users from across the north. The theme, striking a balance between production and conservation in the grassy landscapes of northern Australia, meant that delegates hailed from all sorts of backgrounds: pastoral production, conservation and primary industry government agencies, scientists, extension workers, Aboriginal agencies and program managers and policy makers.

It suggested a series of regional forums to help achieve integrated regional planning and continued communication about issues of long-term sustainable management.

It was a packed agenda, with presentations covering fire and weed management; monitoring for biodiversity change; sustainable production

challenges and management techniques; regional approaches to land management; grasslands and conservation; managing parks and tourism ventures and soil conservation. Its style was a mix of presentations, workshops, social outings and field trips. The aim was to give an overview of current research and knowledge in managing northern grassy landscapes, with a particular focus on providing people with practical land management tools and advice.

By conference end all had agreed the involvement and participation of people at all levels of decision-making was the key to developing a balance between production and conservation and long-term sustainability throughout the north's landscapes.

### State of the north's grassy landscapes

In many parts of southern Australia the problems of degraded land, dryland salinity, non-sustainable

*continued page 6*



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

## Thumbs-up for Centre in its fifth year

IN September the Tropical Savannas CRC had good reason to celebrate as the Second Stage of the Fifth Year review drew to a close in Darwin. The Fifth Year review is the most important of the periodical reviews of CRCs undertaken by the CRC Program Committee through its expert panels. The Centre had passed through the first stage—held in July this year—with flying colours. The release of the Committee’s final Report at the end of September indicates that the second stage expert panel had been equally impressed.

While the Tropical Savannas CRC is a predominantly a public good CRC, it addresses economic activities that contribute approximately \$7.5 billion per annum to Australia’s economy. The review found that when the TS–CRC was established there were almost no mechanisms for east-west integration of research and application of that research into the tropical savannas of north Australia. However, in the five years of its existence its progress, said the panel, “has been impressive given the long history of limited collaboration of research and management agencies across the region.”

It found that the CRC made significant progress towards defining the states of health in various parts of the tropical savannas and land-use regimes.

One area that received particular praise was the TS–CRC’s Master and Graduate Diploma of Tropical Environmental Management developed within its education and training program.

Levels of industry/user participation and cooperation between the participants, and across programs, also came in for its share of approval.

The panel recommended that in the final two years even more attention should be given to promoting the flow of information, sustainable technologies and management practices to end-users.

A submission for a further term of funding for a CRC for Tropical Savannas Management has been made to the CRC 2000 Round. This would provide funding to 2009.

The existing CRC has focused on linking land-management research across jurisdictions and disciplines. A new CRC for Tropical Savannas Management will still link research dealing with ecological sustainability but will take this further to examine economic viability and social desirability of land-management solutions in partnership with savanna stakeholders.

Read the entire report on the TS–CRC website:  
<http://savanna.ntu.edu.au/centnews.html>

### Tropical Savannas CRC —Linking the North

The Tropical Savannas CRC is a joint venture of the major organisations involved in land management of the savannas of north Australia. It comprises two universities, two divisions of CSIRO, four NT, three Queensland, two WA government agencies and one federal agency. The Centre promotes sustainable use and conservation of Australia’s tropical savannas by acting as a bridge between agencies engaged in land-management research and industries representing land users: e.g. pastoralists, Aboriginal groups, the tourist industry and conservation managers; and by looking for ways to ensure more research ends up being used on the land.

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## Outback guides take world tourism awards by storm

IT’S OFFICIAL: the Savannah Guides is the best tourism group in the world. The group has just won two categories in the British Airways Tourism for Tomorrow Awards, one of which was for the world’s Best Tourism Organisation.

The Guides were thrilled to win the inaugural Australian division of the awards in the first week of October, and just one week later were in shock after the global win.

“We’re ecstatic to have won such a prestigious award,” said Tom Warnes, president of the Savannah Guides. “We were extremely proud to be chosen as the Australian winner, but to be recognised as the best tourism organisation on Earth is simply incredible.”

In winning the Australian award, Don Clark, British Airways’ regional general manager said the group was recognised for its outstanding contribution to the conservation of the natural and cultural environment of northern Australia.

He said the company showed environmental responsibility and should be congratulated for its visionary work toward promoting and protecting the remote areas of north Australia.

The Savannah Guides were formed in 1988 to educate visitors through its guides and tourism sites about the environmental conditions of the gulf savanna region.

The groups now comprises 13 eco-tourism enterprises and offers guided tours through the 1.9 million square kilometres of tropical savannas from Cairns to Broome.

“This is an incredible honour for the Savannah Guides and the culmination of 12 years’ hard work.” said Bram Collins, Guide and past president of the group.

“This highlights the importance of a community-based organisation like Savannah Guides, not only for the role they play in interpretive tourism, but on a broader regional development perspective.

“This award is not only great for Savannah Guides but also for the tropical savannas of northern Australia. It further confirms our role in establishing Australia as a world leader in nature-based tourism.

“We’re offering visitors unique access to some of the most beautiful countryside in northern Australia while preserving the environment. Our aim is to protect and interpret each region’s natural and cultural assets through our tours.”

Web: [www.savannah-guides.com.au/](http://www.savannah-guides.com.au/)

# Results out for world's biggest fire experiment



*Fires are occurring more frequently in northern Australia—and the effects on biodiversity are not well understood.*

THE results of one of the world's largest fire experiments, conducted in Kakadu National Park over an eight-year period, show that fire managers in northern Australia are on the right track, but an overly high frequency of fires is of concern.

The Kapalga Fire Experiment was established by CSIRO because fire is such an important part of the northern Australian environment, with more than 30 million hectares burnt annually.

Although fire is a major part of life in the north, CSIRO ecologist Dr Alan Andersen said, the long-term effects on biodiversity are not well understood. Conservation managers need this information to help them do their job.

The Kapalga experiment covered 250 square kilometres, and tested four major fire regimes common in the Top End. The results showed that much of savanna biota is remarkably resilient to fire. However, a significant number of plants and animals are seriously affected by burning each year. Many of these species are

affected more by whether or not fire occurs, rather than by how intense the fire is. This suggests that savanna biodiversity would benefit from improved management of fire frequency.

"Much of northern Australia is burnt each year," said Dr Andersen. "However, more consideration needs to be given to how frequently fires occur. Our results show that biodiversity is optimised if substantial areas of savanna are only burnt once every three to five years."

Current rates of burning in many parts of the Top End are substantially above this, with fire frequencies

tending towards between one and two years.

"At Kapalga we were able for the first time to look at the effects of fire on the whole ecosystem. The experiment involved researchers from universities and other organisations, as well as CSIRO, covering topics including fire behaviour, nutrient cycling, hydrology and stream dynamics, vegetation, insects and spiders, and all vertebrate groups," he said.

Parks Australia North, which manages Kakadu, provided valuable support for the experiment. The agency's head, Peter Wellings, said land managers and scientists all agree that fire needs to be actively managed in the Top End.

"The question is not 'should the country be burnt?' but 'when and where?'," he said. "Kapalga's results are not just important for Kakadu, but for all Top End land managers."

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## Study finds tree clearing continues apace

QUEENSLAND'S Statewide Land-cover and Trees Study 1997–99, released in late September—has found a major increase in land clearing activity from 1995–97.

The average annual clearing rate in the state for 1997–99 was 425,000 ha/year, 25 per cent higher than the 1995–97 rate of 340,000 ha/year and 47 per cent higher than the 1991–95 rate of 289,000 ha/year. The preliminary estimate of clearing rate for 1988–91 is 475,000 ha/year.

Two-thirds of clearing in 1997–99 occurred in areas mapped as remnant by the Queensland Herbarium's regional ecosystem mapping.

It is estimated that one-third of the

clearing in 1997–99 was of regrowth vegetation. The brigalow belt remains the biogeographic region with the largest rate of clearing. In 1997–99 it contained 59 per cent of the total area cleared.

