



SAVANNA LINKS

Cooperative Research Centre for Tropical Savannas Management

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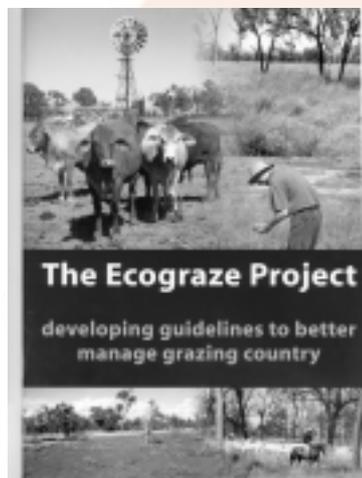
Access to the spectacular fishing off Australia's coast is now a problematic issue for Aboriginal groups, commercial and recreational fishers— and one that could take years to resolve

Photo: Dennis Schulz

Tourism with a catch: how do we share the spoils?

Tourism is an increasingly important source of income and employment for people in the tropical savannas. But while tourism provides opportunities, it can also generate negative impacts and costs. For Aboriginal communities, recreational and commercial fishing raise even more complex issues.

Dennis Schulz and Julie Crough report—Go to page 6.



Read all about it: birds, cows, plants & weeds

SOME great new books are now out, including this report into an eight-year study on grazing management. There's also the updated guide to *Weeds of the Wet/Dry Tropics of Australia: A Field Guide* by Nick Smith; the *Birds of Groote Eylandt* by Richard Noske and *Plants of the Tropics, Rainforest to Heath: An Identification Guide*, by Betsy Jackes. Go to pages 3 & 9.

NEW satellite technology is set to change how fires are detected, monitored and managed across northern Australia. On board two new NASA satellites launched in Darwin recently is an instrument called MODIS that can detect fires and hotspots not only at night but also during the day. Go to page 3.

Projects take up new CRC research directions

NEW research projects are now formally under way in the Tropical Savannas CRC, since gaining approval by the CRC's Board at its meeting in June. These projects reflect the CRC's greater focus on the practicalities of managing land and integrating its biophysical, social and economic aspects. A few project proposals are undergoing some revision, but we are confident that they will be fully developed and ready to start by the October Board meeting later this year. Following are the new projects and their respective project leaders:

Theme 1—Landscape Ecology and Health (Leader: John Ludwig, CSIRO Sustainable Ecosystems)

- **Predicting outcomes of savanna management: ecological interactions and socio-economic trade-offs across landscape scales:** John Gross, John Ludwig, CSIRO Sustainable Ecosystems, Qld.
- **Effects of disturbance on biota, and nutrient and water dynamics for landscape function in tropical savannas:** Garry Cook, CSIRO Sustainable Ecosystems, NT; Mike Webb, CSIRO Land & Water, Qld.
- **Understanding the impacts of disturbance on woodland dynamics and carbon cycling to improve savanna management and health:** Andrew Ash, Dick Williams, CSIRO Sustainable Ecosystems Qld & NT.
- **Biodiversity on the fault lines: examination of mammal decline across northern Australia, and implications for management:** John Woinarski, Parks & Wildlife Commission of the NT.
- **Savanna Riparian Health: definition, indicators and response to management:** Michael Douglas, Northern Territory University; George Lukacs, James Cook University, Qld.
- **The impacts of exotic grass establishment on basic savanna function: using ecological information for**

better management: Samantha Settlefield, Michael Douglas, Northern Territory University; Tony Grice, CSIRO Sustainable Ecosystems, Qld.

Theme 2—Industry and Community Natural Resource Management (Leader: Jill Landsberg, James Cook University, Qld Parks & Wildlife Service)

- **Refining methods of off-reserve conservation of biodiversity in tropical savanna rangelands:** Alaric Fisher, Parks & Wildlife Commission of the NT, NT.
- **FIREPLAN: Fire management for the savanna community:** Jeremy Russell-Smith, Bushfires Council NT.
- **North Australian beef industry natural resource management best practice project:** Stephen Tapsall, TS-CRC, NT.
- **Monitoring biodiversity health in tropical savanna rangelands:** Alaric Fisher, Parks & Wildlife Commission of the NT.
- **Indigenous ecological knowledge for land management:** Mark Horstman, Kimberley Land Council (WA); Peter Cooke, Northern Land Council (NT); Nick Smith, Balkanu Cape York Development Corporation (Qld).

A major grazing land-management project, involving both Queensland, Western Australia and the Territory, is currently being finalised and will begin later in 2002.

Theme 3—Regional Planning and Management (Leader: Dan Walker, CSIRO Sustainable Ecosystems)

- **Integrating research and management at property and regional scales through participatory knowledge-building:** Ockie Bosch, Helen Ross, University of Queensland.
- **Integrating people, properties, policies and plans between regional and property scales:** Helen Ross, Ockie Bosch, University of Queensland.

Continued on page 5.

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 three universities, government agencies from the NT, Qld and WA and the Commonwealth, CSIRO, and representatives from Aboriginal groups and the pastoral industry.

The Centre promotes sustainable use and conservation of Australia's tropical savannas by acting as a bridge between agencies engaged in land and resource-management

research, and research users and decision makers e.g. pastoralists, conservation managers, Aboriginal land managers, and the tourism and mining industries.

The Centre communicates outcomes of research and other knowledge about the savannas and ensures this knowledge can be used effectively by people living and working in the savannas.

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Fire and patchy landscapes

Mid-July saw an International Conference in Darwin: Savanna Landscapes in Northern Australia—fire and heterogeneity. Supported by the Key Centre for Tropical Wildlife Management at NTU and the Tropical Savannas CRC, at least two major messages emerged from the week-long gathering.

