



# SAVANNA LINKS

Cooperative Research Centre for the Sustainable Development of Tropical Savannas

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CONTENTS

**NEWS** \_\_\_\_\_ 2-3

- Fiery Landscapes
- Savanna Books
- Overseas Fellowship
- Ag Force

**FORUM** \_\_\_\_\_ 4-5

- Wildlife for Sale
- Pros & Cons

**WEEDS** \_\_\_\_\_ 6-7

- Weedbusters
- Policy Revamp
- Rangelands Audit

**CLIMATE** \_\_\_\_\_ 8-9

- Stormy Weather
- El Nino Turtles

**FLORA & FAUNA** 10-11

- Landholders & Conservation
- Incentives

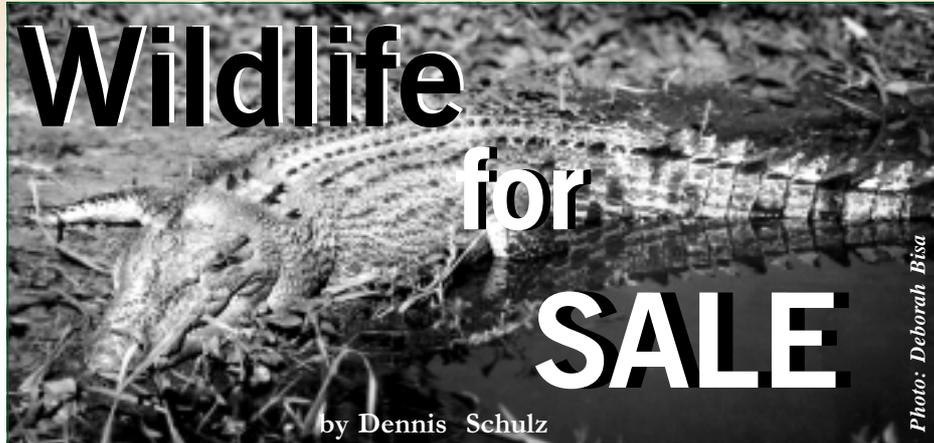
**TOURISM** \_\_\_\_\_ 12

- Rural Adventure
- Long-lived Queens

**CALENDAR** \_\_\_\_\_ 13-16



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*Sold down the river— or saved from extinction? Commercial use of wildlife could be one way to ensure the survival of threatened species*

**T**he commercial use of Australian native wildlife could provide the next boom in live exports, adding new meaning to the term 'primary producer'. The farming and export of cockatoos, freshwater turtles and magpie geese are already in the planning stages in the Northern Territory where the commercial utilisation of wildlife is enshrined in policy.

The plan could not only present landowners with a lucrative income but also with a wildlife conservation strategy. The scheme places a dollar value on native animals — an economic incentive for the landholder to keep wildlife habitat undamaged and look after species on their properties rather than destroying or ignoring them.

A Senate Rural and Regional Affairs Committee Report, published last month, called for trials in the commercial utilisation of wildlife and a review of export laws. "It has got the potential for a far better use of Australia's northern rangelands than grazing cloven-footed animals," declared Committee member, former NT Senator Bob Collins. "It could be an important regional income contributor while having really positive environmental effects."

The report concluded that wildlife residing on 93 per cent of the Australian landmass is unprotected, lying outside established national parks or sanctuaries. That means the overwhelming majority of species are vulnerable to feral animal predation and habitat

destruction initiated by landholders. Commercial utilisation of wildlife targets those landowners.

This is already the case in southern Africa where landowners benefit economically from wildlife through tourism, export sales, selective culling and even big game hunting — all in the name of conservation. After decades of plunder, many species are making dynamic population come-backs in countries like Botswana, Namibia and Zimbabwe, where landholders have been entrusted with wildlife wellbeing. At CITIES (Convention of International Trade in Endangered Species) 1996 international conference, those three countries were rewarded for their increasing elephant populations by the organisation officially sanctioning a tightly controlled export trade in ivory.

The report recognises that lucrative markets for Australian wildlife exists overseas, but the current federal legislation prohibits commercial wildlife export — except if they're already dead. It is under these cadaverous regulations that kangaroo meat, emu products, bushtail possums and crocodile skins are currently exported.

The NT's crocodile management plan provides a blueprint for commercial utilisation. In 1971, after decades of over-hunting, saltwater crocodile numbers in the NT were depleted to an estimated

**Continued on Page 4**

## Overseas fellowship for community leader

A Churchill Fellowship is giving Aramac grazier Lesley Marshall the chance to study land management and regional development issues in Canada. Mrs Marshall chairs the Desert Uplands Build-Up and Strategic Development Committee and will travel to Canada's Prairie Provinces in June next year to visit the Prairie Farm Administration so she can study their strategies for dealing with land management problems.

Mrs Marshall was one of only 19 Queenslanders awarded a fellowship this year, and the only one from Western Queensland. "All knowledge is great and if we go overseas and travel and acquire knowledge we can enrich our own community," she said.

The Desert Uplands Committee is a coalition of landholders, members of the community and government representatives concerned about land degradation and declining standards of living in Central Queensland's Desert Uplands.

Mrs Marshall hopes to bring back information that will assist the committee in its work on sustainable agriculture. An eight-week study tour will take her through the Canadian states of Alberta, Manitoba, British Columbia and Saskatchewan. The agricultural affairs of these states are all managed by the Prairie Farm Administration.

"About 30 years ago they had a lot of problems with their land as it was very degraded," she explained. "I want to see what measures they have taken and what they have achieved in regional development."

The Churchill Trust provides scholarships so Australians from all walks of life to undertake overseas study, or an investigative project, of a kind that is not fully available in Australia. There are no prescribed qualifications, academic or otherwise. The primary test is merit, based on past achievements or a demonstrated ability for future achievement.

**Applications for Churchill Fellowships are called for in November and December of each year and close on February 1.**

### Contact

**National Office**  
Tel: (02) 6247 8333

**WA Regional Committee**  
Tel: (08) 9309 9915

**Queensland Regional Committee**  
Tel: (07) 3224 4802

**NT Regional Committee**  
Tel/Fax: (08) 8981 0870

**Website**  
[http://sunsite.anu.edu.au/churchill\\_fellowships/](http://sunsite.anu.edu.au/churchill_fellowships/)

## Books track knowledge in far north

Two books launched in Darwin recently explore northern landscapes from indigenous and western perspectives. *Burning Questions, Emerging environmental issues for indigenous peoples in northern Australia* is a timely survey by Marcia Langton, Director of the Centre for Indigenous Natural and Cultural Resource Management (CINCRM), at the Northern Territory University which argues for the reimplication of Aboriginal people in the management of northern Australian landscapes.

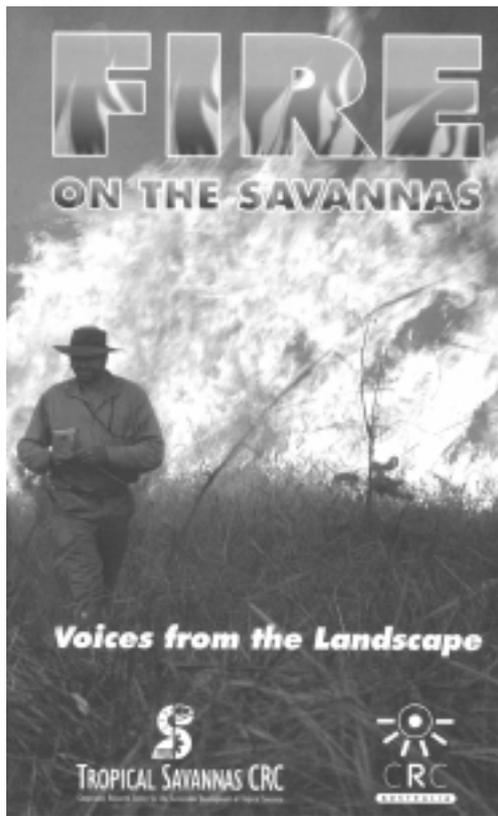
Professor Langton argues that indigenous people successfully managed the landscape for millennia and are responding to the challenge of sustainable environmental management in innovative ways that combine traditional environmental practices and western scientific insights.