The most intensive clearing continued to shift from central to southern Queensland. The Balonne and Murweh shires (around Charleville and St George) were the local government areas with the highest clearing rates for 1997–99. During 1997–99 about 38 per cent of clearing occurred on leasehold land, 59 per cent on freehold land and the remaining 3 per cent on crown land and other tenures. The trend of increasing clearing rates

on freehold tenure reported in the 1995–97 study continued. The increase in clearing on freehold tenure accounted for the majority of the clearing rate in 1997–99.

Approximately 86 per cent of the change in woody vegetation was clearing of woody vegetation to pasture, 10 per cent to crop, and the remaining 4 per cent to forest, mining, infrastructure and settlement. These replacement land-cover proportions remain similar to those for 1995–97.

Web: [www.dnr.qld.gov.au/resourcenet/veg/slats/report/index.html](http://www.dnr.qld.gov.au/resourcenet/veg/slats/report/index.html)  
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## Indigenous conference for Top End

THE second annual Indigenous Land Management Conference was held recently at Wuyagiba outstation in Arnhem Land, between 29–31 August. The conference drew 130 delegates from across the Top End—a tremendous turn-out for such a remote area. People came from Maningrida, Yirrakala, Bulman, Katherine, Kakadu, Pine Creek, Timber Creek, Daly River, Alice Springs and Borroloola.

The conference was facilitated by Clarry Rogers and opened by his father Roger and aunts Queenie, Fanny, Topsy and Bessie who are traditional owners for Wuyagiba and who welcomed visitors to their country.

There were representatives from Land Care Australia, Northern Land Council (Caring for Country Unit), Greening Australia, Jawoyn Association, Northern Territory University and Parks & Wildlife Commission whose facilitator, Joe Morrison, assisted Clarry Rogers, Yugul Mangi Land Care Coordinator. The conference provided a forum to discuss a wide variety of land-management issues. Some of the resolutions reached are listed below.

**Fire management:** that an Aboriginal Bush Fire Council help become involved in teaching traditional burning methods. Wet-season burning was considered problematic as it removes vital food sources for particular animals even though it does help in the eradication of certain weeds.

**Weed control:** that the eradication of weeds be made a high priority by raising awareness of their dangers through resource and women's centres in local communities. Furthermore, weed management could be made more

effective through the use of fencing and controlling the importation of hay and exotic plants.

**Sustainable harvesting:** that the value of sustainable harvesting of natural resources be promoted by programs that monitor various species such as turtle and goanna and that such scientific studies be communicated to Aboriginal communities.

**Tourism:** that the NLC establish protocols for potential tour operators who should liaise with them and that Land Councils seek funding for an indigenous tourist forum to share information and discuss initiatives.

**Turtle management:** that research programs on species and marine debris be community driven by directly involving land owners in planning and by having community members carry out the work. All information should come back to those communities as well as be shared with other Aboriginal communities.

**Mining:** that people need to be warned in advance what kinds of impacts are likely from mining including potential poisoning of lands and bush tucker as well as damage to sites. In order to understand what is involved in mining and its effects, funding for social impact assessment needs to be made available, with an agency like the NLC to run such studies.

The event was formally closed by the handing over of letter sticks, a didgeridoo, mat and basket from Roger Rogers and his sisters to the Dhimurru Land Management group who will be the hosts of next year's conference.

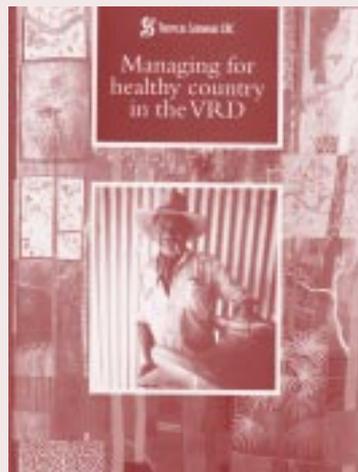
—Rosie O'Donnell

## Managing for healthy country in the VRD

THIS new TS-CRC book brings together a range of research findings relevant to the Victoria River District—which covers an area of more than 125,000 km<sup>2</sup> about 500 km south of Darwin—and gives recommendations for on-ground land management.

Written and compiled by Maria Kraatz, the book is based on a workshop held in November 1999 which aimed to draw together the results of all the research being conducted by the TS-CRC on the status and ecology of the VRD and to develop a common understanding of natural resource management issues and priorities.

The VRD is a mix of grassy plains, rolling savannas, rocky spinifex country and spectacular mesas and plateaux. Pastoralism is by far the dominant land use in the district, however, there are also Aboriginal and conservation lands.



Weeds, fire, feral animals and erosion are common natural resource management issues to each of these land users. The growth of the live export market, establishment of the Bradshaw Field Training Area and the development on the Ord Scheme Stage 2 all have the potential to

change the face of land use in the district. Its chapters include information on what we currently know of the region's geology, soils, climate, vegetation and fauna, as well as the types of land use and economic development.

It also outlines research results relating to vegetation structure and function, water use by vegetation and impacts of fire and grazing on pastures and on native plants and animals. A chapter on managing for the future looks at best practice management and sustainable management issues and priorities.

Price: \$9.90. To order a copy:  
Email: savanna@ntu.edu.au  
Fax: 08 8946 7107 (NT)  
Cheques and money orders payable to:  
Tropical Savannas CRC  
c/o Susanna Martin  
Tropical Savannas CRC  
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## Mining industry deregulation: who stands to benefit?

APRIL–JUNE'S *Savanna Links*, article 'Mining Industry into the Act' presented a rosy view of the Northern Territory's proposed Mines Management Act and moves to increase industry self-regulation. The Environment Centre NT has a less optimistic view of the effectiveness of industry self-regulation, particularly in the Northern Territory where mining companies have not yet demonstrated their ability to meet prescribed performance levels.

Breaches of environmental requirements at GEMCO in 1995, Nabalco in 1999 and ERA's Ranger mine in 2000 all involved mining companies initially attempting to cover up incidents and avoid government and public scrutiny and regulation. How can the public accept the assurances of these same operators and their industry representative bodies that reducing the role of prescriptive regulation and introducing voluntary measures will not facilitate further attempts to conceal poor performance?

Voluntary measures by industry aimed at improving performance are to be welcomed. However a new Canadian book, *Voluntary Initiatives, the New Politics of Corporate Greening*, edited by Dr Robert Gibson from the University of Waterloo, questions the effectiveness of industry self-regulation and voluntary environmental measures. Dr Gibson writes "expectations for voluntary initiative success are not yet firmly supported by the record of experience".

He adds "Government enthusiasm for the concept has coincided suspiciously with the rise of political devotion to deficit reduction. The governments most willing to embrace corporate voluntarism in place of regulation have also been those most energetic in gutting environmental and other social programs in the name of fiscal responsibility".

Just as successive NT Governments have been unwilling to 'wield a big stick' to ensure environmental standards are met (of the above-mentioned breaches, only GEMCO was prosecuted), government is also joining the push to offload its regulatory responsibilities. In some instances the NT Government seems already to have abandoned its regulatory role. The operators of Mt Todd

gold mine, which recently went broke again, were not required by the NT Government to contribute to a sinking fund for rehabilitation on the grounds that the mine had failed to turn a profit. The administrator appointed in July this year announced that rehabilitation costs of around \$20 million would need to be met by the NT Government. The NT Government had only required the operators to contribute \$900,000 to a rehabilitation fund. By failing to perform its regulatory role at Mt Todd the NT Government has guaranteed the public one of two unsatisfactory outcomes—either the mine site will not be rehabilitated properly or the public will have to contribute a huge sum to the rehabilitation effort.

Weakening or replacing prescribed regulatory measures with self-regulation amounts to government abdicating its role of ensuring responsible and ecologically sustainable resource development. A mining industry (or any other industry) committed to improving performance should be only too happy to meet standards prescribed and enforced by government on behalf of the public.

**Mark Wakeham and Kirsten Blair**  
Coordinators, Environment Centre  
Darwin, Northern Territory

### To The Editor

I WAS very interested to read your articles, 'The Changing Savannas' in the April/June issue of *Savanna Links*.

The same thing is very much evident in the Cairns area on the fringes between rainforest and open country.

