



SAVANNA LINKS

Cooperative Research Centre for Tropical Savannas Management

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National approach to invasive species

A Senate Committee report on the lamentable state of Australia's pest control management is likely to bring much-needed change.

The report identified weaknesses in the nation's control and management of invasive species; principally the lack of national consistency in legislation to control the trading and planting of invasive plants. See pages 4–7.

Fire unites people on the land

Fires were so extensive in the Top End this year an area the size of Tasmania and Victoria combined was burnt.

But the harsh fire season had the benefit of uniting some of the region's diverse groups of landholders for the first time. Go to pages 8–9.



Mynah irritation



And the Indian mynah bird takes out top honours for Australia's most annoying pest. Take a look at page 13.

Turtles and dugongs

The North Australian Indigenous Land and Sea Management Alliance has signed a \$3.8 million contract with the Commonwealth to develop community-driven approaches to sustainably manage dugong and marine turtles across northern Australia. Turn to page 2.



Photos this page, clockwise from top: Blair Grace, Kathryn Thorburn, Joe Morrison and Chris Cooper.

Locals to have a say in turtle, dugong use

IN November 2004, the North Australian Indigenous Land and Sea Management Alliance (NAILSMA), through the Tropical Savannas CRC, signed a \$3.8 million contract with the Australian Government to develop community-driven approaches to sustainably manage dugong and marine turtles across northern Australia.

The project aims to have Traditional Owners from the Kimberley, Top End of the Northern Territory, southern Gulf of Carpentaria, Cape York and the Torres Strait regions collaborate on and implement bottom-up approaches to managing northern Australia's marine turtle and dugong.

"We want local people to take control and accept responsibility for looking after the dugong and turtle populations they depend on," said Joe Morrison, Coordinator of NAILSMA.

He argues that management of these animals should be based on strong cultural relationships. "Turtle and dugong are totems to many groups and a range of customary activities surround their use and management."

"We are talking about the lives of remote communities. If you are going to limit what people can catch and eat, then you must take responsibility for inevitable impacts on Indigenous nutrition and health, as well as increased impacts on other wildlife species," said Joe. Both the sustainable livelihoods of Indigenous people and biodiversity outcomes will be addressed by the project.

The project's Technical Reference Group will include scientists and government and natural resource management agencies supporting Traditional Owners.

An important part of the project will be to ensure that particular regional research findings are not incorrectly extrapolated across northern Australia—which Joe believes is the case with the National Recreational and Indigenous Fishing Survey and the recent report on dugong hunting in the Torres Strait.

"Unfortunately, we continue to see a retreat to the soft option, with population studies in one part of the dugong's range being extrapolated to other regions in an



Photo: Joe Morrison

The new project aims for community-driven approaches to turtle and dugong management, taking into account cultural relationships

entirely misleading way," he explained. "As well as hunting, it is important to understand impacts of other factors like boat strikes, shark nets, marine debris, poaching for crab bait, and polluted catchments damaging seagrass eaten by the dugong and turtle."

Joe said that NAILSMA recognised that there were places where unsustainable harvesting occurs outside customary practice.

"But NAILSMA takes the view that it's time to get serious about sustainable management. We now have some resources to support and mobilise people who have a real stake in building robust collaborative natural resource management systems."

The NAILSMA Dugong and Marine Turtle Management Project is set to begin in early 2005, and will be conducted as a partnership between Indigenous communities and organisations, scientists, wildlife managers and the Australian Government.

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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 northern 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.

These include pastoralists, conservation managers, Aboriginal land managers, and the tourism and mining industries.

The Centre communicates the outcomes of its research and other knowledge about the savannas to ensure this knowledge can be used effectively by people living and working in Australia's savannas.

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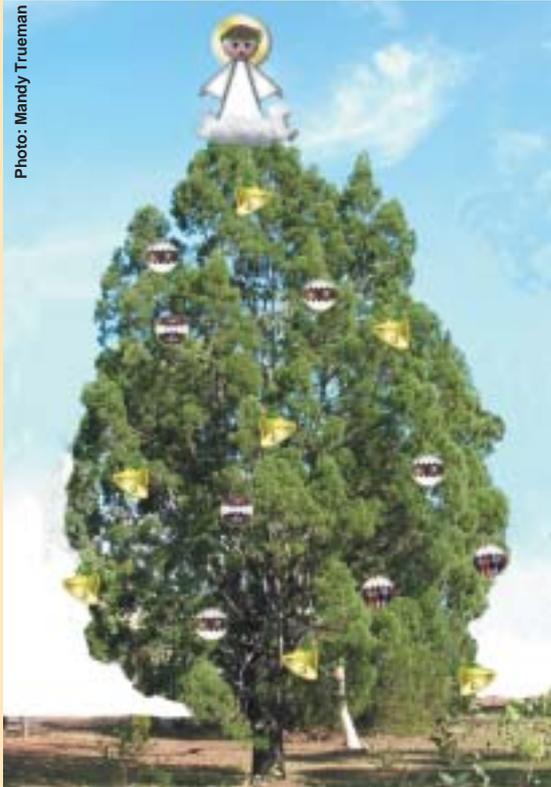
Web: <savanna.cdu.edu.au>

Spot the quoll—before it's too late

WOULD you like to be part of a Quoll Seeker Network? The Northern Savannas branch of the Threatened Species Network is seeking any information about recent northern quoll sightings in the Top End. With the advance of the cane toad, quolls are disappearing fast and it is important to find out where they still survive. It is envisaged that the network will be established early in 2005 to monitor and promote northern quoll conservation in the Top End. All are welcome!

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Photo: Mandy Trueman



Cypress pine (*Callitrus intratropica*)—the northern Christmas tree

Fire threatens North's own Christmas Tree

THE northern cypress pine, the native Christmas tree of northern Australia, is being wiped out by bushfires that have swept through half of Northern Territory's Top End in the past few months.

The northern cypress pine (*Callitrus intratropica*) is particularly vulnerable to hot fires, according to Mark Gardener, a researcher with the Tropical Savannas CRC.

"This tree, unlike local Eucalyptus species, will die when subject to fires that burn 100 per cent of their leaves," he said. "The Cypress pines take at least 10 years to mature and produce seeds, meaning they could easily be wiped out by frequent fires before they reach maturity.

"This could be changing our landscape forever."

Mark said that many of the native plants in northern Australia are likely to be suffering the same fate. For the Arnhem plateau, one of Australia's emerging biodiversity 'hot-spots', this is of particular concern. Almost the entire 35,000 km² Arnhem plateau was burnt this year by wildfires. The unusual weather conditions experienced in the Top End in 2004 have meant even more hot fires during the late dry season, October–November, which are hotter and harder to control.

Turn to page 8 for an account of the latest fire season in the NT.