*Tracking Knowledge in North Australian Landscapes* edited by Deborah Rose and Anne Clark, is a collection of essays that focus on northern and central outback regions of Australia. They explore some of the systematic ways in which Australian people have organised, communicated,

erased, and reinvented knowledge of these unique environments. Among the contributors are Settler and Indigenous writers; the range of their academic disciplines includes anthropology, archaeology, biological science, and geography.

**For *Burning Questions* contact:**  
Northern Territory University Bookshop  
Tel (08) 8946 6497 Fax (08) 8946 6656  
Email [john.simpson@ntu.edu.au](mailto:john.simpson@ntu.edu.au)  
Or CINCRM  
Northern Territory University  
Tel (08) 8946 6279 Fax (08) 8946 7755  
Website <http://www.ntu.edu.au/cincrm>

**For *Tracking Knowledge* contact:**  
North Australian Research Unit  
PO Box 41321 Casuarina NT 0811  
Tel (08) 89220066 Fax (08) 89220055  
Website  
<http://online.anu.edu.au/naru/Welcome.htm>



## Voices tell of fiery northern landscapes

*Fire on the Savannas: Voices from the Landscape*, the CRC's booklet on the experiences and opinions of some of the north's fire managers is now in print. The genesis for the booklet were interviews conducted at the CRC's fire management workshop held in April this year. This workshop brought together pastoralists, indigenous land managers, scientists, conservationists, tour operators, miners and the military.

The proceedings of another fire management workshop, held in the remote Aboriginal community of Kalumburu in the North Kimberley region of Western Australia are also now in print.

This earlier workshop was held over 10 days in 1997 and addressed a range of regional fire management issues. Only limited numbers of the Kalumburu proceedings are available. Contact: The Bush Fire Service of WA Tel (08) 9169 1370.

For information on the CRC's booklet and proceedings: Tel (08) 8946 6285 (NT) Email peter.jcaklyn@ntu.edu.au Tel (07) 4781 5967 (Qld) Email kate.odonnell@jcu.edu.au

The booklet is not an authoritative text on fire management, but a fascinating account of viewpoints to fire management in the north, illustrating where these views diverge and meet. Proceedings of the workshop are also now in print.

## Ag Force the new player

The merger of the United Graziers' Association, Queensland Grain Growers' Association and the Cattlemen's Union has taken another step forward with the announcement of their new name: Ag Force. The new organisation, which represents the interests of cattle, grain, sheep and wool producers, aims to be operational by the end of the year. There has been close cooperation between the three groups for a number of years, and the new structure formalises the alliance. Ag Force will have three commodity councils ¼ beef, sheep and wool and grain.

### Websites

- United Graziers of Queensland  
<http://www.farmwide.com.au/nff/uga/uga.htm>
- Queensland Graingrowers Association  
<http://www.farmwide.com.au/nff/qgga/membership.htm>
- The Cattlemen's Union of Australia  
<http://www.farmwide.com.au/Nff/cattlemen/cmu.htm>
- Australian Agricultural Sites  
<http://www.agriculture.net.au/orgs.html>
- Farmwide news and advice  
<http://www.farmwide.com.au/default.asp>

## Dance collaboration brings cultures together

North Australians have the chance to see a unique reconciliation project with the advent of Luuli, a collaborative dance work between traditional Aboriginal and Western dancers.

Luuli is currently touring Darwin, Katherine, Kununurra and Broome and brings together the Mornington Island Dancers and Dance North, a contemporary dance company based in Townsville.

### Tour Dates

- Katherine High School, September 12, FREE
- Kununurra Leisure Centre, September 19, 8pm, Bookings: Tel (08) 9168 1177
- Broome Civic Theatre September 25-26 Bookings: Tel (08) 91921 1325
- Or contact Dance North:**  
Tel (07) 4772 2549 Fax (07) 4721 3014.

# Wildlife for Sale

Continued from page 1

5000 animals. That's when shooting the animal was banned and biologist Dr Graham Webb designed a management plan to restore its population.

Today, over 10,000 croc eggs are harvested from the wild annually, with landowners paid for each egg taken from their property. Animals are farmed for skins to the value of \$3 million per year in exports yet the wild population continues to grow at a rate of 5 per cent a year to a current total estimated at 70,000. So many fully grown adult crocodiles now patrol NT watercourses that late last year the NT Government sanctioned test harvest trials allowing the export of wild skins.

Pastoralists on Carmour Plains station initiated a trial harvest along with Aborigines from the Maningrida community, whose harvest accompanies a successful egg gathering and incubation operation. The NT Government also backs communities interested in crocodile big game hunting, potentially the most valuable commercial wildlife scheme. A hunter

taking a single animal can pay \$25,000 to an isolated community otherwise dependent on government largesse.

"If we can do it with crocodiles we can do it with other species," said Parks and Wildlife NT assistant director of conservation management, Dave Lawson. "These are valid alternatives. We should try them. I'm not saying they all will work. All we're saying is this deserves a valid test."

Lawson's department has already initiated management plans for the sale and export of red-tailed black cockatoos and draft management plans for magpie geese and long-necked turtles.

The Senate committee also believes a live export trade will undermine the flourishing illegal trade. It calls current state and federal laws regulating the use and protection of native species, "confused and inconsistent."

Export proponents argue that a controlled legal trade would put the poachers out of business. Opponents contend that the commercial

utilisation of wildlife remains an untried conservation scheme. That is a view recognised in the Senate report. A major committee recommendation is to set up an experimental management trial to examine the economic viability and conservation prospects of the commercial formula. The trial would see scientists and landowners working on a 2000 square kilometre marginal pastoral property, funded by the Natural Heritage Trust.

They would identify commercial species, turning off all they could on a sustainable case-by-case basis. According to Dr Webb, the rewards could radically change land use nationwide. "Let's test it," he urged. "What if we found you can put vast areas of Australia aside and make them earn more income through wildlife than you can through agriculture?"

*The Commercial Utilisation of Australian Native Wildlife: Report of the Senate Rural and Regional Affairs and Transport References Committee is available from AusInfo. Tel (toll free within Australia) 132 447 Mail: AusInfo GPO Box 84 Canberra ACT 2601 Fax an order to (02) 6295 4888 Website: [http://www.fed.gov.au/n\\_index13.htm](http://www.fed.gov.au/n_index13.htm) ISBN 0642267812*



Forum

## Commercial trade: another threatening process?

*Michael Kennedy, director of the Humane Society Internationale gives his opinion on wildlife utilisation*

**Wildlife in Australia does need a new deal, but achieving this new deal does not mean promoting utilisation as the new Messiah. The national and global recognition of the ethical approaches that need to be taken in respect to our wildlife is becoming increasingly difficult in a world driven by economic rationalism.**

**Like most environmental and animal welfare NGO organisations in Australia (and around the world) Humane Society Internationale opposes the commercial consumptive use of wildlife on philosophical, cruelty and conservation grounds; in the belief that existing programs drain the public purse and are inadequately monitored and enforced. There is also absolutely no evidence of conservation benefit. That trade contributes to the decline of wildlife populations around the world is**

**clearly evidenced by the thousands of species still listed under CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora).**

**The global wildlife trade is extensive. As TRAFFIC Oceania (Trade Records Analysis of Fauna and Flora in Commerce) has recently reported, the annual world trade in wildlife products and live specimens is estimated to be worth somewhere in the region of US\$20 billion. TRAFFIC also estimates that up to one-third of this massive trade is illegal, concluding that: "Illegal and unsustainable wildlife trade threatened more than individual species. Population collapses can threaten entire ecosystems and thus, the quality of our own lives. Keeping wildlife trade under control will never be easy because the trade in wildlife involves**

*Continued on Page 5*



# Wildlife utilisation as an aid to conservation

As our cover story showed, wildlife utilisation is potentially an important issue in the tropical savannas. It is also an issue on which there are many views. Following are two more cautionary assessments: one from wildlife ecologists and one from an animal welfare organisation.