- ♦ What Cook called, "Grassy Hill" at Cooktown is now covered with revegetation bush.
- ♦ Old photos of the hill at Port Douglas show the same type of change.
- ♦ Hillsides of open forest on Mt Whitfield in the 1950's are rapidly returning to rainforest and grassed ridges sprouting trees all over.
- ♦ Range of grassy hills near Moresby, Innisfail, is now covered with trees.

The big question: is it cessation of burning or climate change?

Most of the areas mentioned above were never commercially grazed. If climate change is involved, is it long term or cyclical?

**Bill Cummings**  
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## Training package under way for northern beef producers

A GRAZING land management package is under development for beef producers in northern Australia. Meat and Livestock Australia has awarded a contract to a development consortium comprising staff from the Tropical Savannas CRC, NT Department of Primary Industry & Fisheries, Queensland Beef Industry Institute, Qld Department of Natural Resources and CSIRO.

The package will comprise three parts: core principles and practices; a framework for application at property and regional level and finally planning for implementation on the property. A workshop version will be trialled in four regions before the final version is written.

Currently the regions are the Victoria River District, Burdekin catchment, the Burnett region of

Queensland and the Mitchell Grass country (at Charleville).

The GLM package should be available to the whole of the northern beef industry in 2001, with the final version delivered to Meat and Livestock Australia by June 2001.

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## Striking a balance in the north's grasslands



*Delegates tour fire-management sites at Nitmiluk National Park, north of Katherine on one of two field trips at the conference. The other, inset picture on the front page, went to Eley Station, an Aboriginal owned cattle property in the Roper River district.*

### From Page 1

production and falling levels of biodiversity are now acute. Southern grassy ecosystems are now among the most threatened in Australia.

In the north, the general view is that our landscapes are still healthy and production is sustainable. But landscape change across northern Australia is taking place. Most speakers agreed that the north's landscapes are in fairly good condition—with some reservations, notably in central Queensland where property sizes are smaller and land use has been much more intensive. What land users need to guard against in the north however, is that change is often subtle, insidious and pervasive.

John Childs, director of the TS-CRC, in his opening presentation, spoke of the difficulty of seeing the consequences of human action because of the problem in differentiating between it and climatic effects. Bad management and policy can also be masked by the resilience of grasses and their response to rainfall.

John Woinarski, principal researcher at Parks & Wildlife in Darwin, explained that in contrast to the southern grassy landscapes, in the north there was no stark contrast between reserved and unreserved lands, which can lead to the view that there is no pressing need for concern. However there is mounting evidence that the impact of changed land management regimes over the past 200 years—such as pastoralism, changed fire regimes and land clearing—has led to substantial changes in vegetation and numbers of endangered plant and animal species in the north. What is more significant though, is the scale at which losses take place.

“At a local scale, the resulting changes in biodiversity may be fairly trivial, but when the same management pressures are applied relatively uniformly over very extensive areas, then the local declines coalesce into regional extinctions,” said Woinarski.

### Woody weeds and fire

Two of the most obvious signs of landscape change in the north are the growing frequency of uncontrolled fires

during the dry season and the increase in woody weeds and vegetation thickening. Jeremy Russell-Smith, Bushfires Council of the NT, spoke on the need to develop a better understanding of patch burning, to maintain biodiversity and help improve sustainability in pastoral production.

He said that recent studies showed keeping a mosaic of patches from recently burnt to long unburnt can be a critical requirement for a number of plant communities and animals. In pastoral management systems, patchy burning can help even out grazing pressure and retain perennial grasses. Russell-Smith listed the challenges as developing greater community communication and education; informed, cooperative regional management strategies and involving local communities.

Tony Grice, CSIRO Sustainable Ecosystems, cited that about 90 plant species now formally declared noxious occur in northern Australia. However, managing weeds in northern Australia potentially involves engaging a far larger number of species in a wide variety of situations. There is also the issue that plants introduced as improved pasture species have become weeds in certain situations and are threatening ecosystem processes. This dichotomy of views about value is one of the causes for disagreement and conflict between production and conservation sectors.

### Balance between conservation and production

In the past decade there have been significant changes in the attitudes of many producers to conservation. Many producers now see sustainable industries and a clean green image as essential in their production process.

The North Australian Pastoral Company (NAPCO), one of the country's largest private beef producers, runs 12 cattle stations encompassing an area of approximately 5.7 million hectares running 145,000 head of cattle. NAPCO's Mark Ritchie says that the company is now developing Environmental Management Systems as a way to manage environment impacts and account for environmental responsibilities. The company believes that in the future this approach will become an integral component of best practice management.

Jo Wearing, a pastoralist from central Queensland put forward the view that land managers need to think of themselves as part of a whole system, ecosystems included. “For example, on our property we have allowed vegetation to regenerate,” she said. That was necessary largely because the property was, she believes, over-cleared. “What we didn't account for is that most people around us would continue to clear well beyond our vision 20 years ago,” she said. “What we're finding now is that we are living in a landscape that is dysfunctional, in that connectivity is almost totally gone.”

She says that turning to a more holistic approach of pastoral land management is not so much a pro-conservation process, but one of making an economic success of your venture.

## Indigenous land management

One of the weaknesses of the conference was the lack of representation from indigenous land managers. This was partly because of another large conference held at the same time on indigenous land management, which drew land managers from across the Top End (see story p. 4.)

“There is a lot of indigenous knowledge that is either lost or hasn’t been used on the ground for quite a while because people don’t occupy country any more,” said John Childs. “Making sure that isn’t lost, as well as getting it to be used, is something that’s very important.”

As Mark Stafford Smith—from CSIRO Sustainable Ecosystems—pointed out in his presentation, Aboriginal lands now represent a large portion of northern Australia, particularly in WA and the NT. However, it is a misconception to talk about a single Aboriginal land use as these lands can encompass almost all tropical savanna land uses including mining, grazing and tourism.

“A common characteristic of most Aboriginal lands is that they harbour a complex multitude of mixed land uses, often overlapping and interacting. This is increasingly becoming a feature of other lands also—and the resolution of the resulting diversity of land-use objectives is a matter of considerable importance for research.”

## Future needs

The conference’s final workshops were devoted to small-group sessions to consider the future needs of the grassy landscapes. Among recommended actions were a greater emphasis on integrated regional planning, and a broader context for Property Management Planning—one that incorporated cultural, conservation and production values.

A series of regionally coordinated forums was mooted where people could deliberate on the complex issues and arrive at coordinated regional plans.

Improved legislation on matters affecting natural-resource management and sustainability was also seen as essential. This included fire regulations, and support for mechanisms for biodiversity management within a production context.

A comprehensive monitoring framework for northern

Australia was also put on the agenda. Such monitoring would need to encompass a full range of values important to achieving and maintaining healthy landscapes. An institutional framework would be required to ensure the monitoring occurs and to coordinate it across northern Australia as well as integrating it with local and regional management activities.

## Feedback and outlook for the future

The conference covered a lot of ground in two short days. While striking a balance between conservation and production is an ongoing proposition, the conference did facilitate discussion between the various sectors.

For pastoralist Tom Stockwell while he found the conference useful, what stood out for him was the youth and enthusiasm of the participants—in whatever field they came from. “Economically we have a bright future, resource-wise we’re in pretty good shape, and we’re getting more and more information about how to manage it better,” he said. “I’d say we’re in a lot better position (than those) who are at a comparative stage of development in southern Australia.”

Greening Australia wanted to get the message of sustainable management out to a wide spectrum of people in the north.

“What probably needs to be done now is getting regional forums together that actually bring all the players in on the one regional group or committee,” said Mike Clark, of Greening Australia. “That way you can perhaps come up with regional land-management strategies that incorporate all the players and stakeholders.”

The conference was a good start to developing some long-term solutions to the sustainable future of the region.

It was, Woinarski says, a demonstration of the value and usefulness of the TS-CRC. “I probably couldn’t think of another organisation that could have got together such a diverse group in such a non-confrontational way.”