The first was that remote-sensing technology is now producing more accurate data on fires and other landscape features, but the big challenge is to make this data useful to land managers. The second message was that 'patchiness' of the landscape is critical for the survival of many plants and animals—where the patches might be different plant communities or areas with different fire histories. But again, the challenge is to manage this patchiness effectively. *More next issue.*

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Fires in northern Australia: pixel size 250 m (April 7, 2002 UTC) From MODIS website

Satellites launch new era in mapping fires

NEW satellite technology is set to change how fires are detected, monitored and managed across northern Australia. On board two NASA satellites is an instrument called MODIS (Moderate Resolution Imaging Spectroradiometer) that can detect fires and hotspots not only at night but also during the day.

Until now fires could be detected mainly at night because the older National and Oceanographic Atmospheric Administration (NOAA) satellites confused fires with heated

ground surfaces such as sunlit rocks.

“This new technology will have enormous impact for park rangers, pastoralists and the Bushfires Council of the NT who every year manage thousands of square kilometres that go up in flames and smoke,” Dr Jeremy Russell-Smith, of the Tropical Savannas CRC and Bushfires Council of the NT, said.

“MODIS is much more sensitive to temperature than NOAA which enables land managers to spot remote

fires more easily during the day, track their direction more frequently and all at a much finer scale.”

“With MODIS we can also detect the blackened scars left by fires at a finer scale—down to a few hundred square metres in size—whereas with the older satellites we could only detect fire scars that were well over a square kilometre in size.”

One of NASA’s principal investigators for MODIS, Dr Christopher Justice, agrees.

“Fire information from these new satellites can be used for improved fire and land management not only in northern Australia but also throughout the world.”

“The MODIS fire and thermal instrument has information unique to understanding when and where fires occur and characteristics such as the energy emitted from the fire.

Detailed information on fires is critical both in the short and long-term, since fire changes the vegetation cover and releases gases and particles into the atmosphere, thus affecting ecosystems and atmospheric chemistry,” he said.

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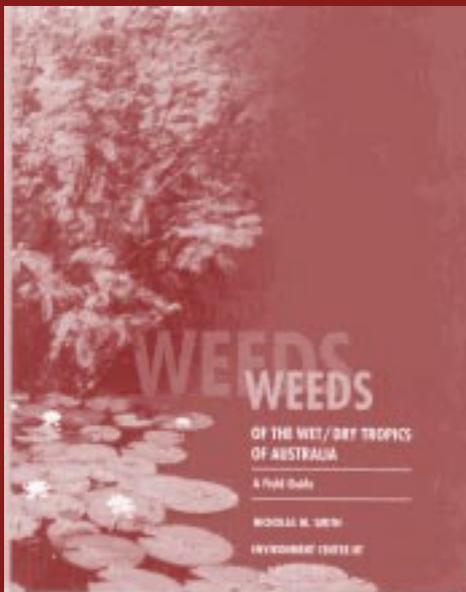
Email: jeremy.russell-smith@nt.gov.au

Overview of MODIS:

<<http://modarch.gsfc.nasa.gov/>>

Fire images: <<http://rapidfire.sci.gsfc.nasa.gov/>>

Updated weed guide now covers all of northern Australia



THE Environment Centre of the Northern Territory has published Nick Smith’s new book *Weeds of the Wet/Dry Tropics of Australia: A Field Guide*. The book is a full-colour revised and expanded edition of the previous publication *Weeds of Natural Ecosystems: A field guide to environmental weeds of the NT*.

The book features detailed descriptions and photographs of more than 80 weeds species found across northern Australia and outlines the best control and eradication measures for these species. The book also includes a section on potential weed threats.

Organisations that helped fund the book were the Natural Heritage Trust, the Australian Quarantine Inspection Service (AQIS), the TS-CRC, Greening Australia, the World Wide Fund for Nature and the Australian Conservation Foundation.

The book retails at \$19.95 (inc GST). A wholesale price of \$16.50 per copy applies to orders of 10 or more copies. Available from the Environment Centre of the NT.

Tel: (08) 8981 1984 Fax: (08) 8941 0387

Web: <www.ecnt.org/weeds.htm>

Now turn to page 9 for other new publications!

One of the biggest problems in managing remote landscapes is funding people on the ground in these areas. One innovative solution could be the Arnhem Land Fire Abatement (ALFA) project which looks at how to better manage fire in Arnhem Land—and to fund long-term land management with carbon credits from greenhouse gas reduction.



ALFA involves communities from Arnhem Land and researchers from the Northern Land Council, Bushfires Council NT, CSIRO and the TS-CRC. *Savanna Links* spoke to a key researcher in the project, Dr Jeremy Russell-Smith of the BFCNT and the TS-CRC.

Why locate the project in Arnhem Land?

Arnhem Land is a landscape that people value for many reasons, it has great cultural and conservation value, but these values are seriously threatened by huge wildfires that sweep across the area in the late dry season. It is also one of most under-employed parts of Australia, so the idea is to tackle both the fire and employment problems by getting local people out on country managing fire.

How does managing fire affect greenhouse emissions?

Arnhem Land is like large parts of northern Australia in that much of the landscape is burnt each year. In Arnhem Land about 40 per cent of the country was burnt on average over the past 10 years or so, and of that, over 85 per cent of those fires occurred in the late dry as extensive wildfire.

If we could do more strategic burning early in the year, we should be able to reduce the amount of country burnt later in the year. That means we end up burning less of the landscape overall. In the case of ALFA, we are talking of going from 40 per cent being burnt each year down to around 25 per cent. We will thus change the frequency at which fire returns to a typical area from once every two and a half years to once every four years. This should substantially reduce the amount of emissions overall.

So by reducing greenhouse gas emissions, you will eventually get carbon-trading credits. Does the project solve the long-standing problem of remote Australia—how to fund land management in the long term?

Yes, we hope so.

But isn't the ALFA project fairly restricted at the moment in what sort of carbon credits it might secure?

Yes, there are all sorts of international discussions we have to refer to here. In relation to the Kyoto Protocol, which is what's on the table at the present time, all we can angle for is to have emissions from forest fires treated like any other greenhouse emissions. Just as you will get

carbon credits for putting a scrubber on a smokestack, we hope to get credits by reducing greenhouse emissions from landscape fires.