An idea presently with wide and growing popularity is that of using the revenue generated from the utilisation, usually by harvesting, of an endangered species to fund its conservation. This has merit but carries dangers. It can constitute a positive feedback loop between the severity of the conservation problem and the amount of utilisation to generate the revenue needed to fix it.

The loop starts with a species in decline and various measures are urgently needed to halt it. A proportion of the population is then removed and sold. That removal steepens the decline and the conservation problem is thereby exacerbated. And so a further proportion of the population is removed and the cycle repeats itself. The essential point is that it is *the rate of the decline which is the critical factor and not the initial size of the population.*

Yet this notion of utilising wildlife to pay for conservation is becoming firmly entrenched in conservation biology. It

has the potential to be beneficial if the utilisation creates public interest in future wildlife populations. In 1992, CITES (Section 12.1.1) passed the resolution "that commercial trade may be beneficial to the conservation of the species and ecosystems and/or the development of local people when carried out at levels that are not detrimental to the survival of the species in question."

The intent is that trade will be beneficial if it is monitored and sustainable; the returns are used to support the management of its habitat and there are no deleterious effects on lookalike species. There are very few species for which this information exists. Under schemes where the revenue is returned to the government, it is difficult to restructure government administration to ensure that income is returned not to general revenue but to a particular department and program. This carries its own risks.

The aim to utilise wildlife to support conservation is almost always hedged with the proviso that the use is

sustainable or that it meets the criteria of scientific management. The criteria for sustainable use or scientific management are not specified (Section 12.1.1). The danger is that those criteria will be developed during a harvesting program that will have its own economic momentum. Utilising wildlife to support conservation may be the beginning of a slippery slope to biological extinction unless management criteria with allowance for uncertainties in estimation of parameters are first established. Management criteria are not the only safety net: the structure of the market and access have to be under control. The possibility that sustainable harvesting of wildlife may not be economically competitive with alternative land uses sets an imperative.

It is that such use should not be presented as the long-term *raison d'être* for conservation as, if it does rest on economic competitiveness, the case for conservation vanishes as soon as a better economic option appears. At best such harvests should not be presented as more than aids to conservation.

An edited extract from *Conservation Biology in Theory and Practice* by Graeme Caughley and Anne Gunn, Blackwell Science, 1996. Printed with permission from Blackwell Science.

## Continued from Page 4

more than 350 million animals and plants each year." While existing programs, especially export programs based on wildlife derivatives, are conducted solely for the purpose of financial gain, the 'new wave' of wildlife managers and industry protagonists, are selling vigorously the concept of 'use it or lose it'. This approach attempts to suggest that utilisation programs will benefit the conservation of the species concerned and the habitats upon which they depend.

But as Dr Ray Nias, the conservation director of the World Wide Fund for Nature comments in the 1995 WWF publication *Using It and Losing It: The commercial exploitation of wildlife in Australia*: "It is difficult, however, to find unequivocal examples that demonstrate the sustainability of consumptive wildlife. It is even rarer to find examples that demonstrate a

clear conservation benefit to the conservation of the species in its natural state". The recovery of the saltwater crocodile was due not to the ranching and subsequent export program, established in the 80s, but to the 1971 ban. The CAMPFIRE project in Zimbabwe is based on sport trophy hunting of endangered African elephants with no demonstrable benefits to local communities. It is propped up annually by millions of dollars in overseas aid money, denying the lie of self-sustainability.

Legal trade simply facilitates and fuels illegal trade. Unless this vogue fetish for 'killing to be kind' is doused by public opinion and logical review, then wildlife trade may become an additional threatening process to wildlife species already poised for massive declines. *Michael Kennedy, Director, HSI Australia*



## Campaign pins down the woody enemy

This year's Weedbuster Week is from October 11-18. Held annually, the campaign aims to raise awareness and understanding about the damage weeds cause across the country. Activities will be held right across Australia and include weed clean-ups, displays, competitions and workshops.

The campaign began as Weed Awareness day in Queensland in 1994. Last year the campaign went national, with all state and territory governments becoming involved. To find out what is happening in your region, contact the coordinators listed below. The CRC for Weed Management Systems also has a Weedbuster Weed Email list server.

This year's campaign theme is 'Identification for a weed-free nation . . . get to know the enemy' so people can recognise weeds and be able to identify them. The campaign aims to help the public make the connection between their gardening, farming and agricultural habits and potential land degradation; as well as fostering community ownership and support for weed management.



*Woody Weed, the cheerful fellow pictured above is the Weedbuster icon who spreads himself around the countryside (like any successful weed) causing havoc, harassing wildlife and costing money. He is bright purple and green and helps promote Weedbuster activities.*

### Weedbuster Coordinators

#### Northern Territory

**Leslee Hills**  
NTDPIF  
Tel (08) 8999 2349  
Fax (08) 8999 2049  
Email  
leslee.hills@nt.gov.au

#### Western Australia

**Sandy Lloyd**  
Agriculture WA  
Tel (08) 9368 3760  
Fax (08) 9474 3814  
Email  
slloyd@agric.wa.gov.au

#### Queensland

**Leanne Parkes**  
QDNR  
Tel (07) 3406 2867  
Fax (07) 3406 2875  
Email  
Leanne.Parkes@dnr.qld.gov.au

#### National

**Salvo Vitelli**  
QDNR  
Tel (07) 3406 2859  
Fax (07) 3406 2875  
Email  
salvo.vitelli@dnr.qld.gov.au

For publications on weeds in the NT, through DPIF:  
<http://www.nt.gov.au/dpif/info/pubcat/weeds.shtml>  
Or Email [christine.uttley@nt.gov.au](mailto:christine.uttley@nt.gov.au)  
Tel (08) 8999 2313 Fax (08) 8999 2307

SWEEP is the 'Strategic Weed Eradication and Education Program' managed by Queensland Department of Natural Resources .  
Contact QDNR Tel (07) 3406 2867  
Email [Debra.Beck@dnr.qld.gov.au](mailto:Debra.Beck@dnr.qld.gov.au)

### Weedbuster Websites

#### Queensland

<http://www.dnr.qld.gov.au/land/admin/landprot.htm#weedbusters>

#### Western Australia

<http://www.agric.wa.gov.au/progserv/plants/weeds/buster/buster.htm>

#### Northern Territory

<http://www.nt.gov.au/dpif/weeds/weedbust.shtml>

### Weed Research Sites

#### The National Weed Strategy Home Page

<http://www.dpie.gov.au/dpie/armcanz/pubsinfo/nws/nws.html>

#### A calendar of weed research activities

<http://www.agric.wa.gov.au/progserv/Plants/weeds/calendar.htm>

#### The links page from Ag WA

<http://www.agric.wa.gov.au/progserv/plants/weeds/links.htm>

#### CRC for Weed Management Systems

<http://www.waite.adelaide.edu.au/CRCWMS/weedies.html>

Tel (08) 8303 6590

Fax (08) 8303 7125

Email [crcweeds@waite.adelaide.edu.au](mailto:crcweeds@waite.adelaide.edu.au)



## List targets exotics' threat

A joint program between north Australian agencies has substantially updated the Weeds Target List from 23 exotics to descriptions and illustrations of 40 species. The list targets weeds known to occur in Papua New Guinea, Indonesia or South East Asia that could wreak havoc on rural industries and the natural environment if introduced into Australia.