Water plan raises storm in Kimberley

THE feasibility of supplying Perth with water from the Kimberley is back on the agenda with a new study to investigate the construction of a 3700 km-long canal between the Fitzroy River and Perth. The latest proposal, from contractor Tenix, abandons previous engineering solutions which proposed a dam and pipeline. However, the proposal has still angered the community, Green and Aboriginal groups, who say they were not consulted about the new feasibility study.

Investigations into meeting Perth's growing water demands have taken place for decades, with the latest report into the feasibility of a pipeline released only in September last year. That report, from GHD consultants, found that while piping water from the Kimberley to the south was technically feasible it was highly complex, expensive and likely to cause significant ecological impacts—particularly on the Fitzroy River.

Tenix, however, says that its new proposal, while drawing water from the Fitzroy River, will not involve the construction of any dam or weir. The company also says only 200 gigalitres would be taken from the Fitzroy, the equivalent of 2 per cent of the river's flow.

A spokesman from the company, Liam Bathgate, said that many of the details of the canal's construction are commercial-in-confidence and that the Western Australian Government is currently taking advice on an expert advisory group over the merit of its proposal.

"If we receive a go-ahead from the State Government, we would then undertake a more detailed feasibility study," he said. The company expects the government to report on its findings by mid-year.

Carol Martin, State Labor MP for the Kimberley, said her phone had been running hot with complaints since news of the new study broke.

"I have had nobody walk into my office and say, 'I support this'," she said. "All I've had is a steady stream of people that are really, really angry."

Coordinator of Environs Kimberley Maria Mann said the environmental, social, economic and cultural costs of the canal were prohibitive. The organisation is also sceptical that the rate of water taken from the Fitzroy, if the proposal went ahead, would remain at 200 GL.

Leading water scientist, Professor Peter Cullen of the Wentworth Group, was scathing about the plan to transport water from the Kimberley, predicting water bills rising four or fivefold.

"Instead of sacrificing the iconic Fitzroy River and its biodiversity," said Prof. Cullen, "cities including Perth should get smarter by using storm water or recycling. The first and easiest option is to see whether they can pinch someone else's water," he said.

Tenix: <www.tenix.com.au>

Sustainability review of the Kimberley Pipeline Project, GHD Consultants: <www.watercorporation.com.au/publications/12/Kimberley_Pipeline_Project_Review.pdf>

Draft Kimberley Water Allocation Planning—Outcomes of Scoping Exercise(Overview of stake holder issues), Water and Rivers Commission, October 1999 can be ordered from the Western Australian Water and Rivers Commission: <www.wrc.wa.gov.au>

Environs Kimberley: <www.environskimberley.org.au>

Chronology of irrigated cropping attempts in the Kimberley: <www.environskimberley.org.au/cotton.htm>

New bill to target the weakest link in control of exotics



The water buffalo is just one of many species released in Australia that harm the environment

There are likely to be changes to Australian legislation regulating the control and management of invasive species following the findings of a Senate Committee which were released in December 2004. The report, *Turning back the tide—the invasive species challenge*, identified several glaring weaknesses in the nation's control and management of invasive species; principally the lack of national consistency in legislation to control the trading and planting of invasive plants (see box opposite page).

This lack of a national, coordinated approach was the underlying reason for the failure of strategies such as the Weeds of National Significance (WONS) list and the National Environmental Weeds Alert List. Sale of plants on the WONS list, along with existing Alert List weeds and NAQS target weeds continues despite WONS being declared in 1999 and agreed to in 2001.

The committee's findings and recommendations—drawn up by senators from the Labor, Liberal and Democrat parties—were unanimous. In all there were 27 recommendations covering animal and plant pest species, with the key being the Commonwealth developing a “robust national framework in consultation with state, territory and local governments to control and manage invasive species.”

Key features of this framework would be the development of three standard categories for invasive species. These categories use some existing lists—such as WONS—as a starting point, but depend on a new and expanded list of “invasive species of national importance”.

- 1 **National Quarantine List:** Those species with either a high invasion risk to Australia, or may have already invaded Australia, and whose early detection should enable cost-effective eradication. Starting points, says the report, should be the Northern Australian Quarantine Strategy and the Trigger List of Introduced Marine Pest Species.
- 2 **National Alert List:** Species that have naturalised, have a restricted range or are predicted to have a major impact on the environment or industries. This list also would include garden plants that are yet to escape, and are subject to an early-warning surveillance action.
- 3 **National Control List:** Naturalised and generally widespread species, or those having a major impact on environment and or industry and whose containment or control will assist protected areas of national signifi-

cance. Starting points are the WONS, invasive species listed as a Key Threatening Process under the Environment Protection Biodiversity and Conservation Act (EPBC) and marine pests that are subject to a national action plan.

The national statutory framework would depend on relevant sections of the EPBC Act and development of state legislation consistent with the national statutory framework. The report also recommends agreed Commonwealth–State cost sharing arrangements for both eradication and strategic containment.

Another important feature is the development of a national strategy for vertebrate pests, which is currently lacking altogether.

The committee heard from plant nursery groups, agricultural organisations, environmental groups, Commonwealth, state and territory ministers, with around 76 submissions received. The committee also held four public hearings, in Adelaide, Brisbane and Canberra, where it heard from 54 witnesses. It also held at least one site inspection.

All of the submissions can be viewed online.

Some recommendations also referred directly to the gardening industry, which is the pathway for many exotic plants to escape into Australia. It recommended that the nursery and gardening industry label all invasive plants, including those that can be sold legally but may have invasive characteristics. It also pointed to at least one controversial remedy: a principle of polluter-pays where importers pay for the cost of control and repair should a plant become a weed.

“The national effort to overcome invasive species is only as strong as the weakest link,” says the report, “and control and eradication efforts in one region are quickly undone in other regions which adopt a less aggressive regulatory stance.”

The Committee's report contributes to the Environment Protection and Biodiversity Conservation Amendment (Invasive Species) Bill 2002 [2004], which is currently before Parliament.

Inquiry into the regulation, control and management of invasive species and the Environment Protection and Biodiversity Conservation Amendment (Invasive Species) Bill 2002
<www.aph.gov.au/Senate/committee/ecita_ctte/invasive_species/index.htm>

List of submissions, many of which are available to download or read.
<www.aph.gov.au/Senate/committee/ecita_ctte/invasive_species/submissions/sublist.htm>

Preventative medicine the best for pests

WIPING out weeds before they take off is not rocket science—a stitch in time saves nine. Gaining the resources and political will to stop people selling and spreading some weeds, and to eradicate small weed patches, is usually the difficult part. It is often too late to act by the time a weed has become an obvious problem.

Mimosa (*Mimosa pigra*) now covers a massive area (more than 800 km²) of Top End wetlands, and is spreading rapidly. It could, however, have been eradicated in Australia in 1966 with one additional person. This position was not made available and as a result, millions of dollars are spent each year controlling this weed. Mimosa is here to stay, but there are plenty of other potential weeds that could easily be removed from the NT.