A report on the conference can be downloaded at <http://savanna.ntu.edu.au/centnews.html> The proceedings will be available soon on CD. Contact Peter Jacklyn Tel: (08) 8946 6825 Email: [Peter.Jacklyn@ntu.edu.au](mailto:Peter.Jacklyn@ntu.edu.au)

## New Acts open for biodiversity and vegetation management

### National

THE Commonwealth Environment Protection and Biodiversity Conservation Act 1999—which came into force on July 16 this year—represents the most fundamental reform of Commonwealth environment laws since the first environment statutes were enacted in the early 1970s. It is the first comprehensive attempt to define the environmental responsibilities of the Commonwealth and enables it to join with the States and Territories in providing a national scheme of environmental protection and biodiversity conservation. It focuses on matters of national environmental significance and establishes an integrated

regime for biodiversity conservation and management of important protected areas.

Go to: [www.environment.gov.au/epbc/](http://www.environment.gov.au/epbc/)

### Queensland

THE State Government is implementing a comprehensive framework for managing native vegetation across Queensland. It will use regional vegetation planning, (based on the state’s 13 bioregions); and property vegetation management plans—where applicable—to develop a system for native vegetation management planning. Regional ecosystems were developed to classify biodiversity at the landscape level. While there is no blanket ban on clearing,

landholders require approval in most cases to clear native vegetation on freehold land and will still need to apply to clear on leasehold land. The new framework comprises the Vegetation Management Act 1999 and the Amendment Bill 2000, which makes vegetation clearing on freehold land assessable under the *Integrated Planning Act 1997*; and the *Land Act 1994* which governs vegetation management on leasehold and other state land. State policies and community information sharing are also part of the new framework.

Qld Dept. Natural Resources  
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[www.dnr.qld.gov.au/resourcenet/veg/](http://www.dnr.qld.gov.au/resourcenet/veg/)

## The last frontier: someone's backyard

By Mark Horstman

An Aboriginal research project in the North Kimberley, supported by the Tropical Savannas CRC, is showing how collaboration between Aboriginal and non-Aboriginal knowledge systems and management responsibilities can lead to practical outcomes.



Mark Horstman

*At Punamii-unpuu (Mitchell Falls, north-west Kimberley) Wunambal people want to ensure that tourists and governments respect Aboriginal law. From left: Aaron, Simon, Wilfred Goonak, Sylvester Mangolamara, Mervyn.*

Standing with Wunambal people on the edge of the chasm at Punamii-unpuu in the north-west Kimberley (Mitchell Falls), it is easy to sense the significance of the place to its Aboriginal owners. Gazing into the deep pools and feeling the roar of water through your feet, the power of the country is readily apparent.

However, whitefella scientists would describe this landscape quite differently from its traditional owners. It has been the exception, rather than the norm, for European science to work collaboratively with Aboriginal knowledge. Yet our understanding of Australian ecology benefits from a bi-cultural perspective, and environmental management is improved when the shared knowledge is applied.

The North Kimberley includes Aboriginal tenure (as Aboriginal Reserve), unallocated Crown Land, four pastoral leases, a mining reserve for bauxite, and the Drysdale River National Park. Two Native Title claims encompass the region: the Wandjina/Wunggurr-Uunguu claim of the Wunambal-Gaambera language groups in the west, and the Balanggarra claim in the east.

Last year, these two major Aboriginal groups living in the North Kimberley agreed to work together. Managed by the Kimberley Land Council, a research project was funded by the Tropical Savannas CRC to explore the interface between traditional ecological knowledge and scientific perceptions of 'good' or 'appropriate' land management. During the 1999 dry season, nearly two months of fieldwork were undertaken in six areas of coastal, river, woodland, and plateau country in the North

Kimberley. More than 50 traditional owners, from the family groups in each of the study areas, participated in the fieldwork.

The ecological knowledge of the Balanggarra and Wunambal-Gaambera peoples is immense and detailed, drawing from thousands of generations of experience. Knowledge of names, uses, behaviour, and distribution were recorded for more than 600 plants and animals, a significant proportion of the region's biodiversity.

A management manual has been prepared to provide an information platform for negotiations about access and joint management between traditional owners and government departments, research agencies, mining and exploration companies, commercial fishers, tourism operators, and other user groups.

The work demonstrates clear evidence of ongoing Aboriginal connection to country. It will be used to create educational products for the community and tourism use. It provides a foundation to continue ethnobiological research, by enabling work to advance from the taxonomic level towards the ecological level, in the terms and language of the traditional owners.

Importantly, the process of ethnobiological field research itself—families of traditional owners travelling and camping on country—provides the most appropriate forum for consultation and planning about future management to occur.

### Wunambal country

Unmanaged and rapidly growing tourism is one of the most urgent issues in the north Kimberley. For Wunambal people at Mitchell Plateau, the pressures are acute. Visitor

## ***Wandjina and Wunggurr: Creators of the north-west Kimberley***

Wunambal law is centred around the belief that the north-west Kimberley was created by the Wandjina and Wunggurr. One old man who has now passed away explained: "the Wandjina came from the wind and travelled the land and made this earth, and sea, and the mountains, the rivers, the waterholes, the trees, the plants, the animals, the language and then the people. Wandjina made everything. Wandjina then gave us the law to follow and gave us the land".

As major fertility figures, Wandjina are associated with regeneration, creation of rain, renewal of resources, and continuation of life. Wandjina left themselves throughout the region as landscape features and distinctive cave paintings (featured in the Olympic Games opening ceremony).

Wunggurr are creator snakes; their winding travels through the country with Wandjina made the rivers. Many came from the sea, and now reside in deep pools and

waterholes. The Mitchell Falls are part of Punamii-unpuu, a powerful creation place and Wandjina-Wunggurr "cathedral". The senior traditional owner, Wilfred Goonak, tells the Lalai (Dreamtime) story that "the snakes all meet up here, and say 'right, where are we going to camp? We're camping at Punamii-unpuu, this is our home.' Lalai, Creation, in the history. That's the law."

Wunggurr are intimately associated with Wandjina, ensuring water flows and good rains, showing themselves as rainbows in the spray over the falls during the wet season. "The rainbow is made from that snake", says Goonak. "When you see that rainbow, that snake comes out of the water."

Just as the traditional owners of Uluru are concerned about people climbing the rock, Wunambal people require that visitors to Mitchell Falls behave correctly and swim in the river "on top" or "low down", and not in the deep pools where Wunggurr live.

numbers have increased ten-fold in recent years, and at current rates will nearly double within four years.

Traditional owners are especially concerned by the potentially dangerous consequences of uncontrolled access to sacred sites—which could result in accident, illness and even death. Tourists frequently visit, disturb, and camp on sacred art, ceremonial and burial sites with no appreciation of their importance. Tourists have also been held responsible for the movement, and removal, of parts of skeletons placed in burial sites.

### **Land management**

Wunambal people regard management as inseparable from land and sea ownership. Management is a responsibility that comes with belonging to country. For this reason, Aboriginal people in the Kimberley are concerned that genuine joint management of national parks, where traditional ownership is recognised, does not yet exist in WA. Currently, ownership is vested in a government authority and management is delegated to the Department of Conservation and Land Management (CALM). Traditional owners have no role in decision-making.

In July, Wunambal people invited the WA Minister for the Environment and CALM to come to the Mitchell Plateau to present the results of their work on the TS-CRC project.

At the time the Wunambal people were unaware that the WA Government had already converted 150,000 ha of unallocated Crown Land within

their registered native title claim to national and conservation parks. These were created without notifying the native title holders, receiving their consent, or getting agreement on joint management. The new parks are the first European tenure over areas of Wunambal country since 1788.

Angry elders make it clear that while they want CALM to help them manage tourists on the country; "we know that those people want to come up here—but we want it done in a proper way, a way that doesn't steal our country."

Among the Plateau's conservation and tourism values of interest to CALM is the amazing diversity of vegetation types, which is in large part created by long-term Wunambal fire management.

Wunambal people have called for the government to 'pull back that paper making the national park before we can start talking again'. Backed by legal action, they want the reservation orders withdrawn, pending negotiations about genuine joint management. Their call is supported by the Australian environment movement and the Australian Committee of the IUCN.

