

Forest Matters



Rainforest CRC Newsletter

june 2003

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Front Cover Photographs

*Top: An elusive but interesting seed disperser, the superb fruit dove (*Ptilinopus superbus*), feeding on ivory basswood (*Polyscias australiana*) (photo: Andrew Dennis). Story on Page 10.*

Bottom: Trinity Anglican School Year 12 student, Mark Leitner, gets his hands dirty preparing to defend the Cairns Garden Show Schoolyard Blitz Title (photo courtesy of Cairns Post). Story on Page 16.



From the Chief Executive Officer



Rainforest CRC Chief Executive Officer Nigel Stork has a twin vision for the organisation. The Canopy Crane has created opportunities for previously impossible canopy level research and a specialised tropical rainforest research institution with a commercial focus has won Queensland Government Smart State support. In this extract from the Radio National program *In Conversation* Professor Stork tells Peter Pockley the Daintree Wet Tropics rainforest just north of Cairns is the greatest biological hotspot in Australia.

Chief Executive Officer: Professor Nigel Stork

Peter Pockley: Nigel Stork why did you choose this particular patch of rainforest to erect this canopy crane, we can actually here the motor in the background.

Nigel Stork: It has the greatest diversity of species, but it could well be argued that it is the greatest biological hotspot on earth of plants. Not because of the number of species but because the number of families of the primitive flowering plants. There are 19 families of primitive flowering plants in the world, 12 of them are found here and two of those are only found here, where we are standing. You compare that to the Amazon basin which has nine of those families, but none of those are only found there. So this place is more important than the Amazon when it comes to these primitive plants and that is actually quite important. A lot of botanists come here. If we are to understand the evolution of plants as a whole, we need to get to grips with some of these very primitive flowering plants. So the reason we put our crane in this particular site, dates back to thirty or fifty million years ago. Almost all of Australia was covered with some form of Rainforest, going from cool right through to tropical rainforest, but as the continent of Australia moved northwards and became cooler and drier our forests have shrunk down to little patches on the East coast. One around the Daintree, and the other around Mission Beach area and also on the tops of mountains. So we have about 30 little patches on the tops of those mountains. Right in this small band, between Townsville and Cooktown. About 400km long and at the maximum about 50 km wide. We are talking about 10 000 sqkm that's all.

PP: It is only about 1 or 2 per cent of Australia's total landmass.

NS: Oh it is less than that. I think it's about .2 per cent of the Australian landmass.

So we put the crane here because what we wanted to do was to be in one of those real hotspots, a place where it had been a refugium in that last ice age. A place where plants retracted to because the conditions stayed the same the way that it had been previously and of course what we have seen is all those species have expanded out again to cover what we currently have. I also wanted to have a site that hadn't been logged in any way and we looked and found a number of patches. This one was ideal because there was actually a natural tree gap. You could look through it and say that's where my cranes' going to go. We had an extraordinary process where we put a very narrow track through. A little digger could come in, dig a few holes to put some base patches for concrete and then we lowered every bit of the crane down through it by one of these Russian helicopters that requires two pilots. So over forty lifts, about 100 tonnes of concrete and steel were moved with this huge jib going over the top. Quite an extraordinary feat and it was all done in a day and half.

PP: Now the Daintree is very famous in Australia, because of the site of one of the most prolonged and bitter disputes about preservation of Australian rainforests and other environmental concerns that's now a World Heritage Area but we are not in the World Heritage Area are we? We are just on the edge of it. Why is that?

NS: We are actually situated on land we leased from a resort here because it was the most accessible. There are little patches of forest on the edge in that lowland that still have enormous conservation value that are under private ownership.

The Crane was funded by an Australian Research Council grant. There were funds then from the three partner institutions,

James Cook University, Griffith University and the University of Queensland. This is a shared facility owned by those universities. That partnership has been one of the great strengths of this crane. We have increasing numbers of people from overseas doing exciting and interesting things. We want them to replicate the kind of projects they are doing in other parts of the world here. It makes this place something really significant globally in terms of research, it is really putting us on the map. The first crane was put up by the Smithsonian Institution. It created a huge amount of interest from researchers from around the world. There are now a dozen cranes around the world. One in Switzerland is entirely given over to increased carbon dioxide experiments. They are actually pumping carbon dioxide throughout the forest to see what happens to it as you enrich it with higher levels of carbon dioxide - the sort of levels we can expect to see in the next 20 to 30 years because of climate change. What we want to know is how that effects the growth of those plants? How it effects the biodiversity that lives with that?

PP: Climate change. You have introduced a very major global topic, a matter of great environmental, political and social concern. How is the work going on here linking to the studies and the debates about global warming.