The aquatic weed cabomba (*Cabomba caroliniana*, and also known as fanwort), recently found in the Darwin River, needs to be eradicated quickly. It was introduced as an aquarium plant and has the potential to choke waterways as it out-competes native freshwater plants; it also smells as it stagnates and decays, discolouring and tainting drinking water. If the weed made it into Darwin's main water supply, it would require around \$40 million just to build a water treatment plant. Eradicating the weed downstream from the Darwin River Dam has cost \$500,000 to date.

Like cabomba, lantana (*Lantana camara*) is listed as one of Australia's 20 worst weeds. It is escaping from gardens in the NT, and climate-matching models suggest it could become a big problem. Differences in legislation



Cabomba is an aggressive wetland invader first introduced as an aquarium plant. Recently found in the Darwin River, it has potential to enter the city's main water supply

Photo: Blair Grace

and attitudes between states can make it difficult to prevent weeds spreading into new areas—for example it is still legal to buy lantana in the NT.

Thorny trees are another example of a potentially significant problem in the Territory. Prickly acacia (*Acacia nilotica*) and chinese apple (*Ziziphus mauritiana*) are serious problems in Queensland and mesquite (*Prosopis* spp.) is a major problem in the Pilbara region of Western Australia. Isolated pockets of these weeds in the NT could potentially be wiped out if resources were made available before they become widespread.—Blair Grace

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Eradication festival puts a halt to Devil's claw

A 16-year program to eradicate the noxious weed devil's claw (*Martynia annua*) from Gregory National Park in the Northern Territory is finally paying off. Because the weed had a limited distribution, park rangers decided to go for eradication rather than perpetual control—and came up with the idea of an annual festival to gather together the people they needed.

The most effective and environmentally safe treatment is hand-pulling before seeds are produced, but this is very labour intensive. So, since the early 90s, a group of park rangers, volunteers and local Aboriginal people arrive each year to patrol about 60 km of riverbeds pulling up plants when discovered.

Although numbers fluctuate depending on the weather, in the early 1990s it was common to find around 20,000 plants along the park's three rivers. By 2003 only 300 or so plants were found. In December 2004, 38 people from all over the Northern Territory, including National Park Rangers, the Green Corps, local Aboriginal people and volunteers from all walks of life found only 19 seedlings and three mature plants with seeds.

This wonderful result demonstrates that with long-term commitment and good planning, eradication of weeds with limited distribution is possible. Devil's claw will be



The hooked seeds of Devil's claw which is now almost eradicated from Gregory National Park

deemed eradicated once no plants have been found for five years. And while the focus of the two-week festival is the hard work of eradicating weeds, volunteers are treated to a fun weekend fishing in Timber Creek, meeting the locals, and a big party on the last day.

Contact: Mark Anderson, Senior District Ranger, Gregory National Park, Parks & Wildlife Service of the Northern Territory, Tel: (08) 8975 0888 Email: <mark.anderson@nt.gov.au>

Cattle and fire to limit wetland invader



Research vehicle almost hidden by the extent of the para grass infestation on Townsville's Common. Right, Tony Grice with student Karine Payet, ground-truthing vegetation mapping on one of the Common's trial plots



A new collaborative research project conducted by CSIRO and Queensland Parks and Wildlife Service is trialling a combination of fire and grazing in the hope of controlling an aggressive wetland invader: para grass. *Kate O'Donnell reports.*

Just on the edge of Townsville in north-east Queensland, is the city's Town Common Conservation Park, which 30 years ago was one of the country's most significant seasonal wetlands, home to crowds of water birds such as egrets, herons, ducks and geese. Go down to the Common today however, and you will see that large areas are covered in para grass—one of Australia's most invasive wetland weeds—which has displaced most of the native plant species so that far fewer birds now nest or feed there.

The use of cattle to rehabilitate weed-infested land is of course somewhat ironic—the weed in question was introduced as a ponded pasture in the late 19th century. When it escapes pasture lands, or is left to itself, it rapidly forms a dense monoculture that excludes other species. It is now a common weed in many tropical cane-growing areas, particularly in low-lying ungrazed areas.

Cattle were removed from Townsville's Common in the 1970s when it was made into a conservation park. Cattle are not permitted in Queensland's national parks, but because the Common is managed by QPWS for the Townsville City Council, it is legally possible for the research team to use cattle in this project. By 2005, dense para grass up to 1 metre high extends over most of the wetter areas.

Tony Grice from Townsville's CSIRO Sustainable Ecosystems leads the weed management trial, and estimates there is about 20 tonnes of para grass per hectare. "Other methods of weed control—such as physically removing the grass, or poisoning it—are

impractical with such a large infestation," he says. "In fact, it is highly unlikely that the species can be eradicated, though some degree of control is possible."

Information gathered from the project will be used to develop and promote methods to restore other northern coastal wetlands degraded by para grass—but it's not a method that can be used to control all wetland weeds. However, the results of the work should be relevant to other palatable grasses in wetlands.

Brolgas and magpie geese are the two bird species most affected by para grass but any species that needs wetland habitat and prefers open vegetation will struggle in dense infestations. There are anecdotes that once hundreds of brolgas thrived at the Town Common, but today those numbers have been reduced to perhaps tens.

The project is a joint partnership between CSIRO, Queensland Parks and Wildlife Service and the Burdekin Dry Tropics Board. It is funded by the Natural Heritage Trust through the Burdekin Dry Tropics Board and will involve community groups including Conservation Volunteers, Bird Observers' Club of Australia, the Townsville-Thuringowa Landcare Group, Wetland Care Australia and local Indigenous communities.

Study sites

The study is taking place over 72 hectares of the Common, with 12 experimental plots of 6 hectares each. Trials began in August and will continue for at least the next 18 months. Cattle are removed from the area at the beginning of the wet season, and will be re-introduced when the dry begins.

Treatment trials

The photos at left show views of the different plot treatments: the big question is how quickly will the para grass recover? At this time, the burnt and grazed plot seems to show the most effective reduction of the grass, but the answers to which management is appropriate in the longer term will have to wait until after the wet. “We have massively reduced the grasses’ biomass over the past few months,” said Tony. “It will recover, but it is important to find out which treatment has the most lasting effect on para grass.”

A short history

Para grass was introduced to Australia for use in ponded pastures for cattle in the late 1800s. It thrives in wet swampy areas, growing in water up to a metre deep from which it excludes other species, establishing itself as a dense monoculture. In 2001 the Queensland State Government passed legislation regulating the use of ponded pastures stating that their development should not occur in areas that are tidal, or in or adjacent to natural wetlands, or of high conservation or fish habitat value.

Four types of treatments are being applied across the sites (see pictures opposite page):

- No treatment (leave para grass as it is)
- Control burning, with no grazing
- Control burning and grazing
- Grazing with no burning

Every month since the study began the research team has conducted bird surveys. Mammal sampling has also taken place, and so far rodents, planigales, bandicoots and agile wallabies have all been observed, as well as at least 50 different bird species.