Agriculture Western Australia, the Australian Quarantine and Inspection Service, and the Department of Conservation and Land Management (CALM) worked together to produce the list with a number of overseas countries providing samples of particular weeds for the collection.

Agriculture Western Australia development officer and botanist with NAQS (North Australian Quarantine Strategy) Andrew Mitchell co-authored the list with Barbara Waterhouse, who works with NAQS in Queensland.

"The original list was compiled nine years ago and included 23 weeds of quarantine concern," Mr Mitchell said. "The new list is much more extensive with 40 species described and illustrated. They are exotic weeds not previously recorded in Australia."

Mr Mitchell said the target list would help promote industry and public awareness of potential weed threats, enhancing the probability of early detection enabling a swift response.

The list is lodged at Agriculture WA, AQUIS, CALM, Northern Territory Department of Primary Industry & Fisheries and Queensland Department of Natural Resources. Mr Mitchell said the list would be continually reviewed by botanists and weed scientists.

Contact Andrew Mitchell  
Tel (08) 9368 3929  
Email [amitchell@agric.wa.gov.au](mailto:amitchell@agric.wa.gov.au)  
[The Australian Quarantine Inspection Service Website](http://www.dpie.gov.au/aqis/inspection_service_website)  
<http://www.dpie.gov.au/aqis/homepage/aqishome.html>

## WA revamps its policy on declared weeds

Western Australia's Agriculture Protection Board has completed the first major review of the state's Declared Weed Policy in more than 25 years. There is now a revised list of declared plants, clarification of landholder responsibilities and a stronger compliance policy.

Declared weeds are those that, under legislation, have to be controlled in specific ways. These can range from eradication to containment. The APB, which establishes policy and determines plant declarations under the Agriculture and Related Resources Protection Act, has also called for an increased focus on surveillance and control of WA's most serious weeds.

APB Chairman Keryl Enright said the review was needed because of significant changes to farming and advances in technology, including the availability of new herbicides for weed control. "The revised Declared Plant List reflects the seriousness of the named weeds and the compliance policy specifies the action required by affected landholders for the benefit of their own agricultural enterprise and the wider community," she said.

The review of weed declarations and compliance policy included an extensive consultative process with local government authorities, regional advisory committees and industry.

"Their local input and knowledge was important and was evaluated along with weed risk assessments and technical advice from Agriculture Western Australia staff," Mrs Enright said.

The revised Declared Plant List will be publicised through advertisements soon to appear in rural media in WA. Landholders can also contact their local Ag WA office.

## Hi-tech project brings together knowledge on North's rangelands

Tropical Savannas CRC has joined with the National Land and Water Resource Audit in a major project that, for the first time, will trial methods for monitoring the condition of the whole of Australia's northern rangelands. The project will link ground-based data with satellite information.

The key areas under study will be the East Kimberley in Western Australia, the Victoria River District and Sturt Plateau in the Northern Territory and the Burdekin Catchment region of Queensland.

The National Land and Water

Resource Audit is assessing the condition and trend of Australia's natural resources as a whole over the next three years. The Audit is funded under the Federal Government's Natural Heritage Trust and aims to provide an independent, objective assessment of the extent of degradation of land and water, including an economic analysis of each problem. The rangelands monitoring project is one of seven audit themes.

Contact: Mr Rod Applegate, NT DLPE Tel: (08) 8999 4568; Dr Paul Novelly, Ag WA Tel (08) 9166 4000; Mr Colin Creighton, NLWRA Tel: (02) 6257 9516

# Stormy forecast in climate crystal ball

Earlier this year CSIRO Atmospheric Research released a report *Climate Change under Enhanced Greenhouse Conditions in Northern Australia*. *Savanna Links* interviewed one of the authors, Senior Research Scientist Dr Kevin Walsh

**SL:** *Is there a connection between the high temperatures around the world at the moment (see graph opposite) and climate change?*

**KW:** It's been in the news that July 1998 was the warmest month worldwide in the historical record. I think it's fair to say that we haven't detected an unambiguous human contribution to this trend but on the other hand if Greenhouse gases were causing the world to warm then this is exactly the sort of effect you might expect.

**SL:** *But can you say that the longer term temperature rises we've seen are due to Greenhouse gases and not just natural variation — such as more radiation from the sun?*

**KW:** Several studies have come out recently which have reinforced the

conclusion that it is at least partly due to Greenhouse gases

**SL:** *How can they tell?*

**KW:** Firstly, Greenhouse gases produce a characteristic warming across the globe — more at poles than at the equator — and secondly Greenhouse gases warm more in the upper troposphere than lower troposphere (the troposphere is the 8km thick layer of constantly moving air closest to the earth). These telltale warming patterns have indeed been detected.

**SL:** *Is there a link with the flooding here and overseas?*

**KW:** The thing about the impact of flooding is that it is so dependent on climate variability from year to year

and human trends like population increases in flood-prone areas. The jury is still out on links to climate change.

**SL:** *Moving on to the North Australia Study, what aspects of climate change are important up here?*

**KW:** In north Australia the variation in rainfall is the important factor.

**SL:** *So what are your predictions for the changes in rainfall in the north?*

**KW:** We had great difficulty in coming up with predictions for summer rainfall in the north that's linked to ENSO (El Nino Southern Oscillation) variations. We don't know what's going to happen to ENSO under climate change. The latest models give us different results for rainfall change than the earlier models — unusually the Australian region is the only major region in the world where this is true.

**SL:** *Why?*

## Far North 2030: turn on the fan, pass the banana prawns

**Climate models suggest a warming of 0.4 to 1.4°C inland and 0.3 to 1.0°C on the coast.** The confidence for this forecast is moderate to good; i.e. above 50% but not as high as 95%. In some areas such a rise would produce a 50-100% increase in the number of days above 35°C.

**Sea levels should rise by between 10 and 25cm.** Due to thermal expansion of the oceans and melting of glaciers. Similar confidence to temperature predictions.

**Dry season rainfall should decrease slightly.** All the rainfall predictions are less certain than those for temperature and sea-level.

**Wet season rainfall changes are less certain.** Predictions vary depending on the model used. Models suggest increases in intensity and more extreme rainfall events.

**The timing and geographic distribution of rainfall is also difficult to predict.**

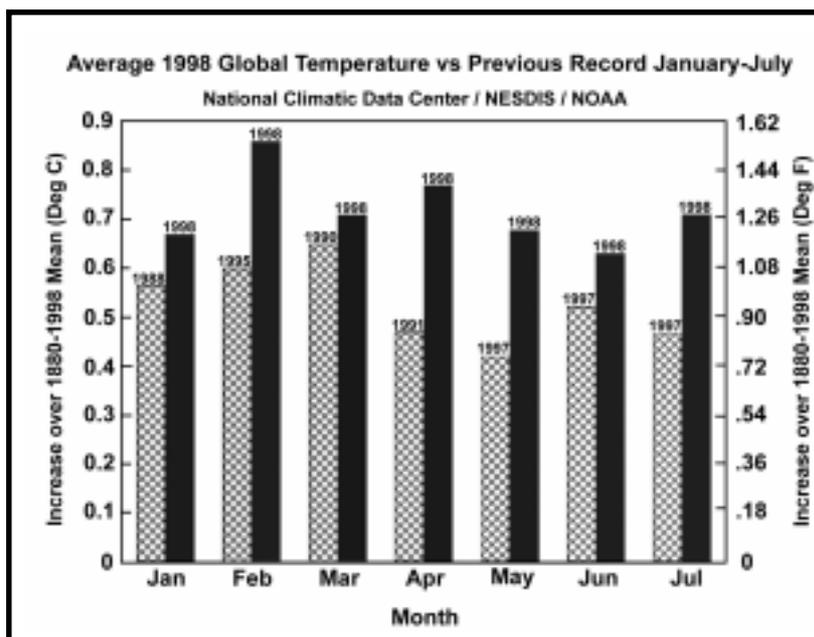
Such changes will have important impacts on natural ecosystems, crops and the pastoral industry.