But we will only get credits for reducing greenhouse gases such as nitrous oxides and methane, not carbon dioxide, because CO₂ emitted by fires is not considered by Kyoto to be much of a greenhouse problem. This is because it's assumed to re-absorbed by soils and vegetation in new growth in the following wet season period. But our research has shown us that we can in fact significantly reduce CO₂ emissions with fire management (See story opposite page).

Also, the emission reductions you can get credits for won't be able to be traded straight away?

No, the likely sequence of events will be that Australia ultimately ratifies the Kyoto Protocol, out of economic necessity if not for any serious environmental concern, and then trading will be applied to carbon abated or sequestered between 2008–2012. The Europeans and all other signatory nations will be working towards that.

What about the problem that funding for local on-ground goals of fire management is a global atmospheric goal, rather than a local goal—is it a marriage of convenience?

Yes, but you get substantial conservation, landscape, and social benefits from meeting that global goal. You stop the big fires moving into the escarpment and other sensitive country, including established National Parks such as Kakadu and Nitmiluk, and you get huge employment opportunities for remote communities. It meets the same goals that the people on the ground want. And remember too, if we can make the project work in Arnhem Land, the technologies and methodologies developed can be readily transferred to other parts of fire-prone northern Australia, and savannas globally. So, we think this is a pretty important initiative.

Interview: Peter Jacklyn

How credit for fire management might work

To help nations reduce greenhouse gas emissions, a system of carbon 'credits' was proposed under the Kyoto Protocol whereby these emissions can be offset by supporting activities that absorb greenhouse gases such as the planting of trees (which absorb carbon dioxide). Governments, for example, might allocate carbon credits to activities that ultimately stored carbon, and these credits could then be sold to emitters of greenhouse gases.

Activities that absorb CO₂ are called carbon 'sinks' and to qualify for credits these sinks must be:

- created by human as opposed to natural causes;
- created since 1990 (the Kyoto Protocol governs emission reductions from this date);
- able to be measured with a reasonable accuracy.

Because of these restrictions the only sinks accepted by the Kyoto Protocol so far are types of forest plantation created since 1990, the so-called 'Kyoto Forests'. But there are other land uses that store carbon that may be considered in the future, many people in northern Australia are hoping that fire management is one of these.

Fire management and greenhouse emissions

If fire managers in northern Australia can successfully change a fire regime from one that is dominated by late-season fires, to one that is dominated by early dry-season fires then less of the landscape will be burnt each year. Therefore fewer greenhouse gases from fires, including CO₂, methane and nitrous oxides, will be emitted from that landscape. However these changes to the fire regime are not considered to make a difference to the net CO₂ entering the atmosphere—because all CO₂ emitted by fires is assumed to be re-absorbed by new vegetation growth following the fire. At the moment then, the Kyoto Protocol would only accept that the non-CO₂ gases in the atmosphere are reduced by this change in fire regime.

But research¹ indicates that the analysis above is too

simplicistic and that more traditional patchy fire management and early burning and less intense fires will affect the carbon stored in the landscape: the unburnt vegetation should start to thicken and will feature larger trees that will be less susceptible to fire damage. This larger and thicker vegetation will store more carbon than the landscape with late season more intense fires.

How can we be sure that changes in a fire regime are human-induced?

This is where satellite mapping of fires comes in. It is now possible to determine if a particular fire was due to a prescribed burn or not. It should also be possible to determine if fuel reduced by prescribed fires early in the dry has had an impact on reducing late dry-season fires.

How can we accurately measure the impact on emissions by the change in fire management?

Airborne surveys are already measuring the greenhouse gas profiles of savanna fires, and any changes over an area the size of Arnhem Land should be able to be identified. When it comes to the carbon stored on the ground, satellite and aerial surveys can be used to measure the number and size of trees. When combined with ground surveys, researchers hope to be able to accurately monitor changes in carbon storage produced by fire management.

—Peter Jacklyn

1. Scholes, R.J. & Hall, D.O. (1996), 'The carbon budget of tropical savannas, woodlands and grasslands', in *Global change: effects on coniferous forests and grassland* (eds A.I. Breymer, D.O. Hall, J.M. Melillo and G.I. Agren), pp. 69–100. John Wiley and Sons Ltd.

UN Convention on Climate Change and Kyoto Protocol: <www.unfccc.de/resource/convkp.html>

Australian Academy of Science's NOVA site on carbon credits: <www.science.org.au/nova/054/054key.htm>

Northern Land Council: <www.nlc.org.au> go to Caring for Country and then fire management.

Cont.
from
Page 2

Projects take up new CRC research directions

- **Analytical and modelling methods for characterising regional community, economic and natural resource dynamics:** Mark Stafford Smith, CSIRO Sustainable Ecosystems, NT.
- **Improving the benefits to savanna communities from tourism:** Romy Greiner, CSIRO Sustainable Ecosystems, Qld; Mark Horstman, Kimberley Land Council, WA.
- **Bioregional planning in Australia's savannas:** Geoff McDonald, University of Queensland.
- **Regional vegetation management and water resource planning for sustainable landscape management:** Allan Dale, Dept. Natural Resources & Mines, Qld.
- **Tourism and two laws on the Gulf Savannah (NT). An examination of the interrelationships between social and environmental well being on the savanna lands of the southwest Gulf of Carpentaria:** John Bradley, University of Queensland.

Theme 4—Human Capability Development (Leader: Ian Falk)

- **Higher education:** Penny Wurm, NTU, NT.
- **Communication resources for the tropical savannas:** Peter Jacklyn, TS–CRC, NT.
- **Indigenous Capacity Building (proposal under development):** Ian Falk, NTU, Rosemary Hill, JCU, Qld.
- **Scoping study: Natural resource management on Aboriginal land:** David Epworth, Balkanu Corporation, Qld.

Go to our website at <savanna.ntu.edu.au> for a full description of all our existing and past research efforts.

More information on projects, contact the CRC's theme leaders.