Rehabilitation

But to rehabilitate the Common the diversity of the area’s vegetation needs to improve. The initial survey undertaken during the dry season found fewer than 20 species of plants in the study areas. “We don’t know how diverse the wetland originally was, but it certainly would have been more diverse than this—but what can grow in all that para grass?” asks Tony. “What would once have been here were sedges, which is what you really want to get back for the brologas who eat their bulbs.”

The team is hoping a combination of the grazing and the fire will hold the grass back. A lot of the grass has been taken away in the short term but, says Tony, “you need to inform any management decisions by documenting what happens after removing the cattle.”

More information: Dr Tony Grice, CSIRO SE,
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Burdekin Dry Tropics Web: <www.burdekindrytropics.org>

Photo A

Photos: Kate O’Donnell



Photo A, above, shows the ungrazed plot of para grass on the right standing at about 1 metre high, with a grazed-only plot, standing at only a few centimetres, on the left.

Photo B



Photo B shows the same grazed-only plot on the right, with a grazed and burnt plot at left.

Photo C



Photo C shows the difference between the burned and grazed plot on the right, with para grass that has been burnt only on the left.

Fires were so extensive in the Top End this year an area the size of Tasmania and Victoria combined was burnt. But the harsh fire season united some of the region's diverse landholders for the first time.

Peter Jacklyn talks to Dr Mark Gardener, fire capacity-building officer with the TS-CRC, who worked with the land managers of the Top End.



Photo: Kathryn Thorburn

Fire season brings together landholders

Could you describe this year's Top End fire season?

This fire season was big: more than half of the Top End area was burnt this year. That looks to be the biggest area burnt since records began in 1993. In particular we had three or four very large late-season wildfires in the Arnhem Land Plateau; just those few fires burnt out 30,000 square kilometres. In the Tanami Desert we had an incredible fire of 80,000 square kilometres (see map opposite). If you put all the fires together that we've had in the Northern Territory Top End this year, they've burned out approximately the same area as Victoria and Tasmania combined.

So why were the fires so big this year?

The most obvious reason is that the past two wet seasons have been very good and in 2003 we also had quite a small fire season, so there's been a build-up of fuel. We had a late wet season in 2004 which went to June, which meant that the fuel did not fully dry until the hotter time of year—so the fire season began in June and didn't end until December. We also had some hot days and high winds and so we got these large-scale wildfires.

Were there more people lighting fires?

I don't think so; it's just that perhaps in previous years many ignitions would have gone out, whereas this year they've carried on to something bigger.

What have you been doing with people on the ground to help deal with these large fires?

I've been working with a few different groups on the ground, in particular a group of land managers in the Victoria River District (VRD) which is in the west of the Northern Territory. I've been working with a relatively small number of people who manage very large pieces of land and they're mostly managing it for cattle. However, the VRD also has the second-largest National Park in Australia—Gregory National Park—and several Aboriginal communities and a large military training area as well.

So we've got a diverse range of people! In the past there has been some division between them, but the fires have been so extensive in this region this year that they've realized they have to work together—to plan regionally. After all, you can't always have firebreaks just along property boundaries; you might have to put in a firebreak that goes across three different land tenures.

So collaboration was given a boost by the big fire season?

Definitely. People have talked about better collaboration but until this year when everyone was involved and everyone got burnt, it hadn't happened. In 2004 they all worked together for once: there were Aboriginal rangers, station hands and park rangers all standing next to each other all fighting the fires on all different land tenures. That sort of thing hasn't happened before.

What are the biggest challenges in achieving this collaboration?

It is to have effective coordination from one or two agencies—the key agency there is the Bushfires Council of the NT—so there are sufficient resources to actually implement fire management plans, and to get information to allow people to manage fire better. I guess my role, and that of my colleagues, is to provide the information that these people need to go forward.

What sort of information?

Currently the *North Australian Fire Information* website is proving very helpful—it shows where fires are and where fires have been for that year. But people also want this information in different ways.

For example, they may want to see where fires have been over, say, the last five or 10 years, which helps them plan on their property and with their neighbours, by indicating the most likely places that a fire is going to start. Also we teach people to use computer-based mapping tools so they can map their own private information—such as infrastructure, roads, tracks, grass-fuel loads—with the publicly available fire locations.

Cont. p. 9

As the fire map illustrates, last year saw the greatest amount of fires in the Top End since records began in 1993. Just three or four late-season wildfires burnt out 30,000 square kilometres in the Arnhem Land Plateau, and in the Tanami Desert fires burnt out 80,000 square kilometres.

- 1. Yarralin fire (12 Aug - 4 Nov)
- 2. Muckaty fire (12 Aug - 4 Nov)
- 3. Karantjipa fire (6 Oct - 4 Nov)
- 4. Humbert fire (22 - 29 Oct)
- 5. GNP fire (29 Oct)
- 6. Powell Creek fire1 (19 Sep - 6 Oct)
- 7. Central Desert fire (12 Aug - 6 Oct)
- 8. Powell Creek fire2 (29 Oct - 4 Nov)
- Early Fires (5 Apr - 11 Aug)
- Misc. Late Fires (12 Aug - 4 Nov)

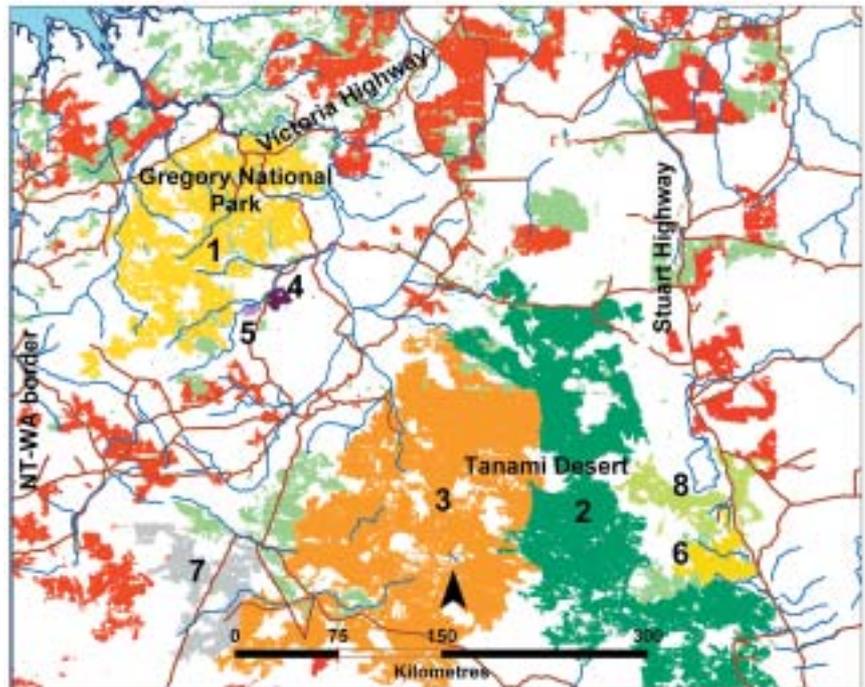


Image generated from the North Australian Fire Information website

Cont. from p. 8

What has been the problem with particular groups talking to each other in the past?