### **Leading the way**

Meanwhile, the Mitchell Plateau mob intend to use the outputs from their CRC-supported research and lead the way in managing their country. They have asked KLC to assist in the development of a management plan to address the immediate issues of visitor impacts and sacred site protection on their country. The guiding

principles of the plan are the maintenance of Wandjina-Wunggurr law, and the protection of areas like Punamii-unpuu in their natural condition.

Aboriginal rangers and guides, signs, interpretive information, camp grounds and access plans are proposed. Agreements will be negotiated with commercial tourism companies. The pro-active plan will also deal with longer-term matters such as fire management. The initial draft will be released for public comment, and support will be sought from all quarters, including CALM.

Next tourist season, visitors will receive information about culture, ethnobiology, history, the do's and don'ts of using Wunambal country. The older people are teaching and urging the younger people to assert their ownership and management of country.

Sylvester Mangolamara, one of the researchers on the TS-CRC project, is guided by his elders when sharing knowledge and country. "We can share this land with white people if they want to come and look at country," he said. "They have to respect what we say, even if it's hard for them to understand. The only thing we don't want in this Wunambal country is disrespect."

The Wunambal management plan can be viewed on the web at [www.waantwg.org.au](http://www.waantwg.org.au). For more information, contact Mark Horstman, KLC Land+Sea Management Unit, Email: [landsea@comswest.net.au](mailto:landsea@comswest.net.au).

Cultural information in this article is not to be used without the permission of Wunambal traditional owners.

**See response from CALM overleaf.**

## CALM parks and reserves in the Kimberley

Savanna Links asked CALM for its view on the management of conservation parks.

*Chris Done*, regional manager for WA Department of Conservation and Land Management, in the Kimberley replies.

THE WESTERN AUSTRALIAN Government recently announced the creation of five new north Kimberley parks designed to protect and conserve extremely important ecosystems and landforms in the region from ever-increasing pressures of tourism and to facilitate active management of elements such as fire and feral animals.

The announcements were the culmination of over two decades of effort to reserve the areas.

The Environmental Protection Authority's "Red Book" recommendations for System 7 (the Kimberley) in 1980 were accepted by the government of the day as the basis for a conservation reserve system for the north Kimberley.

In 1991, CALM's publication *Nature Conservation Reserves in the Kimberley* reassessed and refined the proposals and the National Parks and Nature Conservation authority accepted that the proposals should be pursued on an opportunistic basis.

Until then no progress had been made in expanding the conservation reserve system in the area mainly because the mineral potential of the region had not been fully assessed and the recognition that Aboriginal interests needed further consideration.

The Mt. Hart pastoral lease was purchased by CALM in 1991 and since then has been managed for conservation and recreation. Its recent change of tenure to 'conservation park' formalises that process. This park encompasses the spectacular King Leopold Range and

straddles the Gibb River Road, itself a tourism magnet that allows relatively easy access to the new park's major attractions at Bell Creek, Lennard Gorge and Silent Grove.

Its reservation and management as a conservation park will co-exist with the Native Title rights of the area's Aboriginal claimants and discussions continue to ensure that they are able to be as fully involved in the cooperative management of the new park as they desire.

The newly created reserves around the Mitchell Plateau had all been subject to previous land tenure such as pastoral lease. The reservation will coexist with Native Title rights.

The new parks adjoin an Aboriginal reserve and complementary management objectives for both tenures will go a long way to ensuring that the unique biological values, perhaps the least impacted of all mainland Australian regions, are maintained intact.

The declaration allows formal management to commence and the involvement of the Native Title claimants is considered by CALM to be vital in this process. A management plan being produced by the Wunambal people is a welcome initiative and will complement recreation management concepts jointly developed with them by CALM over the last 18 months or so. CALM looks forward to effective cooperative management with Aboriginal claimants of the new reserves.

## fauna

### Nothing personal: just male mouse spiders on mating rampage

THE 'build-up' season in the NT's Top End is not just known for the increasing humidity—it's also associated with the annual movement of the male northern mouse spiders (*Missulena pruinosa*) as they permanently leave their burrow, risking life and limb, in search of females.

Females stay safely in their burrows (except in emergencies), unseal their trapdoors and lay out threads for detecting prey. These threads contain pheromones, and indicate an interest in mating to which the male spiders respond.

During their journey, males can often be found around houses or gardens. To defend themselves from apparent or real predators they rear up, raising their front legs and exposing their fangs in an attempt to appear large and intimidating.

In this position they can be mistaken for funnel webs, which are



not related, and which do not occur in the Top End. Mouse spiders belong to one of several trapdoor spider families, the family Actinopodidae. They have a short stocky body and very large chelicerae (which hold the fangs) making the head region steep.

Males are shiny black with a conspicuous white or bluish-white colour to the top of the abdomen, which is where the species name

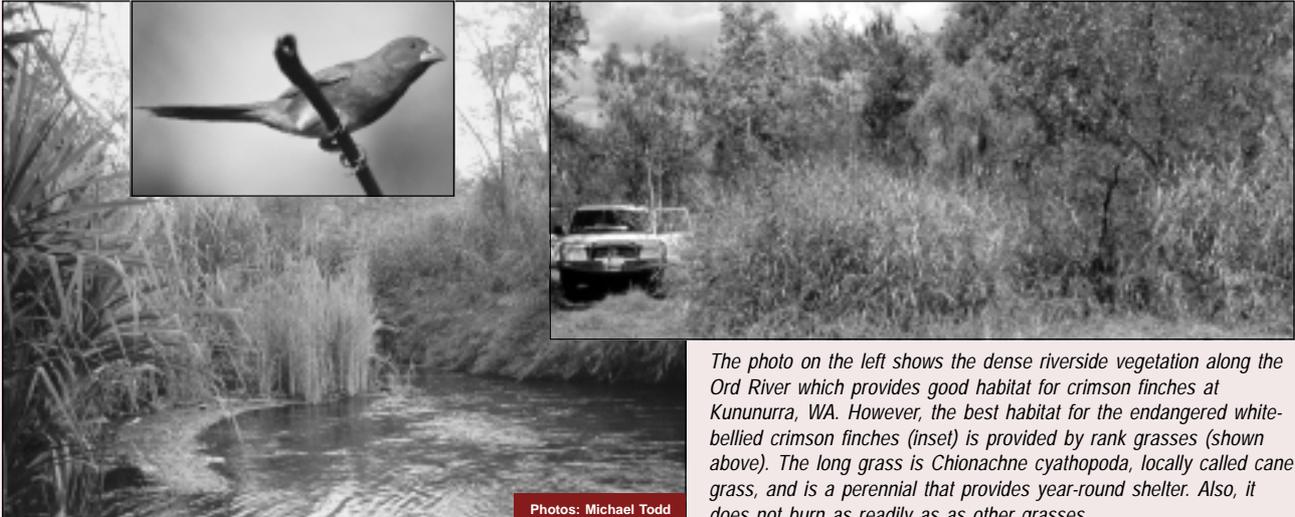
'*pruinosa*' originates. They acquired their common name because when one of the southern species was first discovered it was thought that of the shape of the burrow was like a mouse's hole!

According to a recent study\*, the bite of the spider has caused local pain and redness and, in some cases, headache, nausea and dry mouth. There has been no case of major envenomation and the nature of the venom is currently under study.

By all means show these spiders respect and keep your distance, but also appreciate that the male is only focused on his mission to maintain his species among Australia's other 10,000 estimated spider species!

—Dr Tracey Churchill TS—CRC & CSIRO

\* Isbister G. K., Churchill T. B., Hirst D. B., Gray M. R. and Currie B. J. (2000), 'Clinical effects in bites from formally identified spiders in Tropical Australia', *Med. J. Aust.* in press.



The photo on the left shows the dense riverside vegetation along the Ord River which provides good habitat for crimson finches at Kununurra, WA. However, the best habitat for the endangered white-bellied crimson finches (inset) is provided by rank grasses (shown above). The long grass is *Chionachne cyathopoda*, locally called cane grass, and is a perennial that provides year-round shelter. Also, it does not burn as readily as other grasses.