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Tourism with a catch: sharing the spoils



Tourists seeking the perfect catch at Karumba.

Tourism is an increasingly important source of income and employment for people in the tropical savannas. But while tourism provides opportunities, it can also generate negative impacts and costs. For Aboriginal communities, recreational and commercial fishing raise even more complex issues.

In these two articles we look at just some of the problems tourism can bring to host communities.

A new TS–CRC project is asking how can communities better harness the potential benefits of tourism and minimise impacts and costs? Julie Crough reports.

While tourism represents the next great boom for the Gulf Region since the mining and pastoral boom in the late 1800s, it comes at a cost. Around Karumba, the township that perches on the edge of the Gulf of Carpentaria and is the tourism hub of the region, fish stocks, specifically barramundi and grunter, are increasingly being depleted. The fresh water reservoir is running low—with water restrictions imposed on residents as early as June this year—and the rubbish tip is bursting.

Yet many tourists spend little more than an average of \$15 per day, and that is mainly for a campsite, fuel and milk as they typically bring in their own supplies. Also, despite a predominantly Aboriginal population, there are no Aboriginal commercial activities directed towards tourism (*also see story, opposite page*).

Australia’s savannas offer an essentially nature-based tourist product. A large proportion of tourists are self-drive and many tour by caravan, but they still require services and infrastructure that exist in savanna towns. The Carpentaria Shire, which lies in the heart of the Gulf Savannah, is feeling the pressure of this conflict of interest. Tourism in the Gulf is poorly developed but tourist numbers are approaching 100,000 per year in Karumba.

A new TS–CRC project will explore ways in which the regional community can generate more prosperity from tourism. Project leader Dr Romy Greiner, from CSIRO Sustainable Ecosystems, said the project developed from the community’s need to progress and manage tourism development so that it provided genuine social and economic benefits for the people of Normanton and Karumba.

“Tourism is a major user of natural resources, community facilities and services,” she said. “Currently, the regional community receives little benefit in return from the largest visitor segments, who are recreational fishers and retired caravanners.”

Romy said that tourism as a whole had to be analysed in a regional context. The project will establish a detailed profile of the visitors to the region, visitor expectations, activities and attitudes. It will elicit visitors’ preferences

Tourism activity in the Gulf and Kimberley occurs along an extensive road and track network and concentrates in areas such as the Gibb River Road and the Gulf of Carpentaria at Karumba. The Gulf Savannah covers around 425,000 square kilometres. Karumba is located 425 km east of the Northern Territory border with Normanton just 72 km south. The Gibb River Road, spanning 670 kilometres from Derby to the junction of the Great Northern Highway between Wyndham and Kununurra, traverses some of the Kimberley’s most spectacular cliff, river and gorge country.

for making financial contributions in return for access to various natural resources, infrastructure and services in Karumba and Normanton.

It will also develop mechanisms and policies that can be implemented at the local government level and by tourist development organisations.

“The idea is to promote and manage tourism in a way that provides necessary advantages for the people in the region, promotes sustainable tourism and complements broader regional development strategies,” Romy said.

“Ways have to be found by which visitors provide a fair contribution to the region and for Aboriginal people to participate in the industry.”

A tourist survey will form the basis of the project with recent pre-tests demonstrating overwhelming support from local tourist operators and tourists. A team of research staff and local people will conduct the first series of tourist interviews during this winter school holiday period.

In parallel, Mark Horstman, from the Kimberley Land Council, and his team will conduct tourist surveys during this dry season for the Gibb River Road when self-drive tourism is predicted to be at record levels.

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 Kimberley Development Commission <www.kimberley.wa.gov.au>
 Savanna Explorer: Kimberley <savanna.ntu.edu.au>

Across northern Australia, Aborigines are demanding a greater role in the management of recreational and commercial fishing on the rivers and coastlines of Aboriginal land. It's an issue that could take years to resolve, writes Dennis Schulz.



Access to the spectacular fishing off Australia's coast is now a problematic issue

Photo: Dennis Schulz

The lure of fishing is one of main reasons people in towns and cities travel to the tropical savannas.

Increasingly, however, recreational fishers need to obtain permits or pay to access fishing on Aboriginal land.

Aboriginal people of Maningrida, lying alongside the Liverpool River in Arnhem Land, are actively lobbying the NT Government to close the river's mouth to commercial fishing. They watch from the shore as commercial fishing boats lay kilometres of netting across the wide river mouth, hauling in tonnes of barramundi. They see thousands of fish and other sea creatures float lifelessly to shore as unwanted "bye-catch". The community licenses a recreational fishing operator who pays the community to allow him fishing access, but he reports that once the commercial nets go in, all other line fishers may as well return to camp.

Whose resource?

The 3000 people of Maningrida do not receive any money from commercial fishing operators even though they see the catch as their resource. They want a greater role in managing the fish and seafood stocks passing by their community and want a say in who is granted access to it.

"The people consider the fish belong to everybody in that region and they wish to control the access to that," explains Maningrida's Bawinanga Association manager,

David Bond. "They are quite prepared to share it but they need the share to be equitable."

The Maningrida situation is just one of many similar scenarios facing Aboriginal 'saltwater people' around the north coast of Australia.

Access for commercial and recreational fishers has become a hot issue in the Kimberley region of Western Australia and in north Queensland, but it is most acute in the Territory where 85 per cent of the coastline is on inalienable freehold Aboriginal land. Under the provisions of the Federal Government's Land Rights Act of 1976, permits are required before entering Aboriginal lands and fishers must comply or face charges. Commercial fishers working rivers on Aboriginal land or coastline that is Aboriginal owned, however, need not seek permits to fish offshore, nor pay compensation to the land owners.

User rights vs owner rights

Even though the High Court recently decided that indigenous people do not have exclusive rights to the resources of the sea, some groups, like the people of the NT's Cobourg Peninsula are also pushing for control beyond the low-water mark. "I don't see Aboriginal use of resources as a 'user' group," explains John Christophersen, Cobourg Peninsula's representative to the Northern Land Council, "We are an 'owner' group. We have the right to control and manage our estate."