The three main groups are Aboriginal people, pastoralists and National Park staff. In the past there's been something of a 'blame game' with Aboriginal people in particular blamed for lighting a lot of fires. But the interesting thing about recent meetings with pastoralists is that people acknowledge this, but then they decide to move on. They felt it was far better to get Aboriginal people involved and let them sort it out themselves. So pastoralists are looking at including a lot more Aboriginal people in fire planning. The other animosity is between National Park staff and pastoralists, but again both seem to have come to a mutual understanding of the need to work together.

When you say "trying to help Aboriginal communities help themselves"—how does that work?

It's involving local people, figuring out who are the key

people who have the capacity and the desire to be involved and then supporting those people through training, employment, and including them in decisions. There's the hope that there will be self-regulation among Aboriginal people.

So is there a danger that if the cycle goes back again and we get less destructive fires, that the incentive for cooperation will drop off again?

I can imagine that it would go through that cycle—people might say 'OK we've sorted this out' and so some funding and effort would be withdrawn and then we would get another big destructive wildfire season.

North Australian Fire Information: <www.firenorth.org.au>

Mark is part of the Natural Heritage Trust funded North Australian Fire Knowledge Project with officers in Qld, NT and WA. He is leaving the TS-CRC to start a job as senior plant ecologist at Earth Water and Life Sciences, an environmental consulting firm based in Darwin.

Rangeland fire regimes risk sustainability

THE TS-CRC's latest fire report, *Fire management in the rangelands*, reviews practices and regimes in these areas. Commissioned by the Australian Department of Environment and Heritage under the Natural Heritage Trust, the report contains a checklist for fire management plans, with links to a range of information.

Fire is an integral part of the ecosystems of Australia's rangelands, and its management is one of few tools available to land managers in this zone. Sustainable pasture production is dependent on maintaining soils and pastures through sound fire management.

Some elements of rangeland ecosystems are resilient to variations in fire regime, others are sensitive to fire intensity and/or sensitive to fire intervals—so no single fire regime applied at landscape scales can meet the needs of multiple land management objectives.

While there is relatively low level of disturbance in Australia's rangelands compared to the intensive agricultural areas of eastern, southern and south-western Australia, the abundance and richness of biodiversity is declining. There is evidence that inappropriate fire regimes are partly responsible.

The report includes definitions of terms and concepts; descriptions of the major vegetation types within the rangelands followed by a list of key references; communication principles and planning priorities; a list of sources of information, i.e. fire species attributes, and fire and land use mapping resources and links to other resources. Download the report as a free PDF from the CRC website, or contact the CRC for a hardcopy.

Web: <savanna.cdu.edu.au/publications/books_reports/fire_management.html>
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 Email: <peter.jacklyn@cdu.edu.au>

Expedition checks out river health

Field trials are showing that the CRC's Tropical Rapid Appraisal of Riverbank Condition is proving to be user-friendly for the non-expert—a key element if the method is to be worthwhile for savanna managers throughout the north.



Volunteers of the Australian Geographic Scientific Expedition at the Douglas–Daly

Trials of a user-friendly method to assess habitats alongside rivers, waterholes and streams—also known as riparian zones—took place in the Douglas–Daly Region in September. However, the research team had the good fortune to conduct their trials with a large volunteer team from the Australian Geographic Society who were conducting their own ‘Top End’ Scientific Expedition.

Ian Dixon (Charles Darwin University) and Rodney Metcalfe (NT DIPE – Water Monitoring Branch) trained 15 expedition volunteers and staff in how to perform the Tropical Rapid Appraisal of Riverbank Condition (TRARC) (see *Savanna Links* Issue 28, p. 4). The TRARC is used to score indicators of condition in the riparian zone, such as vegetation cover, woody debris, weediness, regeneration and disturbance.

The group spent two days assessing the condition of five sites along the Douglas River.

“Each participant independently assessed each site and results were compared to identify if similar results were collected—that is, we wanted to determine the amount of variability between users of the TRARC,” explained Ian Dixon.

The results collected by the volunteers were also compared to those collected by Ian and Rodney to determine whether trained non-experts could collect accurate data. “We were pleased to find that the Expedition team quickly became efficient users of the TRARC and collected very similar results to those of the ‘professionals’”, said Ian.

Modifications to TRARC

There were some shortfalls in collecting data, and Ian and Rodney have now identified ways to improve the appraisal method to make it easier to use and to ensure different users get more consistent results.

“With minimal training, non-experts can competently use the TRARC as an effective assessment and monitoring tool,” said Ian.

Further development and trialling of the TRARC will continue across the savannas over the next two years. A workshop is proposed for early 2005 to further develop

the methods to suit the vastly different biogeographic regions that comprise northern Australia’s savannas. Future field-training workshops will be held with potential users of TRARC, such as pastoralists, and conservation and Indigenous land managers. Finally, a plain-language manual will be published for land managers.

It is anticipated that TRARC will become the standard method for assessing the condition of the riverbanks, streams and waterholes across northern Australia.

Australian Geographic Society Expedition

Other science projects that were part of the Australian Geographic Society Expedition included ecological studies of fresh and salt water crocodiles, wallaby and crocodile interactions, the Australian Bustard, pig-nosed turtle, northern long-necked turtles, and mammals. Articles on the expedition will appear in the Journal’s next issue.

Australian Geographic Society Journal
<www.australiangeographic.com.au>

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Email: <ian.dixon@cdu.edu.au>
Michael Douglas, Charles Darwin University, Tel: (08) 8946 7261
Email: <michael.douglas@cdu.edu.au>



Exposed ground—such as on this bank—can lead to erosion

The riparian zone varied in condition along the Douglas River. These photos show the range of disturbances seen: Bottom of opposite page: exposed ground can lead to erosion; This page, top to bottom: Undisturbed area with native vegetation and some fallen logs; Fire can kill sensitive vegetation; Weeds can smother seedlings and prevent native regeneration.



Photos by Ian Dixon and Rodney Metcalfe



Landmark ILUAs settle title claims over tropical north

AUSTRALIA'S largest beef producer, Australian Agricultural Company (AACo) and the Waluwarra/Georgina River people signed a landmark Indigenous Land Use Agreements (ILUA) in October 2004, settling access and traditional activities on AACo's north-western Queensland property, 'Headingly'.