Photos: Michael Todd

## Rank grass and sugarcane provide succour to north's endangered finches

**A**TS-CRC project on why the tiny crimson and star finches of northern Australia might be declining has unearthed enough information on the birds' biology, feeding habits and breeding patterns, to develop some initial conservation plans for the species. Crimson and star finches are among a number of granivorous birds—birds that feed on the seeds of grasses, both perennial and annual—across northern Australia. Overall, the researchers obtained information on food, breeding, moult and habitat, all of which help explain why these bird populations have declined, as well as providing a basis for the development of management plans.

Through 1998–99 studies concentrated on Cape York Peninsula where the species have contracted in range. However, during the wet season of 1999–2000 the project shifted its emphasis to Kununurra where both species of finch are thriving. At Kununurra the birds were studied in both pastoral and agricultural landscapes throughout the wet season. Comparisons between these two areas suggest that the structure of the vegetation—such as rank grass—is more important than grass type.

While the star finch requires rank grass only during its breeding season the crimson finch—which nests in pandanus or palm fronds—relies on rank grasses all year round. The short, broad wings and long tails of the crimson finch means it has only a limited flying ability and the bird relies on long undergrowth to hide it while it feeds, and to shelter from predators.

Unfortunately these grasses are both grazed and trampled by cattle as well as being vulnerable to late dry-season fires. Two of the most northerly populations of the white-bellied subspecies, at Aurukun and Lockhart River in Cape York Peninsula, are now extinct probably because of ill-timed fire. In this area, patches of good habitat are often further apart than they are in the Northern Territory and these isolated populations of finches are therefore more vulnerable to local extinctions.

In northern Australia rank grass is produced annually on floodplains that are usually too wet at the time star finches breed to be affected by grazing cattle. However, this would not be true of the rank grass that would have grown around waterholes in the southern part of the species range from which the star finch is now likely to be extinct. These areas tend to undergo heavy grazing and trampling by stock, and become devoid of lush, rank grasses that would have once marked their perimeters.

While pastoralism threatens the rank grasses both finches need, some forms of agriculture, in particular sugarcane, are replicating the environment these native grasses provide. Kununurra's sugarcane and other crops are one of the reasons finches are abundant in this area. For the star finch sugarcane provides excellent sites for nesting while food is available in surrounding shorter grass and from weeds growing beside irrigation channels. The black-bellied crimson finch prefers pandanus when nesting, but will resort to buildings or any sort of introduced palm.

With the help of traditional owners, QPWS and Birds Australia volunteers, a large area of finch habitat was surveyed on the southern shores of Princess Charlotte Bay, revealing a feeding strategy of the star finch.

It survives the annual seed shortage at the beginning of each wet by feeding on seeds of grasses growing along saltpan fringes. Though these grasses require extensive rain to germinate, they still have some seeds early in the wet. Similar habitats occur in many areas across northern Australia where star finches are still found.

The study is proving valuable for managing conservation areas on Cape York with the results already incorporated into fire planning.

Contact: Stephen Garnett or Mick Todd  
 Queensland Environmental Protection Agency  
 Tel: (07) 07 4046 6644 Fax: (07) 07 4046 6643  
 Emails: [stephen.garnett@env.qld.gov.au](mailto:stephen.garnett@env.qld.gov.au) [micktodd@bigfoot.com](mailto:micktodd@bigfoot.com)  
 Web: <http://savanna.ntu.edu.au/research/projects/finch.html>

## Beef and black-striped wallabies

WALLABIES are being studied by the Old Department of Primary Industries to see how they can co-exist with beef cattle. Masters student Debra White is researching the habitat and resource needs of the black-striped wallaby, in particular, in the Brigalow environment for DPI's Queensland Beef Industry Institute in Rockhampton. The ultimate aim is to define strategies to enhance biodiversity and co-existence with industries such as beef production. The study is under way at the Brigalow Research Station, Theodore, in natural scrub and adjacent improved pastures. A possible scenario is that the wallabies are over-populating because of the combination of a sheltered scrub habitat very near an artificially abundant food source, supplied by improved pastures. Ms White said it was necessary to find out if wallabies actually compete with cattle for the same species of grass. As the remnant original brigalow bush is rare it is essential to know if the wallabies are contributing to its destruction.

Debra White Technical Officer Tropical Beef Centre Tel: (07) 4923 8100



Wallaby collared for radio-tracking  
Picture: Barbara White

### Australia is really smoking

WIDESPREAD fires across northern and central Australia appear to be responsible for one of Australia's largest ever smoke plumes. A NASA satellite used for measuring suspended particles in the atmosphere, such as ash, dust and smoke clouds, detected a huge cloud of particles originating in northern Australia in late September. The plume persisted well into October and extended over much of the continent and out over the Indian ocean. Dr. Joseph Prospero, an aerosol specialist from the University of Miami said this was the largest plume detected from Australia—at least since the satellite observations started in 1996. This is consistent with fire being the cause of the plume: the widespread intense fires in central and north western Australia occur at this time of year due to the hot weather and lightning strikes among other factors. They are also feeding off very high levels of grassy fuel which are in turn due to the unusually extensive rainfall seen over the last couple of years in northern Australia.

### New division for CSIRO

CSIRO has strengthened its research into natural resources by forming a

new division, CSIRO Sustainable Ecosystems, through merging the integrated agricultural systems work of the Division of Tropical Agriculture with the ecological and biodiversity capabilities of the Division of Wildlife & Ecology. Dr Steve Morton will head the new division which will have around 330 staff with capabilities in ACT, Queensland, NT and WA. "We've united CSIRO's expertise in conservation biology and ecosystem management with some of its farming systems and social assessment skills in regional Australia," said Dr Morton. "It's a great marriage of knowledge and capacity that puts us in the best possible position to make a meaningful contribution to healthy landscapes, viable industries and vital communities. Our approach will be to take a 'whole view' when looking at how people use the land. We will consider scientific, social, economic, wildlife and environmental factors and bring them all together."

Contact: Dr Steve Morton, CSIRO  
Tel: (02) 6242 1742

### Online land & water resources

THE National Land and Water Resources Audit's massive task of providing nationwide assessments of Australia's land, vegetation and water

### The zen of stakeholders

MANAGING the rising social expectations of Australia's mining and energy sector by communities, landholders, Aborigines and others is becoming an integral part of successful business management, says CSIRO's Dr Fiona Solomon, author of the new book *Zen and the Art of Stakeholder Involvement*. "Stakeholders are those who perceive themselves to be affected by or can affect your operations. They are not, however, a homogenous group and they have diverse and often competing interests," she says. The book is based on research undertaken during a travelling scholarship awarded to her by AMEEF. It enabled Dr Solomon to study innovative techniques being developed and tested in Canada and the US to build effective partnerships between the community and the minerals industry.

Contact Australian Minerals & Energy Environment Foundation  
Tel: (03) 9679 9911

Dr Fiona Solomon, CSIRO Minerals  
Tel: (03) 9545 8500

resources, can now be viewed online. The website has information about the Audit, its objectives and outcomes. The site's publications' section has brochures and fact sheets describing the Audit's projects, an online newsletter and annual reports. Several datasets are available under the Data section, including those on land use mapping and soils. An online atlas is also under way.

Go to: [www.nlwra.gov.au](http://www.nlwra.gov.au)

### Climate change controversy

OPPONENTS of moves to limit global warming under the Kyoto Protocol have seized upon a controversial new scientific paper that appears to absolve carbon dioxide of blame for the rapid warming seen over the past few decades. The paper, from a team led by James Hansen of the Goddard Institute for Space Studies in New York, proposes that reducing emissions of methane, soot and the gases that cause photochemical smogs would be the easiest way to limit climate change in the short term. Climatologists have questioned the

## Camels latest woody weed weapon



AUSTRALIA's camels—already popular in tourism, racing and steadily increasing in exports—are gaining a reputation as efficient grazers of woody weeds. A project run by Rural Industries and Research Development Corporation (RIRDC) is assessing the feasibility of cattle and camels co-grazing, and research suggests camels consume some woody species, and can reduce problems of thickening being experienced in many of the drier zones of the savannas. Camels are browsers and possess a split upper lip which is well suited to this purpose. They are adept at eating leaves from the prickliest trees and shrubs and eat a number of forbs generally regarded as weeds on cattle country. Other research—by AGWEST—has found that saltbush and acacia form an important part of camel nutrition and therefore have the potential to be used as a source of income from areas of land that are increasingly salt-affected. RIRDC's co-grazing project has found that cattle perform better during drought when grazed in paddocks with camels; and in good seasons, there is no appreciable difference in cattle performance.