NS: I guess one of the real problems of climate change research is a focus on isolated factors. We need to link the research of physical factors and the impact of those changes on biological diversity? Are we going to find that some species, because their environments have changed, are going to disappear from those environments. Are we going to find that there are changed abundancies of some particular species because of that raised carbon dioxide level? Some quite interesting experiments have been going



on looking at the effect of raised carbon dioxide levels on the herbivorous insects, the one's that eat leaves. As carbon dioxide levels change so does the nutrient level in leaves. Do these insects require more leaves or less leaves? Are we going to see more insect attack or less? Anybody who has crops knows the damage that insects can do at certain times and are there going to be other changes with the things that predate those insects. Are we going to see longer periods on those pest organisms?

We are increasingly seeing that impacts of climate change on natural resources such as tropical forests is a critical area that we need to be working on. What's going to happen to the river systems we have got here? Are we going to find changes in some upland species of marsupials for example? We may find the nutrient levels of the leaves might change. We need to know whether our forests are working as carbon sinks. Are they sucking up carbon or releasing carbon? But of course the other thing we are going to find potentially is changes in the frequency and severity of cyclones in this region, and again that will affect forests. We are standing here in a forest that was devastated by a cyclone three years ago. What is it going to be like if it happens every three or four years? How is that going to change our carbon stocks in these forests?

PP: Some of the issues you are raising now your going to be able to address I think with a greater degree of intensity

and long term with the formation of an institute here in Cairns associated with James Cook University and stemming very much from your work in the Cooperative Research Centre for rainforest research. You have just been loaned \$7.8 million by the State Government to get this underway. What are your plans?

NS: What we are trying to do is to create an institute that provides sustainable solutions for tropical forests. You have to provide some economic and social advantages to people, so we are looking at the kind of program of research and commercial outcomes that are going to give improved environments for people in tropical forest regions. That means looking at the forest here as a source of useful genes or chemicals or compounds that might be out there to help solve a lot of the worlds medical or other problems. 80 per cent of the world's drugs that we use come from nature. Like Aspirin.

We are right on that cutting edge at the moment to look at that. So our centre is a partnership with a couple of biodiscovery firms and for example they have already found a tree here that has extraordinary high level of really strong insecticide. Now what that means is that they extracted that, they have actually identified the chemical, they are now looking to have a grow-out program we could be looking at tens of thousands of hectares. You have to have a diverse range of programs you can't just invest in one.

PP: Is there any other kind of institute of tropical rainforests at a University in the

world. You are a professor associated with the James Cook University here in Cairns, are you a rarity?

NS: There are a number of tropical forest Universities, most of them are in the developing world. They are totally under resourced and that makes it very difficult for them to be at the cutting edge. I guess the best example of a real cutting edge tropical forest institute is the Smithsonian and that is why we are partnering with them

PP: This is the Smithsonian Institution based in Washington DC USA with branches around the place, particularly in the rainforests of Panama.

NS: That's exactly right and they have been working there for 100 years. We are brand new and have only been here less than ten years but it is interesting to see they have come to work with us. They are very keen to work with us, which is great because I think we add some new dimensions, we all learn off each other and it's only through strong collaboration that you really will resolve some of the major issues. It is no good just doing one experiment here, it is much better if you can replicate it in a number of forests around the world. If you get the same results you get a much more compelling answer than from a single site.

Transcript courtesy of the Australian Broadcasting Corporation. *In Conversation* is presented by Robyn Williams and a summary of this story can be found at www.abc.net.au/rn/science.

Rainforest CRC ANNUAL CONFERENCE 2003

We take pleasure in announcing the **Hilton Hotel** as the venue for Rainforest 2003, and invite scientists, land managers and the public to the **annual conference** of the Rainforest CRC.

Dates: The dates for CRC 2003 are **Monday 10 to Wednesday 12 November 2003**, with the conference mixer on **Sunday 9 November**.

Science Lunches: A public lecture on Science in the Community will be held each day of Rainforest CRC 2003.

Media Workshops: Evening media workshops for scientists.

Stay tuned to the Rainforest CRC website for more information about the conference.

Inquiries to Derek Tipper derek.tipper@jcu.edu.au

An Action Agenda for Feral Pigs

A workshop on current feral pig control and research and the future needs in Australia **James Cook University, Cairns QLD, June 2 & 3, 2003**

Who should attend?

- Researchers working on feral pigs
- Managers responsible for pest animal control
- Agencies with responsibilities for feral pigs
- Those interested in human and veterinary health matters affected by pigs.
- Representatives of groups with a commercial or recreational interest in feral pigs.

Draft Agenda

Session 1: A triple threat to Australia?

Environment Australia: the Feral Pig Threat Abatement Plan explained.

Biosecurity Australia: the relative importance of feral pigs in potential exotic disease outbreaks.