Representatives of both groups met at Marmanya Waterhole near Urandangie, 320 km south-west of Mount Isa, to sign an MoU acknowledging the Waluwarra/ Georgina River People as the traditional owners of the area. The MoU provides for protection of the Waluwarra/ Georgina River people's significant sites on the pastoral land and their access to country to pass on culture to younger generations.

■ IN Cape York, four similar ILUAs have led to the Federal Court recognising native title over an additional 1.227 million hectares of the Wik and Wik-Way people's traditional lands in western Cape York.

It is the first time in Queensland that native title has been recognised as continuing to co-exist with privately held pastoral leases.

ILUAs outline mutual undertakings in relation to the use and access of the agreement area. They include use of fire; duration and location of access and use; use of vehicles; and Aboriginal objects and cultural heritage.

■ IN Western Australia, the Yungngora Ngaanyatjarra Lands people have come a step closer to achieving native title recognition, with the State Government's announcement of support for their native title agreements in December 2004.

The Ngaanyatjarra Lands Native Title Claim covers 187,641 square km in the Central Desert.

National Native Title Tribunal
<www.nntt.gov.au>

Join the AussieGRASS Club

AussieGRASS is a spatial modelling framework which estimates pasture growth, total standing dry matter and fire risk and how it rates on an historical basis. To help launch AussieGRASS in the NT, the Territory's Department of Business, Industry and Resource Development Pastoral Production team has started the AussieGRASS club. Members of the club will have free access to all the AussieGRASS tools until April 2005 as well as any assistance to help interpret and utilise the information. Joining is free if you are prepared to answer a survey about the usefulness of the tools at the end of the project. Contact AussieGRASS representatives at the Katherine Research Station: Robyn Cowley Tel: (08) 8973 9750; Trudi Oxley Tel: (08) 8973 9763

Queensland bird areas

TWELVE locations in north Queensland were recently identified as internationally important areas for birds by the conservation group Birds Australia. IBAs—Important Bird Areas—are an attempt to encourage private landholders and government agencies to get involved in conservation of priority areas that hold threatened birds or a lot of birds.

The first 12 Australian IBAs are all in north Queensland and include cattle grazing properties and rainforests in north-east Queensland, the only home to the endangered golden-shouldered parrot.

Go to: <www.abc.net.au/science/news/enviro/EnviroRepublish_1219175.htm>

Threatened species' info online

A NEW online database for community and industry groups provides key information on threatened plants, animals and ecological communities. The Species Profile and Threats (SPRAT) database, is available on the Department of Environment and Heritage website, and aims to help people make informed decisions on conservation activities for threatened species under the EPBC Act.

SPRAT provides a profile of what a species looks like, where it is found, what it likes to eat, where it likes to live, how it moves about the environment and breeds and its protected status under the Act. The database also provides an image of each plant and animal. Information is available on threatened frogs, reptiles, fresh-



Rangers meet for hands-on weed work

ABORIGINAL rangers from Wooliana, Acacia Gap, Timber Creek, Wadeye, Wudikapildiyerr, Gunbalanya and Peppimenarti in the Top End gathered recently for a three-day weed workshop on the Daly River. Representatives from the Natural Heritage Trust, the Indigenous Land Corporation, Tropical Savannas CRC, Northern Land Council, NT Dept. Infrastructure, Planning and Environment Weeds Branch, Bushfires Council and Batchelor Institute also attended the workshop.

Hosted by Albert Myoung and the Malak Malak people from Wooliana Community, the workshop's aim was to bring together Aboriginal Ranger groups in the Top End, particularly those working as part of the Top End Aboriginal Land Management and Employment Strategy, with other agencies working on Aboriginal weed management so that knowledge could be shared.

A major benefit was that the Aboriginal rangers got a chance to talk to each other and share stories. People at the workshop also developed a plan to manage the weeds at the Brown's Creek (Diggireyett) campground and then put it into practice. As part of the plan, the overall situation in the 4 hectare campground was assessed (i.e. how weeds interacted with the land), weed priorities identified, methods for action determined and future monitoring discussed.

Andrew Calma, an experienced senior ranger from Acacia Gap Land Management Team, gave a talk on the progress of contract work controlling mimosa on the Adelaide River. A field trip on the final day was to the nearby Shark Swamp and Red Lily to see the work that the Malak Malak Land Management Team had done to reduce the extent and density of mimosa.

In addition, talks were given on the importance of early intervention when a new weed is discovered, definitions of a weed and legal obligations under the Weeds Management Act (2001), current and future opportunities in land management. — Mark Gardener, TS—CRC.

water fish, marine mammals including whales and 12 plants groups.

Go to: <www.deh.gov.au/sprat>

Prickly acacia bartop

THE small outback Queensland town of Muttaborra, north of Longreach, has recently installed a new timber bar made out of prickly acacia. The new bar was part of a project by

researchers at the Dept. Primary Industries & Fisheries, funded by the Natural Heritage Trust in collaboration with the Upper Thomson Landcare Group (UTLG).

The UTLG undertook a preliminary investigation into the processing and use of prickly acacia timber. Prickly acacia is a declared weed of national significance.

Top 100 countdown: world pests take a bow

SCIENTISTS have identified the world's 100 most destructive invasive species, in a new release compiled by the World Conservation Union (IUCN). Number One in the *One Hundred of the World's Worst Species*, is the Nile perch, which has contributed to the extinction of more than 200 endemic fish species in Africa by eating not only their food but also the fish themselves. The top 10 are:

1. Nile perch
2. Water hyacinth (native to South America)
3. Caulerpa seaweed (introduced accidentally to the Mediterranean around 1984)
4. Crazy ant (caused environmental damage from Hawaii to the Seychelles and Zanzibar)
5. Small Indian mongoose (introduced to Mauritius, Fiji, the West Indies and Hawaii to control rats but has caused extinction of birds, reptiles and amphibians)
6. Feral pig (it damages crops, stock, native fauna and property and transmits many diseases)
7. Dutch elm disease (deadly fungus, spread by the elm bark beetle)
8. Grey squirrel (devastated Britain's native population of red squirrels)
9. Japanese knotweed (introduced from Asia to Europe in the mid-19th century)
10. Giant African snail (has attacked more than 500 known different kinds of plants in the islands of the

Pacific and Indian oceans and parts of South America). Go to news.independent.co.uk/world/environment/story.jsp?story=585082 (from *Environment in the News*, 22 November 2004)

Mynah irks suburban Aussies



ON the local front, a recent ABC survey found that Australians most abhorred the Indian mynah bird. The bird took out the national broadcaster's Pest of the Year Award, beating some pretty worthy contenders including the cane toad and feral cat. The survey was the result of 4300 contributions from pest watchers Australia-wide. To read more, go to the ABC Wildwatch website, where you can also read about and contribute stories on local animals (and pests) in your region.

www.abc.net.au/wildwatch/

Memory goes digital

A NEW project is using digital technology to strengthen local Indigenous languages, cultures and environments in northern Australia. The Indigenous Knowledge and Resource Management in Northern Australia is a three-year project funded by an Australian Research Council grant until 2006.