**Cyclones may increase in intensity by up to 20% and persist further south. Woody weeds could spread in the rangelands.** These plants benefit from increased CO<sub>2</sub> and from disturbed conditions more than many other plants.

**Fire regimes could change.** Clearly changes in extreme temperatures, rainfall and vegetation could affect fire regimes. It's just that no one knows exactly how.

**The health of indigenous people may face the greatest risk from climate change.** Poor water quality, sanitation and lack of other health resources make indigenous communities particularly vulnerable to climate change impacts.

**The positive side?** There may be benefits to some crops that grow well in higher temperatures and CO<sub>2</sub> levels and more flooding in coastal waters means we may get more banana prawns.



This graph from NOAA illustrates how July 1998 was the warmest month worldwide in the historical record. Printed with permission of the National Oceanic and Atmospheric Administration (NOAA)

### Websites

**National Oceanic and Atmospheric Administration**  
<http://www.ncdc.noaa.gov>

**SILO: meteorological and agricultural information**  
<http://www.bom.gov.au/silo/>

**Queensland Climate Centre**  
<http://www.dpi.qld.gov.au/qcca/Welcome.html>

**CSIRO Division of Atmospheric Physics**  
<http://www.csiro.au/csiro/structure/clim.htm>

**National Greenhouse Advisory Committee**  
[http://www.erin.gov.au/air/climate/greenhouse/NGAC/ngac\\_int.html](http://www.erin.gov.au/air/climate/greenhouse/NGAC/ngac_int.html)

**KW:** Because our rainfall is dependent upon sea surface temperatures in the Pacific, and those in turn are related to ocean circulation changes which we don't have a really good understanding of yet.

**SL:** *Can you say something about expected changes in rainfall intensity?*

**KW:** One of the things that we suggested might occur would be increased intensity of rainfall events in the north Australian summer.

**SL:** *What about the dry-season winter rainfall?*

**KW:** That's interesting because for winter rainfall the older models and newer models agree for northern Australia and predict slightly less rain in the future.

**SL:** *Is there a link between climate change and the record wet seasons and "wet" dry seasons that parts of the north have been getting lately?*

**KW:** It's difficult to make extrapolations for a long forecast from just the past few years. Again it is a question of local effects being influenced by year-to-year changes in climate rather than long-term ones, so I don't know if you should read too much into that at the present time.

**SL:** *Anything you want to add to finish up?*

**KW:** I think it's important to realise that some climate change is now inevitable. Even if we stopped producing Greenhouse gases tomorrow the oceans' temperature are still adjusting to the Greenhouse gases that have already been put into the atmosphere so that will keep on warming into the middle of next century.

## El Nino gets blame for WA's sick turtles

A marine scientist believes the El Nino weather pattern may be contributing to what is known as the 'floating turtle' syndrome.

The syndrome affects turtles along the north coast of Western Australia each year, causing their immune systems to shut down and limiting their ability to dive for food. Current reports from Shark Bay, Exmouth and Dampier suggest up to two turtles a day are dying from the syndrome. Dr Bob Prince, Department of Conservation and Land Management WA, heads CALM's marine

turtle project and says the cause of the syndrome is widely unknown. However, Dr Prince says preliminary evidence suggests the warm Pacific current which supplies northern waters may be affected by El Nino and in turn is reducing the turtles' food source.

Dr Prince says turtles along the Pilbara coast this year are probably, in part, suffering from the equivalent of a drought in the sea — starving because not enough food is being produced.

— Tanya Nolan, ABC Radio Karratha



# Landholders and conservation

A new project in the Northern Territory aims to involve landholders and managers in conservation management of the Barkly Tableland. By *Alaric Fisher*.

While the recent Northern Territory Parks Masterplan focuses on the formal National Park system, it also recognises the vital role of off-reserve conservation and the importance of involving landholders in maintaining an environmentally healthy landscape. It notes that in some environments, arrangements with landowners that ensure the conservation of wildlife could prove an alternative to expanding the network of National Parks. The grasslands and swamps of the Barkly Tableland are one outstanding example of the potential for off-reserve conservation.

The Barkly Tableland is a major feature of semi-arid northern Australia, extending from Elliott in the Northern Territory to the south of Mount Isa in Queensland. The 'downs' country dominates the landscape: flat or undulating treeless grasslands on dark, cracking clay soils. The dominant vegetation of this area is Mitchell grassland, named after the main perennial grasses (*Astrebla* spp).

This country is well suited to cattle grazing and it is economically one of the most important areas for pastoral production in the Northern Territory. There is little permanent surface water on the Tableland, and one factor in the success of pastoral use is the comprehensive network of bores throughout the area that feed raised earth dams ('turkey-nests') for watering cattle. The development of the industry in this region began a century ago, so most areas have been grazed by stock for many decades.

Largely because of the high pastoral productivity of this environment, and also because in the past it was not perceived as attractive to tourists, or even important for wildlife, the area of National Parks within the Barkly Tableland is very small (c. 400 square kilometres). In fact this 'monotonous' grassland is made up of many plant species, with up to 60 species occurring within a single

hectare. The cracking clay soils provide shelter for small mammals and reptiles. This includes the tiny long-tailed planigale, which is one of the world's smallest mammals but also a voracious carnivore, and an alarming collection of poisonous snakes. The abundant seeds from the grasses and herbs provide food to many bird species, including



Photo: Alaric Fisher

*The tiny long-tailed planigale, virtually invisible to humans, is the most common mammal species on the Barkly's Mitchell grasslands. Despite being one of the smallest mammal species in the world, it's a ferocious carnivore. Like many of the small mammals and reptiles in this habitat it lives in cracks in the soil, its very flattened head helping it squeeze into narrow spaces.*

the flock pigeon, singing bushlarks and button-quails shelter in the grass, while flocks of aloof bustards are still common. A large variety of raptors (eagles, falcons, etc.) hunt over the grasslands. The Barkly Tableland is also an important habitat for waterbirds and migrant shorebirds, with 75 species recorded. While there is no evidence that pastoral land use has had a severe impact on the wildlife in the Barkly Tableland, it is a

different story in some of Australia's other arid-zone rangelands. The spread of artificial watering points means that most of inland Australia's landscape has now been opened up to grazing by sheep or cattle.

A recent CSIRO study compared sites at different distances from watering points, including 'reference' sites so distant from water that they were inaccessible to stock. They found that a proportion of native plants and animals (up to a third of all the species in the region) were more abundant at sites further from water. Of these, some species were found *only* in reference sites, suggesting that some native species can no longer survive in much of the rangelands.

Our studies show that this pattern is not as pronounced in the Mitchell grasslands, although there are no true reference points. Some bird species are very common close to water and have been advantaged by pastoral development. However, some of the most common species, including some of those unique to this region, become more abundant further away from water and so seem in some way to have been disadvantaged by pastoral use.