Vertebrate Pig Committee: an assessment of feral pig damage in Australian agriculture. *USDA or Doc NZ:* Feral pigs around the world. *Fast papers:* 3-5 minutes from those with complementary information or different views.

Session 2: Current research and control programs

Biosecurity CRC, Rainforest CRC, Pest Animal Control CRC Environment Australia Consultant:

Preliminary results of an assessment of current control programs in Australian States and Territories.

Fast papers: 3-5 minutes from researchers or practitioners conducting current programs.

Session 3: Improving control methods

Australian Veterinary Association: Is eradication viable? *Animal Control Technologies:* the need for a better pig bait. *Bureau of Rural Sciences:* research commissioned.

Environment Australia: further research requirements. *Fast papers:* 3-5 minutes from researchers or practitioners with proposals.

Session 4: Improving coordination (workshop); Session 5: Priority issues (workshop);

Session 6: An action agenda



PSGs and Other Stories



It is now six months since my appointment to this position, and I am very much enjoying the new challenges, devoting much of my time to becoming familiar with the research programs and projects across the CRC.

*Rainforest CRC Deputy CEO
Associate Professor Steve Turton*

Producing a workable budget for the next three years is also a high priority. Preparing budgets is not an easy undertaking, but I am grateful for the cooperation and good sense of the Program Leaders in fulfilling this task.

I have also been reviewing the education training program, and have recently re-introduced top-up scholarships to APA Holders in the CRC. We are currently exploring ways of attracting industry funding to support strategic and tactical research projects for honours and postgraduate students in the CRC. We also plan to award travel scholarships for students to attend the annual conference in Cairns later in the year.

Derek Tipper and I have attended all the Program Support Group meetings, and have been impressed by the breadth and depth of research across the CRC. These meetings were particularly useful for gaining a comprehensive overview of

the CRC activities and this knowledge and understanding will facilitate stronger linkages among programs and projects. It is clear to me that our CRC is now more focussed than ever on delivering outcomes to our stakeholders, and we can expect this focus to increase significantly over the next three years as projects reach advanced stages. That said we still have some way to go in convincing all our stakeholders of the real value of our research.

The new Catchment to Reef Program, led by Professor Richard Pearson (JCU) will retain its own distinct focus, but will also recognise strong linkages with most of our programs and at least two from the Reef CRC.

The next 12 months will be a busy time for all of us as we move closer to the 5th Year Review which is likely in the latter half of 2004 and a likely re-bid process for a new CRC. It is critical that



FOOD: Rainforest CRC Deputy CEO Steve Turton is amazed at the small amount of food researchers need to get through a PSG meeting.

we get our research products out to our stakeholders before the 5th year Review, and I encourage all researchers to give this some serious thought if you haven't already done so. Jann O'Keefe and Derek Tipper are available to assist you with this process, so please make use of their expertise and skills. Areas where contributions are most welcome include: training manuals, best-practice guidelines and manuals, technical reports, contributions to our new 'Issues' series, specialist workshops and forums.

We are currently planning our annual conference, and would welcome any ideas that you might have for this year's event. We are keen to have a day devoted to research undertaken by our students, but any ideas you may have will be helpful to the planning committee.

I look forward to working with all of you over the coming months as we continue to take our CRC forward.

CRC Top-Up Scholarship Winners 2003

Liana Joseph: Optimal Monitoring of Rare and Threatened Birds.

Richard Pauku: Domestication of priority indigenous fruit trees for Agroforestry in Solomon Islands.

Chris Pratt: The Dispersal, Bioavailability, Impact and retention of Automotive-Derived Contaminants in World Heritage Areas in Far North Queensland.

Matthew Pye: Genetic Structuring of Conifers in Eastern Australia: Rainforest Refugia and population Dynamics.

Thomas Rayner: The trophic ecology of freshwater fishes of an Australian rainforest river.

Luke Shoo: Understanding responses of vertebrates to long-term climate variation and contractions in rainforest.

Round 9 Research Support Scheme Winners

Frederic Beaulieu: The role of rainforests as reservoirs of microarthropod biodiversity: species richness, habitat specificity and cryptic species of predatory mites (Mesostigmata).

Samantha Fox: Population genetics of the spectacled flying fox in the Wet Tropics of northern Australia.

Heidi Hoffmann: No net loss in the Wet Tropics World Heritage Area.

David Jeffreys: Application of a Multi-Objective Decision Support System (MODSS) for the evaluation of farm forestry viability.

Matthew Marrinan: Persistence as an effective regeneration strategy in rainforest after disturbance.

Michael Milione: Links between platypus presence and health of riparian systems in the Barron River catchment.

Richard Pauku: Domestication of indigenous fruit/nut trees in Solomon Islands.