Live camel export numbers have also grown steadily this year thanks to the Central Australian Camel Industry Association and NT Department of Primary Industry & Fisheries. The major hurdle was establishing health protocols in importing countries including Israel, Indonesia, the United States and Malaysia. Much of the current market is for camel meat, but there is also potential for producers to tap into the live camel market for safaris, treks and theme parks. The Central Australian Camel Industry Association (CACIA) is the only one of its kind in Australia, and is working with NT DPIF, QDPI and AGWEST to encourage cooperation among producers to improve efficiency, and meet market demand on time.

Peter Siedel, CACIA Tel: (08) 8951 8183

RIRDC Project: Cograzing of cattle and camels for commercial production

Andrew Phillips Tel: (08) 8951 8140 Fax: (08) 8951 8112

assumptions on which Hansen's conclusions are based, and note that the paper, published recently in *Proceedings of the National Academy of Sciences* (97, 9875–9880; 2000), has not been subjected to formal peer review. In stressing the importance of reducing methane emissions, for which rice cultivation is a major source, and of soot, Hansen's paper also puts greater emphasis on the need for action by developing countries.

(*Nature*, vol 407, 7 September 2000)

### Less gas from livestock

MEANWHILE a major research program targeting new technologies to

curb greenhouse gas emissions from Australia's sheep and cattle is under way. Research at CSIRO's Livestock Industries shows they may also be a good way to bolster profits. The technologies are likely to lower the output of methane from animals digesting their feeds while increasing production of meat, wool or milk. Approaches under investigation are:

- ♦ improved management of animals in extensive grazing systems;
- ♦ feed additives to curb methane production during digestion;
- ♦ a vaccine that inhibits methane-generating organisms in an animal's stomach.

Shaun Coffey, CSIRO Tel: (07) 4923 8182

## Reading

### Biological resources

A REPORT of an inquiry into one of the major environmental issues for the new millennium—access to biological resources—is available for public comment. The report, *Access to Biological Resources in Commonwealth Areas*, recommends groundbreaking regulations be incorporated into the Commonwealth's Environment Protection and Biodiversity Conservation (EPBC) Act 1999, which would control access to genetic material in plants and animals in Commonwealth areas and deliver substantial benefits to industry, the environment and indigenous communities. The major recommendation is that access to biological resources should be controlled through permits and benefit-sharing contracts. Download from EA's website: [chm.environment.gov.au/documents/inquiry.doc](http://chm.environment.gov.au/documents/inquiry.doc).

### Climate newsletter

Streamflow forecasts to help better manage Australia's scarce water resources, and new generation climate forecasting models are just some of the projects featured in the latest issue of *Climag*, published by the Climate Variability in Agriculture R&D Program (CVAP). The Rainman Streamflow Project assembled skills from across Australia to exploit the greater impact of ENSO (El Niño and the Southern Oscillation) and ocean temperatures on streamflow compared with rainfall. Other articles include: Not all El Niños are created equal.

Go to [www.cvap.gov.au](http://www.cvap.gov.au)

### Broome and Beyond

BOTANISTS Kevin Kenneally, Daphne Choules Edinger and Tim Willing's comprehensive guide to the flora of the Dampier Peninsula has been reprinted. First published in 1996, *Broome and Beyond* includes many original field observations and plants not previously recorded in the Kimberley. The book deals with the environment, traditional Aboriginal plant uses, botanical exploration, plant communities and conservation of the Dampier Peninsula. A definitive plant list gives descriptions and traditional uses for the more than 700 species known on the Peninsula.

From selected bookshops and CALM, Locked Bag 29, Bentley Delivery Centre WA 6983. Tel 08 9334 0333 Fax: 08 9334 0498. Price: \$49.95 (inc. GST) plus postage.

## November

### Ecotourism Association of Australia: 8th National Conference

**2–5 November 2000, Lorne and Phillip Island**

**Venue:** Lorne and Phillip Island, Victoria

**Theme:** Ecotourism—Changing the Nature of Australia.

Sub-themes will emphasise topics including:

- Business of Ecotourism.
- Protected area/operator partnerships.
- Marketing ecotourism.
- e-commerce and ecotourism.
- Developing relationships between nature-based adventure, cultural and ecotourism
- Interpretation and eco-guiding.
- Award-winning case studies.
- Accreditation.
- Research into ecotourism.

**Contact:** Tony Charters, Conference Convenor  
Ecotourism Association of Australia

**Postal:** GPO Box 268, Brisbane, Qld 4001

**Tel:** (07) 3229 5550 **Fax:** (07) 3229 5255

**Email:** charterst@tq.com.au

Or Bill Fox, Tourism Victoria

**Postal:** GPO Box 2219T

Melbourne Vic 3001

**Tel:** (03) 9653 9788 **Fax:** (03) 9653 9744

**Email:** bill.fox@dsv.vic.gov.au

**Web:** www.ecotourism.org.au

### Regional Sustainability Tour with Paul Hawken, author of “*Natural Capitalism—the next industrial revolution*” Nov 1–2 Cairns, Townsville

Workshops, public seminars and Ministerial dinners with key business and civic leaders. Presented by the Qld Environmental Protection Agency and sponsored by Qld Department of Primary Industries.

**Contact:** David Wiskar

**Tel:** (07) 3224 2718

### Salinity Stocktake for the Future 14–17 November 2000, Bendigo, Victoria

**Venue:** Latrobe University, Bendigo, Victoria.

Australia's National Dryland Salinity Program (NDSP) invites researchers, industry leaders, catchment managers, advisers and consultants from all states to attend this important forum. Help set future directions for physical, social and legal research, development and extension that will impact on Australia's salinity problem.

The workshop aims to:

- ♦ Exchange information on responses and solutions for managing dryland salinity in Australia;
- ♦ Discuss and collate ideas on dryland salinity research, development and extension in Australia, including priorities and needs for the future for referral to the NDSP partnership;
- ♦ Identify the legal implications from increasing local, regional and cross-border effects of salinity in regional and urban areas;

- ♦ Identify the critical messages from research findings and the conference for transfer of information to urban and regional Australia over the next year.

A series of regional forums are being planned for transfer of information from the conference to the wider community in 2001.

**Registration:** \$220.00 full registration \$150.00; Days 1, 2 and 3 \$85.00; Days 3 and 4; Concession for community representatives available.

**Contact:** Gloria Turner, Conference Manager

**Tel:** (03) 5449 3825 **Email:** turner@netcon.net.au

**Web:** www.ndsp.gov.au

### ‘Landscape Health in Queensland’ Symposium of the Royal Society of Queensland 17–18 November 2000,

**Venue:** Riverglenn, Kate Street, Indooroopilly.

To coincide with release of the National Land and Water Audit, this RSQ symposium aims to bring together representatives from a number of disciplines and will be developed in four sub-programs of soil, vegetation, water, and wildlife. There will be contributed papers and posters as well as keynote speakers for each of the themes.

**Contact:** Andrew Franks **Tel:** (07) 3896 9565

**Email:** andrew.franks@dnr.qld.gov.au

### Hydro 2000 3rd International Hydrology and Water Resources Symposium 20–23 November 2000, Perth

**Venue:** Sheraton Hotel, Perth

The symposium will begin with optional workshops on 20 November. The main symposium runs from 21–23 November, inclusive. An optional two-day tour between 24–25 November completes the week of information exchange.

Sub-themes of the Interactive hydrology theme include:

- Interactions between hydrology and the environment;
- Interactions between hydrology and society;
- Interactions between hydrology and climate;
- Interactions between hydrology and industry/  
Infrastructure/Built Environment;
- Interactions between surface water and groundwater.