"For the past year we have been researching the use of digital technologies to keep local languages and knowledge systems strong with a focus on resource management," Project Coordinator and Lecturer, Dr Michael Christie, explained.

Coordinated by Charles Darwin University's School of Australian Indigenous Knowledge Systems, the project's research is focused in two areas: An audit of databases which represent Indigenous knowledge in Australia's Top End; and development of digital systems that support Indigenous people building collective memory.

The project is working with a range of Indigenous groups and people including Larrakia, Garma Cultural

Studies Institute, West Arnhem landers and others.

Research partners are the Northern Land Council, including Northern Australian Indigenous Land Sea Management Alliance, the NT Department of Infrastructure Planning and Environment and the Yothu Yindi Foundation including the Garma Cultural Studies Institute.

Go to: www.cdu.edu.au/centres/ik/

Indigenous tourism researcher

JOC Schmiechen has been appointed Senior Research Fellow in Indigenous Tourism. He will be based in Alice Springs, beginning early in 2005, during a three-year appointment supported by the Sustainable Tourism CRC, Desert Knowledge CRC, Tropical Savannas CRC and the Northern Territory Tourist Commission. Joc's main role is to coordinate research in Indigenous tourism to better meet the needs of key stakeholders, Indigenous communities and individuals engaging in and seeking to embark on tourism ventures and relevant tourism market—industry bodies.

A major aim will be to communicate and engage research with the various aspects of Indigenous tourism and develop suitable business applications compatible with stakeholder priorities.

Illegal fishing forum

THE countries bordering the Arafura and Timor Seas have established an Expert Forum (ATSEF), which is planning ways to improve the management of the region, alleviate poverty and provide sustainable development. Illegal, unreported and unregulated fishing is increasing the number of endangered species in the Arafura and Timor Seas.

The Forum's National Secretariats met in Townsville in November 2004 to coordinate a management and research agenda.

ATSEF National Secretariat and Regional Coordinator Dr Merrilyn Wasson said progress made in two years has so impressed the United Nations that it has given the region "International Waters" status which brings with it funding to continue the work for a further 10 years.

Landholders and tour operators key to tourism success

THE relationship between landholders and tour operators form an important element of successful tourism in the Kimberley—the majority of tours take place on the vast pastoral stations of the region, access to which is given by the landholders. Landholders are also the principal suppliers of facilities and services.

New research by the CRC shows that this relationship is still in pretty good shape—despite tour operator concerns over recent years that access to properties had decreased.

A new CRC report, *The relationship between landholders and tour operators*, does find however, that there were notable changes between 1997 and 2004.

While access to some areas and services/facilities were lost, new sites, services and facilities became available on properties.

According to the report, tours to some pastoral leases ended for a number of reasons including a re-focus on grazing, destruction of facilities by flood, changes in ownership, and



A permanent tourist camp at the Indigenous community of Iminji. Communities like these receive indirect income from tourism by sub-leasing infrastructure.

concerns over liability and associated insurance. There was also evidence that some tour businesses and their tour guides may not fully appreciate the land tenure situation in the north Kimberley nor understand the conditions and responsibilities under which landholders operate—including lease conditions and the realities of running a pastoral

enterprise in a remote and variable environment.

Download free: <savanna.cdu.edu.au/publications/books_reports/tourism_reports.html>

Limited hardcopies available, contact Romy Greiner or Silva Larsen, CSIRO Sustainable Ecosystems

Emails: <romy.greiner@csiro.au> or <silva.larsen@csiro.au>

Tropical rivers audit

Australia's Tropical Rivers—Data Audit was commissioned by Land & Water Australia to provide an assessment of all catchments draining into the Gulf of Capentaria and the Timor Sea, as well as the east flowing rivers north of Cairns. The report is a compendium of information for the region to allow users a quick appreciation of the environment. It includes 24 full-colour maps including fire scar history, soil classification, land tenure, river gauging stations, annual climate data, groundwater flow systems, threatened species, and estuary conditions. The report is being used to determine research priorities for Australia's northern rivers systems.

<www.lwa.gov.au/downloads/publications_pdf/PR040674.pdf> or order from Canprint Communications on 1800 776616 by quoting product code PR040674. (from *Innovate Australia*)

Preparing for drought

Pasture Degradation and Recovery in Australia's Rangelands: Learning from History combines science, history and economics, as well as graziers' experiences to create a

detailed 'map' of the eight great drought and degradation episodes of Australia over the past 100 years. Author Dr Greg McKeon says the book provides a battle plan to prepare Australia for the next drought in the rangelands—an event as inevitable as the floods that will follow. The report explains that livestock grazing uses 40 per cent of Australia and how much of it has been affected by historical degradation episodes. It also details the extent of recovery and the importance of wet years to the resilience of Australia's rangelands.

Free; Contact: Dr Greg McKeon, Qld Dept Natural Resources, Mines & Energy

Tel: (07) 3896 9548

Email: <Greg.McKeon@nrme.qld.gov.au> (from *Natural State*, Issue 2, Sept. 2004)

Holistic approaches

In Search of Sustainability, edited by Jenny Goldie, Bob Douglas, Bryan Furnass, takes a holistic approach to sustainability, addressing environmental, economic and social issues. Key issues discussed include human health, water resources, land use and natural ecosystems, energy, equity and peace, economic systems, climate

change, labour forces and work, urban design and transport and population.

Publisher: CSIRO Publishing

ISBN: 0643090622 Price: \$29.95

Indigenous knowledge

Working with Indigenous Knowledge in Natural Resource Management provides guidelines, processes and protocols for government regional bodies to work effectively with Indigenous knowledge in regional natural resource management. The report outlines issues involved in supporting Indigenous knowledge, a framework of principles for engagement with Indigenous people, and recommendations to improve regional body processes.

Free: <www.deh.gov.au/indigenous/publications/recommendations.html>

Sustainable tourism

Steps to Sustainable Tourism is designed for tour operators, heritage and environment managers, community groups and others with an interest in places, regions and associated tourism products.

<www.deh.gov.au/heritage/publications/sustainable-tourism/index.html>

February

2005 Council for Australian University Tourism and Hospitality Education Conference: Sharing Tourism Knowledge

1–5 February, Alice Springs, NT

Venue: Alice Springs Convention Centre

Conference aims are to promote the development of tourism and hospitality education and research while providing a stimulating environment to enable the exchange of information, ideas and networking opportunities amongst academics, student researchers, and interested industry organisations and bodies.