Photo: Alaric Fisher

*The goanna Varanus spenceri, another unique inhabitant of the Barkly Tableland*

Our results suggest that the best way to protect all the native species of this region is probably to maintain a network of areas of different distances from water and different levels of grazing. Keeping a reasonable area of land that is only lightly grazed may be most important for ensuring disadvantaged species can survive through dry years when impacts of grazing are most pronounced. Such areas may also act as seed reserves and help to re-establish desirable pasture species following drought.

Through the NTPWC's new project, 'Biograzing: Waterpoints and Wildlife', we are looking at ways to promote

sustainable rangeland management while minimising impacts on economic returns. The project is being carried out in partnership with CSIRO and the South Australian Department of Environment and is funded by LWRDC (the Land and Water Resources Research and Development Corporation). In the Barkly Tableland it has two main components:

- Determining exactly which native species have been advantaged and disadvantaged by pastoral development, particularly the establishment of artificial watering points;
- Developing example plans (such as keeping stocking rates low in certain

areas) that will ensure the continued conservation of the disadvantaged species, and measuring what economic costs such plans might cause.

A key part of Biograzing is to establish a dialogue with landowners and managers (through workshops, field days, articles and personal contact) in order to exchange information and discuss the issues that concern them.

The ultimate goal of the project is to promote the idea that conservation and pastoral production in the rangelands can be successfully integrated. This type of conservation management requires full collaboration of all interested groups, both on the land and in government agencies. This will be addressed in the Regional Parks Masterplan for the Barkly Region, which builds on the vision in the Northern Territory Masterplan.

*Alaric Fisher is a research scientist at the Parks & Wildlife Commission of the NT. Tel (08) 8944 8471 Fax (08) 8944 8455 Email: alaric.fisher@nt.gov.au. This article is an edited version of an original article for Bush and Ranger magazines. Printed with permission of Environment Australia.*

## Incentives help restore remnant vegetation

**M**ore than 90 per cent of the Australian continent falls outside national parks and reserves. Bushcare, a national program to restore Australia's remnant vegetation, involves community, industry and government to implement sustainable land practices on non-reserve and private land.

The program offers a range of incentives from direct grants to community groups to rate relief, fencing subsidies, management agreements and voluntary conservation covenants to landowners and managers.

There are also 'land for wildlife extension schemes' that involve networks of land managers making use of extension and facilitation services. Rate relief and differential rating schemes can be negotiated with some councils.

The subsidies are conditional on land managers demonstrating commitment to ongoing native vegetation management. The program is administered by the Natural Heritage Trust and there is a Bushcare contact in each state and territory.

**For more information contact:**

Environment Australia's Community Information Unit  
Tel 1800 803 772 or Countrylink 1800 026 222.  
Website: [www.nht.gov.au](http://www.nht.gov.au)

### Software tracks species

For those involved in maintaining species databases the Department of Conservation and Land Management WA has available species-editing software for Windows 95/NT. Called Max, it was specifically written for the database needs of field biologists, naturalists and herbaria. The software can read and write database formats including dBASE, Microsoft Access, Borland Paradox, ODBC data sources and a host of SQLs and Microsoft SQL Server.

The test version of Max can be downloaded for free evaluation from the CALM Website. You must register with the CALM Herbarium first.

<http://www.calm.wa.gov.au/science/max/max.htm>  
Email [paulg@calm.wa.gov.au](mailto:paulg@calm.wa.gov.au) for further information.



# Guide book to a rural adventure

**S**omebody out there is interested in what you are doing, says writer Sue Beeton, whose book *Ecotourism: A practical guide for rural communities* was published recently.

“You may think your day-to-day work wouldn’t interest anyone else, but somewhere out there someone is fascinated by road-building, fencing, selling rural produce, fruit growing, or the environment,” said Ms Beeton.

“Natural assets which locals take for granted are often a major reason for tourists to visit an area.”

The book covers many aspects of what people need to know before venturing into the ecotourism market. It explains what ecotourism is and who ecotourists are. It describes working with the local community and the local environment, highlighting some of the constraints and pitfalls. The book also explains what is needed to make a successful venture work and how to make it pay.

Tourism, with its niche element of ecotourism, is one of Australia’s fastest growing industries, overtaking the

traditional export items of coal, wheat and wool in export earnings.

“Diversification of rural industry is the key to survival in today’s economic and social climate,” said Ms Beeton. “By focusing on natural resources, tourism has the ability to generate a range of dispersed jobs in remote and rural communities for young people and allow them to develop a wide range of skills, while remaining in the country.”

The book is the first publication for Landlinks Press, an initiative of CSIRO Publishing.

Contact: CSIRO Publishing  
PO Box 1139  
Collingwood Vic 3066  
Tel (03) 9662 7500  
Fax (03) 9662 7555  
Email [info@publish.csiro.au](mailto:info@publish.csiro.au)

[Ecotourism Association of Australia](http://www.chalmers.com.au/Mackay/Ecotour/association.html)  
<http://www.chalmers.com.au/Mackay/Ecotour/association.html>

## Cathedral mounds & long-lived Queens

**H**ow old are the anthills or termite mounds that dominate some land-scapes in the tropical savannas? The short answer is that it’s difficult to tell. Unlike trees and corals termite mounds don’t seem to have regular growth rings, so they can’t be aged simply by looking at the finished product.

You can of course keep an eye on a particular mound over the years and this shows that some mounds must be pretty old.

A ‘cathedral’ mound (these are the large buttressed mounds that are often more than 5m tall) of the spinifex termite *Nasutitermes triodiae* had to be “topped” when the Overland Telegraph was constructed in the

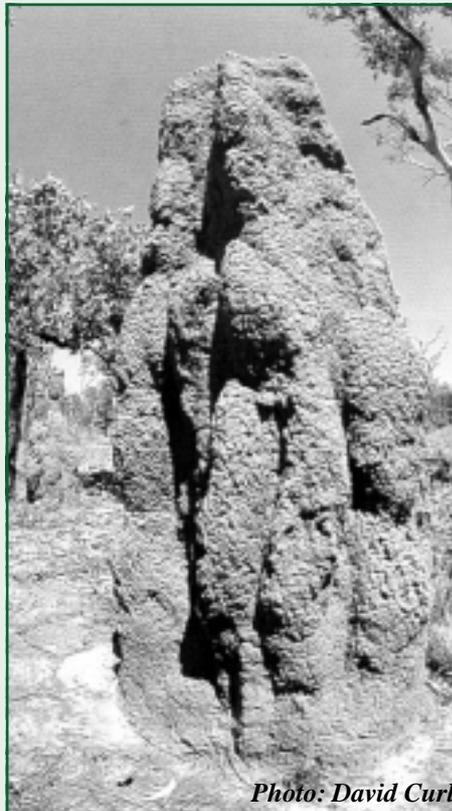


Photo: David Curl

1880s because it interfered with the wires. It was still a thriving colony around 50 years later in 1936 and by the 1950s it was in a state of advanced decay. As it was over 3 metres high when it was topped it was probably at least a few decades old then, giving a total age of around 100 years.

The remarkable thing about this record is that the spinifex termite is thought to have colonies dependent upon a single queen, in other words when she dies she is not replaced and the colony no longer produces eggs and will start to decline.

This implies that the queens of the spinifex termite live for many decades making them among the oldest insects in the world. — Peter Jacklyn

## General

### **Environmental Engineering Research Event 1998 A Forum for Postgraduate Research 6-9 December, NSW**

**Venue** Avoca Beach, NSW

The aim of the forum is to allow postgraduate students working in the environmental field to present and discuss their work and to get a broader view on the challenges facing those who endeavour to improve ecological and economic sustainability of human activities.