The demand for commercial fishing access by permits and a greater management role for Aboriginal communities will continue to be strongly resisted by the Federal Government. "The fish that swim in the sea belong to everybody," argues NT Senator Nigel Scullion, a former commercial fisherman. "I believe that the ownership, the management and the allocation of those fish should reside with the government—and I don't believe that the management arrangements that we have in place should necessarily change."

Recreational fishing

Access to fishing is also an issue for recreational fishing. At May's World Recreational Fishing Conference held in Darwin, Northern Land Council director, Norman Fry demanded that Aboriginal interests be recognised. "Recreational fishers need to acknowledge the rights and interests of Aboriginal people to the land, coasts and seas. This is not negotiable, it is a reality," he said.

This reality is now being experienced. In Queensland permits to camp and fish are required on Aboriginal lands. In Cape York, an increasing number of pastoral properties are being purchased by the Indigenous Land Corporation and turned over to traditional owners, many of whom are not interested in creating tourism opportunities.

"It's a death by a thousand cuts," says fishing journalist Warren Steptoe. "Every year we lose more good fishing areas to Aboriginal land takeovers especially in Cape York."

Fishing strategies

In the Kimberley, Aboriginal demands for a greater voice in management of commercial and recreational fishing resources prompted the WA Dept. of Fisheries to establish an Aboriginal Fishing Strategy Working Group. The group is trying to broker greater indigenous involvement in the management of fishery resources. They are also looking at how customary fishing rights can be recognised in legislation, and seeking opportunities for indigenous economic development through aquaculture, charter work or commercial fishing operations.

Access to Aboriginal Land in the Kimberley also demands a permit, but the regulation is disregarded. "Most recreational fishers don't know they are required to get a permit to enter Aboriginal lands," says Fishing Strategy Working Group executive officer, Ben Fraser. "It's not signposted and not enforced either."

Mr Fraser's team will be reporting soon to the WA Fisheries Minister, Kim Chance, before the group's recommendations are put out for public consultation. But debate on the issue has only just begun.

Maningrida Arts & Culture & Bawinanga Aboriginal Corporation
<www.bu.aust.com/~maningrida/index.html>
WA Fisheries <www.wa.gov.au/westfish/>

Fire burns out large-scale riparian threat



Rubbervine—the tall dark shrubs covering the trees—invades the banks of the Burdekin River in Queensland

The impact of rubber vine in riparian areas is devastating, but landholders in northern Queensland can now add fire to their repertoire in the fight against the weed—particularly for large-scale infestations.

CSIRO Sustainable Ecosystems researcher, Dr Tony Grice, and his team of researchers, along with a Seventy Mile Range Landcare group and the Mount Cooper Bushfire Brigade have developed a practical means of managing large-scale infestations of riparian rubber vine using fire. The researchers have also shown that fire is effective against smaller-scale infestations of the weed.

“The real advantage of fire (as opposed to chemicals or mechanical treatment) is that it can be used on a large scale and that individual plants don’t have to be located and treated,” Tony explained. “Small parts of the landscape can also be targeted with fire.”

However, because controlling rubber vine is a long-term process, landholders will still have to use a combination of mechanical, chemical and biological means such as rust to successfully manage the weed.

Effect on other vegetation

The team examined the short- to medium-term responses of rubber vine to fire and how these fires affected native plant species.

“These fires did not cause significant changes in the densities of most species of native trees and shrubs,” Tony said. The fires stimulated germination of *Acacia* spp., notably *Acacia holosericea*. After burning, the exotic stoloniferous grass Indian couch and native perennial tussock grasses still dominated the herbaceous layer, although there was an increase in native legumes.

Fire results

The results demonstrated that the overall impact of the fire regime on rubber vine was considerable. For example, a single wet-season fire reduced the density of rubber vine from 2147 to 1165 plants per hectare.

The project recommends a regime comprising fires in the first and third year of a 10-year cycle. This regime would allow for two fires of adequate intensity and sufficiently close in time to be very effective. The approach is particularly relevant to Queensland’s Burdekin Catchment where the vegetation is very similar to that of the study sites. Several landholders in the vicinity have now begun to use fire specifically to control rubber vine.

Rubber vine is currently only present in Queensland but is a threat to Northern Territory and northern Western Australia. One infestation has been found in the Kimberley, but was dealt with.

A closely related but less weedy species, *Cryptostegia madagascariensis*, is found in both the Northern Territory

and Western Australia. It was declared noxious in WA.

Management issues

Tony emphasized that for rubber vine management on pastoral properties, it was essential to link a fire management program with a grazing management plan. Graziers must consider whether, to what extent and when they might have to adjust stocking rates in order to be able to burn or in order to allow the grasses on burnt country to recover.

Secondly, most savanna systems are under threat from more than one weed species. Management that targets one species may open opportunities for invasion by others. Thus, attention must be given to understanding and managing ‘weed complexes’. For example, removing rubber vine may well allow other weeds to increase.

“This is a very real threat,” Tony explained, “though there is little or no documentation of the effect.”

Continuing research in riparian weeds as well as new weed research in rangelands may give some insight into weed complexes in the long term. In the meantime, though, careful observation and management is required.

Weed strategy

Not only will the project’s results be beneficial for landholders in northern Queensland, but also they will contribute to the National Rubber vine Strategy that is part of the National Weed Strategy. The research is a joint Tropical Savannas CRC, CSIRO and Queensland Department of Natural Resources and Mines project.

“It would not have been possible without the collaboration of members of the Seventy Mile Range Landcare Group and the Mount Cooper Bushfire Brigade,” said Tony. “Linkages with these groups facilitated effective communication of the work’s results to landholders who are confronted by the practical challenges of weed management in the region.”