Contact: Treasure Gordon, Desliens Conference and Event Management

Postal: GPO Box 2455, Darwin NT 0801

Tel: (08) 8941 0388 **Fax:** (08) 8981 8382

Email: <dcem@desliens.com.au>

Web: <www.cdu.edu.au/cauthe2005/>

Advancing Science and Society Interactions

3–5 February, Seville, Spain

This international conference aims to provide a forum where information on community-based research, carried out in both community and academic settings, can be shared and developed. It will reflect the social impact and scientific and democratic value of research from a range of disciplines including social, natural, physical and technological sciences. Conference themes include the impact of communities on the research and policy agenda and citizen participation in research and policy making.

Contact: Conference Secretariat

Email: conference@paxmediterranea.com

Web: www.cienciaysociedadsevillla.org

Transformations—Culture and the Environment in Human Development

7–9 February, Canberra, ACT

Venue: Australian National University

Looking at global and local trends in cultural diversity and sustainable development, this international forum will consider theory and principles with the goal of developing practical outcomes on ways to integrate culture in planning at all level. The forum will debate contemporary conceptual frameworks, analyse the Universal Declaration on Cultural Diversity and Human Development Report 2004 and explore how they can be implemented at the policy and program levels and develop practical strategic directions at workshops.

Contact: Conference Secretariat

Tel: 02 6282 5755 **Email:** <transformations@fecca.org.au>

Web: <www.fecca.org.au/Transformations.html>

The International Conference on Environmental, Cultural, Economic and Social Sustainability

25–27 February, Hawaii

Venue: East–West Center, Island of Oahu, Hawai'i

This conference aims to develop an holistic view of sustainability, in which environmental, cultural and

economic issues are inseparably interlinked. It will work in a multidisciplinary way, across the diverse fields and taking varied perspectives in order to address the fundamentals of sustainability.

Registration, Program & General Enquiries:

Postal: PO Box K481, Haymarket NSW 2000 Australia

Tel: 02 9519 0303 **Fax:** 02 9519 2203

Publication, Journal and Referee Enquiries

Postal: PO Box 463, Altona Victoria 3018 Australia

Tel: 03 9398 8000 **Fax:** 03 9398 8088

Email: <info@commongroundconferences.com>

Web: <www.SustainabilityConference.com>

June

11th International Symposium on Society and Resource Management (ISSRM)

16–19 June, Östersund, Sweden

Theme: From Knowledge to Management—Balancing Resource Extraction, Protection and Experiences

ISSRM 2005 will focus on the social and cultural dimensions of natural resource issues and their importance to natural resource decision makers and managers. The symposium aims to provide an opportunity for social scientists worldwide to present research relevant to natural resource use. ISSRM is the official meeting of the International Association for Society & Natural Resources.

Contact: ISSRM 2005 ETOUR, **Postal:** Mid Sweden University, SE 831 25, Östersund

Email: <issrm2005@etour.se> **Web:** <www.issrm2005.com>

8th Queensland Weed Symposium

19–22 June, Charters Towers/ Ayr, Qld

Venue: To be announced

The symposium will cover the latest innovations in weed management, weed information, rural and urban initiatives and how state and national weed policies and initiatives affect land managers.

Contact: Shane Campbell, Tropical Weeds Research Centre **Postal:** PO Box 187 Charters Towers, QLD 4820

Email: <shane.campbell@nrm.qld.gov.au>

Web: <www.wsq.org.au>

July

North Australian Remote Sensing and GIS Forum (NARGIS) Conference—Applications in Tropical Spatial Science

4–7 July, Darwin, NT

Venue: Charles Darwin University

NARGIS 05 aims to review what has gone before, discuss current research and applications, and to come up with a set of future directions for spatial sciences in northern Australia. The conference is for all people using spatial information residing or working in the tropics including.

Contact: Dr Diane Pearson, GIS and Remote Sensing Group, **Postal:** Charles Darwin University, Darwin NT 0909

Tel: (08) 8946 6046 **Fax:** (08) 8946 7088

Email: <diane.pearson@cdu.edu.au>

or The Best Conference and Events Company
Postal: GPO Box 2541 Darwin NT 0801
Tel: (08) 8981 1875 **Fax:** (08) 8941 1639
Email: <thebest@norgate.com.au>
Web: <www.nargis05.cdu.edu.au>

August

2005 Queensland Landcare & Catchment Management Conference and Awards 4–7 August, Barcaldine, Queensland

The Queensland Landcare conference will attract landholders and managers, Landcare workers, local and state agencies, as well as members of the community interested in natural resource management.

Contact: Louise Field, Desert Uplands Build-up & Development Strategy Committee
Tel: (07) 4651 1002 **Fax:** (07) 47651 1001
Email: <louise.field@desertuplands.org.au>
Web: <www.desertuplands.org.au>

International Conference on Engaging Communities 14–17 August, Brisbane, Queensland

Venue: Brisbane Convention Centre.

This UN/Queensland Government conference will explore engagement practices from across the globe and the role of participation in good governance for clients, citizens and communities.

Contact: OzAccom Conference Services
Postal: PO Box 104 RBH Post Office Queensland 4029 **Tel:** (07) 3854 1611 **Fax:** (07) 3854 1507
Email: <info@engagingcommunities2005.org>
Web: <www.engagingcommunities2005.org>

September

8th International Conference on Ecology & Management of Alien Plant Invasions 5–10 September, Poland

Venue: Faculty of Biology and Environmental Protection, University of Silesia, Katowice

General themes include ecological impacts and dispersion, distribution and dynamic tendencies of invasive alien plants; predicting and detecting invasions with geomatic tools and legislation, international cooperation and management.

Contact: Dr Barbara Tokarska-Guzik, Department of Plant Sytematics, Faculty of Biology and Environmental Protection, Uni. Silesia, Jagiellonska 28, 40-032 Katowice, Poland
Email: <tokarska@us.edu.pl>
Web: <www.emapi.us.edu.pl/>

November

Hope 2005 World Summit on Environment November 3–5, Mumbai, India

Venue: Taj President Hotel, Mumbai, India

Conference sessions include practical tools to monitor environmental performance; environmental geo-technology; waste recovery/minimization processes; development of sustainability indicators and environmental impact assessment.

Tel: 0091-22-23453253 **Fax:** 0091-22-23421416
Email: <admin@internationalconference2005.com>
Web: <internationalconference2005.com/hope2005/india/environment/environment.html>

December

7th Invertebrate Biodiversity and Conservation Conference December 4–9, Canberra

Venue: Australian National University

The Conference will bring together researchers from a range of disciplines to discuss research in entomology, invertebrate biodiversity and conservation of invertebrates, and systematics.

Contact: Sally Brown Conference Connections
Postal: PO Box 108 Kenmore, QLD 4069 Australia
Tel: (07) 3201 2808 **Fax:** (07) 3201 2809
Email: <sally.brown@uq.net.au>
Web: <www.invertebrates2005.com/>

OUR STAKEHOLDERS



ABORIGINAL COMMUNITIES



PASTORALISM



TOURISM



CONSERVATION



DEFENCE



MINING

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