**Contact:** Congress West Pty Ltd

**Postal Address:** PO Box 1248  
West Perth WA 6872

**Tel:** (08) 9322 6906 **Fax:** (08) 9322 1734

**Email:** conwes@congresswest.com.au

**Web:** www.ieaust.org.au/hydro2000/

### Sustainable Australia? 24th Symposium of the Australian Academy of Technological Sciences and Engineering 21–22 November 2000, Brisbane, Qld

**Venue:** Brisbane Convention and Exhibition Centre, South Bank; Annual Oration and dinner, Brisbane City Hall, King George Square, Brisbane.

International and national leaders from government, industry, science and academia will be participating in

this Symposium. This Symposium is designed to inform and interest all those who are keen to develop a sustainable Australia. It will be preceded by the Annual General Meeting, Fellows Seminar, Annual Oration and Dinner on Monday, 20 November.

Speakers will give the big picture of interrelated long-term issues and the immediate pragmatic steps that can move us towards a 'Sustainable Australia'.

Conference subjects include:

- ♦ greenhouse, sustainability and industry;
- ♦ energy and sustainability; sustainability,
- ♦ conservation and economics;
- ♦ water, land and agriculture;
- ♦ the human dimension;
- ♦ and the way ahead.

Registration: \$500 per person (non-Fellows)

**Contact:** Mrs Joy Dudine, Executive Director

Aust. Academy of Technological Sciences & Engineering

**Postal:** PO Box 355 Carlton South Victoria 3053

**Tel:** (03) 9347 0622 **Fax:** (03) 9347 8237

**Email:** joyd@atse.org.au; michelled@atse.org.au

**Web:** www.atse.org.au

### **National Waterwatch Conference**

#### **The next bend in the river**

**20–24 November 2000, Brisbane**

Aims to promote and advance community water quality monitoring in Australia. The conference will be held at Griffith University's Nathan Campus and is open to anybody interested in community monitoring programs.

**Contact:** Waterwatch Queensland

**Tel:** (07) 3896 9737 **Fax:** (07) 3896 9625

**Email:** waterwatch@dnr.qld.gov.au

### **Symposium on the World Heritage Convention**

**26 November, Cairns, Qld**

**Venue:** James Cook University, Cairns Campus.

The symposium will review and highlight Australian initiatives in World Heritage management through three separate panels. Each panel will briefly present a critical review of the Australian practices and symposium participants will then be asked to comment and contribute further to this analysis. The symposium will draw on Australian and international expertise on World Heritage and will provide an opportunity for comparisons of Australian practices with experience elsewhere.

The symposium coincides with the Cairns meeting of the World Heritage Bureau and the World Heritage Committee.

Organisation and sponsorship:

David Haigh, Law School,

James Cook University

Townsville Qld 4811

**Email:** david.haigh@jcu.edu.au

**Tel:** (07) 4781 4240 **Fax:** (07) 4781 4080

Peter Valentine, TESAG

James Cook University

Townsville Qld 4811

**Email:** peter.valentine@jcu.edu.au

**Tel:** (07) 4781 4441 **Fax:** (07) 4781 4020

## December

### **Remade Lands 2000, Second International Conference on Remediation and Management of Degraded Lands**

**30 Nov–1 Dec 2000, WA**

**Venue:** Murdoch University, WA

**Contact:** Dr Kuruvilla Mathew

Environmental Science

Murdoch University

**Tel:** (08) 9360 2896 **Fax:** (08) 9310 4997

**Email:** mathew@essun1.murdoch.edu.au

### **Soil 2000: 2nd joint conference of NZSSI and ASSSI**

**'New Horizons for a New Century'**

**3–8 December 2000, New Zealand**

**Venue:** Lincoln University, Canterbury

Theme areas include:

- Acid sulfate soils;
- Education and communication;
- Global warming/greenhouse gases and soil science;
- Modelling in soil science;
- Soil biodiversity;
- Soil chemical processes;
- Soil degradation and restoration;
- Soil environmental management;
- Waste management.

**Contact:** Helen Shrewsbury

**Postal:** PO Box 84, Lincoln University, Canterbury, NA

**Tel:** 64 3 325 2811 Extension: 8955 **Fax:** 64 3 325 3840

**Email:** shrewsbh@lincoln.ac.nz

**Web:** www.lincoln.ac.nz/cted/nzsss/

## 2001

### **10th Australian Agronomy Conference Science and Technology:**

**Delivering Results for Agriculture?**

**28 January–1 February 2001, Tasmania**

**Venue:** WrestPoint Casino Convention Centre, Hobart

**Contact:** Conference Design Pty Ltd

**Tel:** (03) 6224 3773 **Fax:** (03) 6224 3774

**Email:** mail@design.com.au

### **19th Federal Convention**

**Water Odyssey 2001**

**1–5 April 2001, Canberra**

**Venue:** National Convention Centre, Canberra

**Themes:** Sustainability of water resources; national water policy and management; water resources and allocation

**Contact:** Australian Water Association

**Postal:** PO Box 388

Artarmon, NSW 1570

**Tel:** (02) 9413 1288 **Fax:** (02) 9413 1047

**Email:** info@awa.asn.au

**Web:** www.19fc.awa.asn.au

**4th International Conference on Environmental Chemistry and Geochemistry in the Tropics  
7-11 May 2001, Townsville**

**Venue:** Jupiters Townsville Hotel and Casino

**Theme:** Geochemical Cycles of the Elements on Land and Sea in the Tropics: Implications for Global and Regional Change.

**Purpose:** The key objective of the conference series is to critically analyse successes and failures associated with environmental chemical and geochemical research in the tropics.

Also, the conference presents an excellent opportunity to share research results and applications in practice, to debate research theories and strategies, to network, and to stimulate needs-driven research and the development of technology .

The following sessions are envisaged:

- Geochemistry of tropical river catchment processes: Flux to the ocean;
- Tropical soil geochemistry;
- Geochemical effects of metal and petroleum industries in the tropics;
- The impact of anthropogenic activities on coastal and marine environments;
- Sustainable farming and forestry systems to prevent environmental degradation in the tropics;
- Geochemical tracers of global change in the tropics Biogeochemical cycles in mangroves, salt pans, salt marshes and sabhkas of the tropics;
- Geochemical effects of fire in the tropics.

**Contact:** Dr A. D. Noble  
CSIRO Land and Water  
**Postal:** PMB PO Aitkenvale  
QLD 4814 Australia  
**Tel:** (07) 4753 8555 **Fax:** (07) 4753 8600  
**Email:** andrew.noble@tvl.clw.csiro.au  
**Web:** www.tvl.clw.csiro.au/geotrop2001/

**Seminars**

**Tropical Ecosystem Research Centre (CSIRO) Seminars**

**Venue:** CSIRO Conference Room  
**McMillans Road, Darwin**

**Time: 3.45 pm**

**November 3**

*NATT unplugged: Climate, soils and vegetation along the North Australian Tropical Transect*

Dick Williams, CSIRO Wildlife and Ecology and Tropical Savannas CRC, Darwin.

**November 24**

*Where to see seabirds on the sea shore: Distribution and status of migratory shorebirds*

Ray Chatto, Parks and Wildlife Commission NT, Darwin.

**December 15**

*Blood, sweat and flies: Recent findings about the ecology of gouldian finches*

Milton Lewis: Parks and Wildlife Commission NT, Darwin

**Contact:** Barbara McKaige  
**Tel:** (08) 8944 8411 **Fax:** (08) 8944 8444  
**Email:** barbie.mckaige@terc.csiro.au

**Queensland Herbarium seminars, Brisbane**

**Held on a monthly basis**

**Venue:** FM Bailey Conference Room  
Queensland Herbarium

Brisbane Botanic Gardens  
Mt Coot-tha, Mt Coot-tha Road  
Toowoong, Brisbane, Qld 4066.

**Contact:** Dr Rod Fensham  
**Tel:** (07) 3896 9547 **Fax:** (07) 3896 9624  
**Email:** rod.fensham@env.qld.gov.au

A substantial calendar section is also available on our website at <http://savanna.ntu.edu.au/news/calendar.html>

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