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Tel: (07) 4753 8500 Email: tony.grice@csiro.au
Weeds Australia: www.weeds.org.au
Qld NRM Rubbervine Factsheet
www.nrm.qld.gov.au/factsheets/pdf/pest/PP11.pdf
CRC for Weed Management Systems
www.waite.adelaide.edu.au/CRCWMS
TS-CRC Rubbervine Fact Sheets:
Go to the Brochures/Info Sheets page on our website
Also Savanna Explorer, Weeds Section.
Go to: savanna.ntu.edu.au

Managing grazing key to better country

Grazing management—not climate—is the key driver of land condition and pasture health in the open forest country areas of northern Australia, an important long-term research study has found.

The recently completed Ecograz study was an eight-year research project undertaken by staff from CSIRO Sustainable Ecosystems' Sustainable Rangeland group based in Townsville and the Queensland Department of Primary Industry's (QDPI) Beef Research Institute, Charters Towers. The project received funding support under Meat & Livestock Australia's (MLA) North Australia Program.

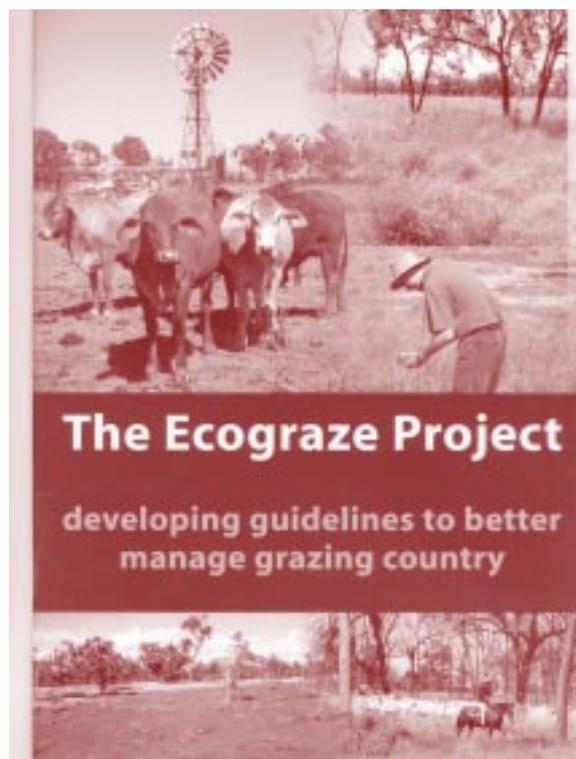
To maintain desirable perennial grasses, the two key principles to emerge from the Ecograz study were conservative stocking with continuous grazing, or a rotational grazing system that includes some wet season spelling. Based on project results, wet season spelling may also provide some opportunity for a modest increase in overall carrying capacity without affecting land condition.

Regardless of the grazing system used, the most important driver of animal production and land condition was the number of stock carried. Calculation of carrying capacity is the first important step in devising grazing strategies to meet production and resource management goals.

For many forest country beef producers, a continuous grazing system with conservative stocking rates may be the most appropriate strategy for their enterprise. The main disadvantage is that uneven animal distribution can lead to selective overgrazing in parts of paddocks that might be lightly stocked overall.

In contrast, rotational grazing systems provide some rest to all areas of the paddock, however such systems require more active management and construction of fences and waters.

Based on Ecograz results, researchers believe fairly



simple rotational grazing systems (three or four paddocks) that have good water distribution and incorporate a wet season rest can achieve healthy pastures and good animal productivity.

(Source: MLA's FEEDBACK journal)

An electronic version of the project's findings will soon be available from CSIRO Sustainable Ecosystems Rangelands and Savannas Program's website. <www.cse.csiro.au> Limited copies of the project book, *The Ecograz Project: developing guidelines to better manage grazing country* are available from: Jeff Corfield, CSIRO Sustainable Ecosystems

Tel: (07) 4753 8551 Email: Jeff.Corfield@csiro.au

Birdlife traced on Top End island refuge

The Birds of Groote Eylandt represents the first scientific book about the birds of the Top End. Written by NT scientist, Dr Richard Noske, it is one of very few Australian books tracing the history of ornithology of a region.

Groote Eylandt, Australia's fourth largest island, is a refuge for birds and other wildlife from introduced livestock, predators and frequent fires that have so altered the natural environment of the mainland.

The book describes the relative

abundance, habitats, movements and regional distribution of each of the 228 bird species that have been reported on Groote Eylandt since 1920.

The vast majority of these birds occur widely across the Top End, including the Darwin region.

As islands tend to support fewer species than the mainland, a section in the book looks in some detail at which species of birds are absent from the island (but present on the mainland) and why.

Publisher: Northern Territory University Press
Available from the NTU Bookshop
Tel: (08) 8946 6497 Fax: (08) 8946 6656
Email: bookshop@ntu.edu.au

For more information about the book, contact the author: Dr Richard Noske
Tel: (08) 8946 6359 Fax: (08) 8946 6712
Email: richard.noske@ntu.edu.au

Tropical plant guide

Betsy Jackes, Head of Tropical Plant Sciences at James Cook University has published a new book on tropical plants. *Plants of the Tropics, Rainforest to Heath: An Identification Guide* is an extensive guide to rainforest and heathland plants of north Queensland. Plants in the book are from the rainforests of Paluma (north of Townsville) and Cairns and the heathlands west of Paluma. Andi Cairns provides a guide to Bryophytes—mosses, liverworts and hornworts of the rainforest.

Available from the James Cook University Bookshop, in both Townsville and Cairns.

T: Tel: (07) 4781 4812 Fax: (07) 4725 1209

Email: bookshop@jcu.edu.au

C: Tel: (07) 4042 1157 Fax: (07) 4042 1158

Email: cairns@bookshop.jcu.edu.au

WA pastoral meeting

THERE was a positive response to a major pastoral industry forum held in Western Australia in May. The two-day conference in Carnarvon was thought to be one of the biggest gatherings in the history of WA's pastoral industry with more than 300 people attending the forum including pastoralists, Aboriginal groups and tourism associations as well as the mining and resources sector. About one-third of the state is held by 548 leases. All pastoral leases in WA expire in 2015 and while guarantees are now in place to roll most over, the forum was held to examine the challenges pastoralists face.