**Theme** Environmental Engineering in Australia: Opportunities and Challenges.

**Contact** Lauren Basson/Andrea Schäfer

Department of Chemical Engineering  
University of Sydney, NSW 2006

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**Fax** (02) 9351 2854/(02) 9385 5966

**Email**

[EERE98@chem.eng.usyd.edu.au](mailto:EERE98@chem.eng.usyd.edu.au)

[EERE98@unsw.edu.au](mailto:EERE98@unsw.edu.au)

[basson@chem.eng.usyd.edu.au](mailto:basson@chem.eng.usyd.edu.au)

[a.schaefer@unsw.edu.au](mailto:a.schaefer@unsw.edu.au)

**Website**

<http://www.chem.eng.usyd.edu.au/events/EERE98.html>

### **Northern Australian Regional Outlook Conference 1998 Focus on Commodities and Enterprise Management September 24, Darwin**

**Venue** MGM Grand Casino, Darwin

**Theme** Focus on Commodities and Enterprise Management

The conference will examine a number of enterprise issues relating to northern Australia. These include commodities and enterprise management, mining and primary

industries, risk management, communication and information technology in the outback, rural and pastoral enterprises, indigenous mining enterprises and business opportunities arising from the Asian crisis.

**Contact** Dr Graham Kirby,  
Northern Territory Department of  
Primary Industry & Fisheries

**Tel** (08) 8999 2367

**Fax** (08) 8999 2200

**Email** [Graham.kirby@dpif.nt.gov.au](mailto:Graham.kirby@dpif.nt.gov.au)

**Website**

<http://www.nt.gov.au/dpif/events.shtml>

### **1998 Annual Australian Fire Authorities Council AFAC Conference October 9-11, Hobart**

**Venue** Grand Chancellor Hotel  
Hobart, Tasmania.

**Theme** Foregoing Partnerships.

The conference program has been designed to help delegates focus on the potential benefits that result from effective partnerships.

**Cost** Delegates \$425

Day registration \$270

**Contact** Melanie Main

**Tel** (03) 9899 5088

**Fax** (03) 9899 5096

**Email** [afac@ausfire.com](mailto:afac@ausfire.com)

**Website** <http://www.ausfire.com/>

### **1998 International Conference on Engineering in Agriculture: Engineering Better Agricultural Environments September 27-30, Perth**

**Venue** University of Western Australia, Perth.

The aim of the conference is to advance the fields of agricultural engineering for sustainable agricultural resources and production by providing a forum to share current expertise between researchers to enhance the communication and

collaboration of researchers within Australia and with those from other countries.

**Contact** Glen Riethmuller,  
Conference Coordinator

**Tel** (08) 9081 3111

**Fax** (08) 9041 1138

**Email**

[griethmuller@agric.wa.gov.au](mailto:griethmuller@agric.wa.gov.au)

**Website**

[http://www.agric.wa.gov.au/whatsnew/cevents/engconf\\_info.html-ssi](http://www.agric.wa.gov.au/whatsnew/cevents/engconf_info.html-ssi)

### **Crisis and Opportunity Hazard management and disaster preparedness in Australasia and the Pacific region November 1-4, Cairns**

**Venue** James Cook University,  
Smithfield campus, Cairns.

The conference encompasses all aspects of hazards and mitigation with a special focus on the Asia Pacific region with its diverse and dynamic communities and various hazard risks. Supported by AGSO, Bureau of Meteorology, TCCIP, Cairns City Council and EMA.

**Cost** Full fees: \$400. Students half price.

**Contact** The Coordinator, James Cook University  
Centre for Disaster Studies,  
PO Box 6811, Cairns Qld 4870.

**Tel** (07) 4042 1215

**Fax** (07) 4042 1214

**Email** [Linda.Berry@jcu.edu.au](mailto:Linda.Berry@jcu.edu.au)

**Website**

<http://www.tesag.jcu.edu.au/cds/cdsweb.htm>

### **MODSS '99 International Conference on Multiple Objective Decision Support Systems for Land, Water & Environmental Management August 1-5 1999, Brisbane**

**Theme** The conference will address the broad spectrum of decision

support through five themes and multiple sessions.

**Contact** Dr Paul Lawrence  
Department of Natural Resources,  
Resource Sciences Centre, 80 Meiers  
Road, Indooroopilly Qld 4068  
**Tel** (07) 3896 9560  
**Fax** (07) 3896 9898  
**Email** [modss99@dnr.qld.gov.au](mailto:modss99@dnr.qld.gov.au)  
**Website** [http://www.dnr.qld.gov.au/  
events/modss99/index.htm](http://www.dnr.qld.gov.au/events/modss99/index.htm) Disaster  
Management

## Indigenous Issues

### **Workshop on Indigenous Use of Wetlands September 29-30, Batchelor**

**Venue** Batchelor College. Held by  
Centre for Tropical Wetlands and NTU  
Centre for Indigenous Natural and  
Cultural Resource Management  
(CINCRM)

The workshop aims to:

- Document the range of uses made of wetlands by indigenous people in north Australia.
- Record the significance of those uses for maintaining traditional lifestyles and culture.
- Record the land management practices adopted to maintain important values.
- Identify threats to important values and the maintenance of local management practice.
- Consider options for expanding the use of wetlands owned or managed by indigenous people for subsistence or commercial purposes.
- Analyse interactions between new and traditional uses and practice and ways of minimising conflicts.
- Consider ways to develop partnerships between indigenous wetland owners and managers and non-indigenous researchers and managers.

**Contact** Maryanne McKaige  
CTWM Coordinator  
**Tel** (08) 8946 6726  
**Email** [ctwm@ntu.edu.au](mailto:ctwm@ntu.edu.au)

### **Conquering Colonialism September 29-October 1, Townsville**

**Venue** James Cook University,  
Douglas Campus, Townsville.

A group of indigenous Australians talk about how they conquered Colonialism.

**Cost** \$340, individual sessions \$50,  
students half price

**Contact** Yasmin Johnson  
Project Officer

The School of Indigenous Australian  
Studies, James Cook University,  
Douglas Qld 4810

**Tel** (07) 4781 4947

**Fax** (07) 4781 4033

**Email** [yasmin.johnson@jcu.edu.au](mailto:yasmin.johnson@jcu.edu.au)

## Pastoral Interests

### **New Rural Industries 98, Advancing Innovation October 18-21, Perth**

**Venue** Belvoir Homestead, Perth.

This conference is an important milestone in the emergence of the major and inevitable cultural shift which is effecting Australian agricultural. It will address a range of issues relating to the development processes of new industries.

**Contact** Promaco Conventions Pty  
Ltd, PO Box 890, Canning Bridge, WA,  
6153

**Tel** (08) 9364 8311

**Email**

[mailto:promaco@promaco.com.au](mailto:mailto:promaco@promaco.com.au)

[promaco@promaco.com.au](mailto:promaco@promaco.com.au)

**Website**

<http://www.promaco.com.au> [http://  
www.promaco.com.au](http://www.promaco.com.au)

### **Beef Expo 2000 April 9-16, 1999 Central Queensland**

The expo will create the opportunity for the entire Australian industry to interact with all of its wider domestic and international stakeholders. Visitors will be able to encounter the

latest technological developments and marketing trends as they progress through the trade fair, or when they attend the wide range of conferences and seminars. Consumers will be able to discover up-to-date ways in which to use beef when they watch one of the cooking gurus in action, or take part in one of the tasting trials.