Security of tenure and diversification of activity on leases were issues of central concern. As a result of the forum working groups are to be formed to address issues and make recommendations for future policy.

Landmark mining report

AUSTRALIA'S mining industry needs to establish more equitable and open partnerships with communities, a landmark report has suggested. *Facing the Future* is the Australian regional report of the worldwide Mining, Minerals and Sustainable Development project. It argues that sustainable development requires all stakeholders to participate in defining the role of industry in society, setting goals and priorities and developing solutions to social and environmental problems. The report culminates a 14-month process of consultation involving industry, federal and state governments, research institutions, unions community, environmental, indigenous and human rights groups. <www.ameef.com.au>

Water, water everywhere ...

RECENT research has shown that rare birds are declining in the Outback because of too much water. Melbourne University researcher, Rhidian Harrington, studied the impact of farm dams and other artificial water points on the number and diversity of bird species. Harrington suggests the reason for the decline in rare bird species is mostly due to stock using the water points causing changes in vegetation. Previous research has shown that water sources have led to a concentration of stock in one area leading to overgrazing, soil compact-

Tree clearing: ups and downs for wildlife

NT Parks & Wildlife Commission senior scientist, Dr Owen Price, and NTU PhD student, Brooke Rankmoore, recently found that vegetation clearing in Top End woodlands led to both declines and increases in wildlife, depending on the type of clearing.

The results suggest that some species will be lost completely once the amount of woodland falls below a particular threshold (60% intact for quolls and about 30% intact for many other species) but if clearing is not severe then larger fragments of woodland supported far more medium-sized mammals than did many uncleared woodland sites.

It is thought that this rise in mammal numbers may be due to the more varied mosaic of woodlands, grassland and crops created by moderate intensification, which had also created fire breaks which resulted in long unburnt areas of woodland. What is concerning is that the contrasting low numbers in areas of intact woodland may be a recent decline.

However, the researchers offer some notes of caution. The study was largely confined to common



The endangered northern quoll

species. Rare species may be more vulnerable to fragmentation than more common species because rarity is usually associated with narrow food or habitat requirements. So impacts on wildlife may be more substantial than the study reports.

Also, the relatively short time since the study area became fragmented poses another problem. Species that still occur in the fragments may be lost in the future as the populations reach a new equilibrium.

Guidelines to minimise impacts on biodiversity where clearing is proposed are still being developed.

Contact: Dr Owen Price PWCNT

Tel: (08) 8944 8467 owen.price@nt.gov.au

ion, and destruction of native vegetation that provides habitat for birds. Harrington said that an extra factor could be that the many common birds now thriving around the abundant water points exclude the rare birds through competition. The research was conducted on the 51,000-ha Gluepot Reserve, about 200 km north-east of Adelaide. Gluepot was a grazing property until 1997 when it was bought by Birds Australia. <www.abc.net.au/science/news/enviro/>

Cool communities in hot climes

COOL Communities, an Australian Greenhouse Office Program, provides a chance for local communities to enable householders to take more action to reduce their greenhouse gas emissions. Twenty-four Cool Communities were selected in the first round of applications, including one from the tropical savannas around Darwin. <www.greenhouse.gov.au>

Roos' stomachs a green key?

UNLIKE livestock, kangaroos emit very little methane—so researchers are investigating microbes found in the stomach of kangaroos in a bid to reduce emissions from livestock. The aim is to isolate bacteria found in kangaroos that prevent the production of methane and determine whether they could be used to reduce emissions from sheep and cattle.

The project is being conducted by the DPI Agency for Food and Fibre Sciences researchers, at the Animal Research Institute in Brisbane.

Researchers have already isolated 40 bacteria from the eastern grey kangaroo. Each of these bacteria is being screened to determine which is efficient at digesting Mitchell grass, an important native pasture. Successful bacteria will then be grown in the laboratory and introduced to cattle and sheep using a drench gun. <www.dpi.qld.gov.au>

July

Landcare and Catchment Management Qld State Conference: Innovation in Action 21–24 July, Townsville

Venue: Jupiters Casino and Convention Centre, Townsville

The conference seeks innovative solutions to landcare and catchment management issues, and will focus on hands-on activities under the theme Innovation in Action.
Contact: Arwen Rickert, Program Extension Officer (Landcare/ICM), NRM, Townsville.

Tel: (07) 4799 7303 **Email:** Arwen.Rickert@nrm.qld.gov.au

Web: <www.burdekindrytropics.org.au>

Environment Institute of Australia National Conference 2002

31 July–3 August 2002

Venue: Sheraton Brisbane Hotel & Towers

Features leading Australian and international keynote speakers; training sessions addressing 15 priority issues; post-conference tours; and debate on professional issues of Ethics, Accreditation/Certification and Advocacy.

Tel: (07) 3369 7866 **Email:** emma@orgaus.com.au

Web: <www.eia.asn.au/conference>

Fenner Conference—Agriculture for the Australian Environment 30 July 1 August, Canberra

Venue: Rydges

The Australian Academy of Sciences' Fenner Conference will discuss the options for designing appropriate agricultural systems for Australia's environment. A large part of the conference will involve discussion and workshop activities where landholders, land managers, industry and government representatives and researchers will reflect on their experiences.

Contact: Melissa Sheehan (conference secretariat)

Tel: (02) 6285 3000 **Email:** fenner@con-sol.com

Web: <http://life.csu.edu.au/fenner>

August

Garma Festival of Traditional Culture & Djakamirri Wangawu 'Caring for Country' Forum 13–17 August, Arnhem Land, NT

Venue: Gulkula, Gove Peninsula, NT

The Garma Festival celebrates the cultural inheritance of the Yolngu People of North East Arnhem Land and is open to both indigenous and non-indigenous people. This year's forum is Djakamirri Wangawu ('Caring for country') and will examine issues such as traditional ecological knowledge; and developments in ecotourism.

Email: yyf@bigpond.com.

Web: <www.garma.telstra.com/garma2002_we.htm>

Rural Land-Use Change—Yes!— But will biodiversity be OK? 19–20 August, Melbourne

Venue: Airport Motel & Convention Centre, Melbourne.

Focus is on three main questions: 1. Do we have sufficient information on land-use change; 2. Are we in agreement on what we want in terms of biodiversity in the rural landscape?; 3. What arrangements and mechanisms for biodiversity maintenance show promise for the future?

Contact: Sue Davies **Tel:** (03) 9596 7341

Email: prex@msn.com.au

Quentin Farmar-Bowers **Tel:** (03) 9412 4190

Email: Quentin.Farmar-Bowers@nre.vic.gov.au

September

12th Biennial Australian Rangeland Society Conference

2–5 September, Kalgoorlie-Boulder, WA

Venue: WMC Conference Centre, Kalgoorlie

This year's conference theme, 'Shifting Camp', was chosen to acknowledging that the people of Australia's rangelands are in an extraordinary state of transition. Includes a full day of invited speakers, two days of concurrent sessions and field tours.

Contact: Sarah Nicolson, Conference Secretariat
Intercomm Event Coordination

Postal: 22 Edmund Ave, Unley SA 5061

Tel: (08)8357 3378 **Fax:** (08)8357 3389

Email: nicolson@w130.aone.net.au

Web: <www.austrangesoc.com.au>

Australasian Remote Sensing Conference: 'Images to Information'

2–6 September, Brisbane

Venue: Sheraton Hotel, Brisbane

This conference will draw together remote sensing applications in a wide range of commercial, government and research applications, with the latest developments in image acquisition, distribution and processing.

Contact: Australian Convention & Travel

Postal: GPO Box 2200 Canberra ACT 2601

Tel: (02) 6257 3299 **Fax:** (02) 6257 3299

Email: 11arspc@ausconvservices.com.au

Web: <www.geosp.uq.edu.au/11arspc>

7th Annual National Water Conference 3–5 September Melbourne

Venue: Crown Casino, Melbourne

This year's highlights nine case studies on water planning and demand management; major water infrastructure projects in Queensland and WA, and Sydney's bushfire water crises and risk management.

Contact: Kristin Fan **Tel:** (02) 9005 0798

Email: kristin.fan@terrapinn.com.

Web: <www.utilicon.com.au/utilicon_au_2002>

13th Australian Weeds Conference 8–12 September, Perth

Venue: Sheraton Perth Hotel, WA.

Theme: Weeds: threats now, and forever?

Host: Plant Protection Society of WA Inc.
Contact: Convention Link
Postal: PO Box 257, South Perth, WA 6151
Tel: (08) 9450 1662 **Fax:** (08) 9450 2942
Email: convlink@iinet.net.au
Web: <members.iinet.net.au/~weeds>

3rd International Symposium on the management of *Mimosa pigra* 23–28 September, Darwin

Venue: Northern Territory University
 Held by the Australian Mimosa Management Committee, the aim to share and document advances in managing the weed.
Contact: Maryanne McKaige, Coordinator Centre for Tropical Wetlands Management
Postal: NTU, DARWIN NT 0909
Tel: (08) 8946 6726 **Fax:** (08) 8946 6847
Email: ctwm@ntu.edu.au
Web: <savanna.ntu.edu.au/news/calendar.html>

Australasian Fire Authorities Council (AFAC) Conference 27–29 September, Gold Coast

Venue: Conrad Jupiters on the Gold Coast
Conference Theme: Hunting for Gold—Innovation and Best Practice. The conference brings together fire and emergency service agencies from Australia, New Zealand and Hong Kong.
Contact: Australasian Fire Authorities Council (AFAC) Conference 2002 C/ Intermedia Convention & Event Management
Postal: PO Box 1280 MILTON QLD 4064
Email: afac2002@im.com.au
Web: <www.fire.qld.gov.au/afac>

December

Ecology 2002 Conference 2–6 December, Cairns

Venue: Cairns Convention Centre
 The Ecological Society of Australia (ESA) and

the New Zealand Ecological Society (NZES) are hosting the second joint meeting of its two societies, to be held in conjunction with the 27th annual meeting of the ESA and the 51st annual meeting of the NZES.

Contact: Jill Landsberg **Tel:** (07) 4042 1443
Email: Jill.Landsberg@jcu.edu.au
Web: <www.tesag.jcu.edu.au/ecology2002>

Australasian Wildlife Management Society 2002 conference 9–11 December, Sydney

Venue: University of Sydney, Camden Vet Science Campus (about 30 km west of Sydney).
Web: <www.awms.org/conferences.html>

2003

National Landcare Conference: Respecting Values — Working & Learning Together 28 April–1 May, 2003, Darwin

Venue: To be announced.
 The 2003 National Landcare Conference will provide an opportunity for information sharing, discussion and debate on a range of landcare issues.
Postal: Desliens Conference & Event Management, GPO Box 2455 Darwin NT 0801
Tel: (08) 8941 0388 **Fax:** (08) 8981 8382
Email: dcem@desliens.com.au
Web: <www.landcareconference.nt.gov.au>

MODSIM International Congress on Modelling and Simulation 14–17 July, 2003, Townsville

Venue: Jupiters Hotel and Casino, Townsville
 MODSIM is the biennial conference of the Modelling and Simulation Society of Australia and New Zealand (MSSANZ). **Theme:** Integrative Modelling of Biophysical, Social and Economic Systems for Resource Management Solutions
Contact: Converner David Post
Tel: (07) 4753 8500 **Fax:** (07) 4753 8600
Web: <http://mssanz.cres.anu.edu.au/modsim2003.html> **Email:** David.Post@csiro.au

OUR STAKEHOLDERS



ABORIGINAL COMMUNITIES



PASTORALISM



TOURISM



CONSERVATION



DEFENCE



MINING

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