**Website**

[http://leaky.rock.tap.csiro.au/  
Beef2000/beef2000-structure.html](http://leaky.rock.tap.csiro.au/Beef2000/beef2000-structure.html)

## Mining

### **Mining and the Environment II September 12-16 Ontario, Canada**

**Venue** Sudbury, Ontario, Canada.

**Theme** Ground and surface water remediation, environmental data management systems, ecosystems, new technology-old problems, mining and society.

**Contact** Sudbury '99 Centre in  
Mining and Mineral Exploration  
Research, Laurentian University  
Sudbury, Ontario, P3E 2C6, Canada.

**Tel** +705 673 6572

**Fax** +705 673 6508

**Email**

[mosher@nickel.laurentian.ca](mailto:mosher@nickel.laurentian.ca) or

[bevans@nickel.laurentian.ca](mailto:bevans@nickel.laurentian.ca)

## Ecology & Biology

### **Understanding and managing organic matter in soils, sediments, and waters**

**September 21-25,  
Adelaide**

**Venue** University of Adelaide,  
Adelaide.

**Contact** Dr Kaye Spark, IHSS-9  
Conference Secretary  
CRC for Water Quality and Treatment,  
PMB 3, Salisbury, SA 5108

**Tel** (08) 8259 0349

**Fax** (08) 82590228

**Email** [IHSS-9@sawater.sa.gov.au](mailto:IHSS-9@sawater.sa.gov.au)  
**Website:** <http://www.clw.csiro.au/conferences/ihss9/>

### **Management for Ecological Sustainability September 22-25, Brisbane**

**Venue:** University of Queensland, Brisbane

A conference to consider the maintenance of ecological processes, ecosystems and primary production consistent with ecologically sustainable development.

**Website**

<http://www.ccb.uq.edu.au/website/Conf98.htm>

### **NZES<sup>2</sup>A — 1998 Joint Annual Meetings of the Australian and New Zealand Ecological Societies November 24-27, New Zealand**

**Venue** University of Otago, Dunedin, New Zealand.

**Contact** Dr Janice Lord  
 Botany Department,  
 University of Otago  
 PO Box 56, Dunedin 9001 New Zealand  
**Tel** 64 3 479 5131  
**Fax** 64 3 479 7583  
**Email** [jlord@phyton.otago.ac.nz](mailto:jlord@phyton.otago.ac.nz)

### **Third Biological Sciences Congress November 27, Singapore**

**Venue** National University of Singapore

**Theme** Biochemistry, Ecology, Biodiversity, Systematics, Cell and molecular biology, Applied Biology

**Contact** Postgraduate Congress Committee

National University of Singapore  
 10, Kent Ridge Crescent  
 Singapore 119260

**Winter Meeting British**

### **Ecological Society January 5-7, 1999, Leicester, UK**

**Venue** University of Leicester,  
 The Society offers a limited number of grants to subsidise attendance at the meeting. These grants cover teachers in the UK, and students in the UK and abroad. Details are available from the BES office. To apply for Student Support applicants must return their completed forms by 30 October 1998.

**Contact** Ecological Society  
 26 Blades Court, Deodar Road,  
 Putney, London SW15 2NU, UK

**Tel** 44 0 181 871 9797

**Fax** 44 0 181 871 9779

**Email**

[winmet@ecology.demon.co.uk](mailto:winmet@ecology.demon.co.uk)

**Website** <http://www.demon.co.uk/bes>

### **BES Annual Symposium: Ecological Consequences of Habitat Heterogeneity March 23-25 1999, Sussex, UK**

**Venue** University of Sussex.  
 This meeting will be present an up-to-date survey of current knowledge about the consequences on environmental heterogeneity for individual organisms, for populations and communities

**Contact** Ecological Society  
 26 Blades Court, Deodar Road,  
 Putney, London SW15 2NU, UK

**Tel** 44 0 181 871 9797

**Fax** 44 0 181 871 9779

**Email** [inmet@ecology.demon.co.uk](mailto:inmet@ecology.demon.co.uk)

**Website** <http://www.demon.co.uk/bes>

### **VI International Rangeland Congress People and Rangelands: Building the Future July 17-23, 1999 Townsville**

**Venue** The congress will be held jointly at the adjoining ITT Sheraton Townsville Hotel & Casino and the Townsville Entertainment & Convention Centre.

The main technical program will be run over the week of July 19-23. The Congress's plenary speakers are Dr Tim Flannery, Dr. Frank (Fee) Busby, and Mr. Richard Leakey.

Six professional workshops will be held prior to the congress, July 16-17. The Congress's sessions are broader in concept than the traditional ones, trying to embrace the issues of scale, multidisciplinary and multiple use.

Topics covered include:

- Future Shocks to People and Rangelands
- People in Rangelands Desertification & Soil Processes for Better Rangeland Management
- International Perspective on the Rangelands
- Policy, Planning and Institutions for Fostering Sustainable Use of Rangelands
- Managing Rangeland Plant Communities
- Building the Future in Education and Communication
- People and the Conservation Estates in Rangelands
- Managing Grazing Pressure
- People & Plant Invasions of Rangelands
- People and Rangeland Biodiversity
- Integrating Management of Land and Water Resources
- Accounting for Rangeland Resources
- Modelling for Better Rangelands
- Range Management and Plant Functional Types
- Rehabilitation of Mined Surfaces
- Economics & Ecology: Working Together for Better Policy
- Sustaining a Rangeland Enterprise
- Accounting for Rangeland Resources

**Contact** Julie Hullick,  
Business Manager  
**Tel** (07) 4771 5755  
**Fax** (07) 4771 5455  
**Website** <http://irc.web.unsw.edu.au>

## Fauna

**Sixth Australasian Applied  
Entomological Research  
Conference  
Pest Management — Future  
Challenges  
September 29 -October 2,  
Brisbane**

**Venue** The University of Queensland,  
Brisbane.

In conjunction with the 1998 Australian  
Entomological Society 29th AGM and Scientific  
Conference.

**Contact** Sally Brown,  
ICTE Conferences  
University of Queensland  
Brisbane Qld 4072  
**Tel:** (07) 3365 6360  
**Email** [sally.brown@mailbox.uq.edu.au](mailto:sally.brown@mailbox.uq.edu.au)

**Marsupial Immunobiology  
September 29-October 2,  
Brisbane**

**Venue** The Auditorium, Building EE,  
Parramatta Campus, University of Western  
Sydney, Nepean

This conference offers an opportunity for a  
timely and definitive review of the current state  
of knowledge of the marsupial immune system.  
**Costs** Full registration \$150, Student registration  
\$80, includes morning and afternoon tea and  
lunch.

**Contact** Sriram Krishnan, Project Co-Ordinator  
Linkwest, UWS Nepean, PO Box 10,  
Kingswood, NSW, 2747  
**Tel** (02) 9678 7648  
**Email** [krishnan@uws.edu.au](mailto:krishnan@uws.edu.au)

## Tourism

**The Tourism Student  
Research Conference  
September 19-20, Townsville**

**Venue** School of Business, James Cook  
University, Townsville, Qld.  
A major aim of the conference is to showcase  
the research and projects of final year tourism  
students at the University.

**Contact**  
1998 Student Research Conference  
Tourism Program, Western Campus  
James Cook University  
Townsville QLD 4811  
**Tel** (07) 4781 6282.  
**Fax** (07) 4725 1116  
**Email** [Julie.Zabala@jcu.edu.au](mailto:Julie.Zabala@jcu.edu.au)  
**Website**  
<http://www.jcu.edu.au/dept/Tourism/conf>

## OUR STAKEHOLDERS



ABORIGINAL COMMUNITIES



PASTORALISM



TOURISM



MINING



CONSERVATION



DEFENCE

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