Thomas Rayner: Trophic Ecology of freshwater fishes of an Australian Rainforest River.

Terence Reis: Biogeographical concordance in Old World rainforests at the continental and local scale.

Michael Guo-Zhang Song: The patterns of regeneration of tree species in a subtropical rainforest.



Measuring Run-off From Catchment To Reef



A \$2.25 million three-year joint research project has the potential to deliver certainty to farmers faced with the prospect that land based practices are affecting water quality on the Great Barrier Reef.

The Cooperative Research Centres for Rainforest and Reef have won joint funding from the Commonwealth Government for The Catchment to Reef collaboration which will explore the impact agriculture and other land based activities have on the Great Barrier Reef lagoon.

A lively preliminary workshop chaired by Sir Sydney Schubert, Chair of the Rainforest and Reef CRCs was held on April 10, 2003 at the Campus Lodge at JCU in Cairns

Program leader, Professor Richard Pearson, said the problem of water quality from catchment to reef was widely recognised as one of Australia's most pressing and challenging environmental issues.

Most leading stakeholders were represented, including: Rainforest CRC, CRC Reef, Coastal CRC, AIMS, GBRMPA, Wet Tropics NRM Board, Wet Tropics Management Authority, ACTFR (James Cook University), Griffith University, CSIRO, Environment Australia, Qld

DNR&M, Qld DPI-Fisheries, Qld EPA, Douglas Shire, Queensland Fruit and Vegetable Growers, Canegrowers, BSES, SRDC, and Aboriginal interests.

Representatives of the groups gave short outlines of their interests in the new program, contributing valuable ideas to a breakout session.

Professor Pearson said the workshop identified several opportunities for collaboration, suggesting the program could lead water management issues in the GBR catchment.

"Valuable contributions were made on the subject of the research plan, standardising methods, sharing data and discussions on shared sites and complementary sites," he said.

"Several new links were established with follow-up to take place as the program gets under way."

Rainforest Cooperative Research Centre CEO, Professor Nigel Stork said the joint research project would develop the tools needed by landholders, industry and other stakeholders to monitor the effects of land use changes and restoration of water quality in the Wet Tropics and GBR lagoon.

"The Commonwealth Government will need effective tools for monitoring the status and trends of water quality entering the GBR World Heritage Area," Professor Stork said.

"The export of nutrients, sediments and other contaminants into near coastal waters and the Great Barrier Reef (GBR) lagoon impacts the viability and condition of these ecosystems and the industries that depend on them.

"Approximately 200 near-shore reefs in the Wet Tropics and Whitsunday areas are under immediate, direct pressure."

CRC Reef Research Centre, Deputy CEO, Dr David Williams said the project linked the Townsville based CRC for Reef Research and the Cairns based Rainforest CRC in the development of successful management practices for the two most economically important and popular World Heritage Areas in Australia.

"There has been an increase in nutrients, sediments and agricultural chemicals flowing in to river catchments and wetland ecosystems that feed into the GBR lagoon," Dr Williams said.

"This runoff threatens the ecology of seagrass areas and significant nearshore coral reefs."

Professor Pearson said the research would fill gaps in the knowledge of the effect farming practices had on the Great Barrier Reef.

"Farmers need to be assured there is a way to assess what their impact might be," Professor Pearson said.

"The joint research project will develop the tools needed by landholders, industry and other stakeholders to monitor the effects of land use changes and restoration of water quality in the Wet Tropics and GBR lagoon."

**Contact Prof Richard Pearson,
School of Tropical Biology,
James Cook University,
Townsville, 4811;
phone 07 4781 5466;
fax 07 4781 5511;
email richard.pearson@jcu.edu.au**



The Australian Canopy Crane Research Facility



This 48m tall construction crane is situated in the lowland rainforest a few kilometres from Cape Tribulation in North Queensland. This biologically rich and diverse environment provides unparalleled opportunities for scientists to study various aspects of tropical biology and ecology. In the past three years, 27 individual research projects conducted by Australian and international scientists were completed, using the canopy crane to explore the 30 meter tall canopy. The facility is administered by the Rainforest CRC in Cairns and interested researchers can obtain detailed information from our web site: www.canopycrane.jcu.edu.au or telephone 07 40421242.

The canopy crane is primarily a research tool. Non-scientists and the general public also have the opportunity to experience the unique sensation of gliding above and amongst the rainforest trees. The Coconut Beach Rainforest Resort offers a two-hour guided tour, which includes a rainforest walk, inspection of the research station and a ride in the gondola of the canopy crane. This is not just a joy ride. An accompanying scientist explains all about the research projects, procedures and the instruments being used. Although there are now eleven canopy cranes around the world, this is the only one accessible to the public. Because research must have priority, the facility is only open for eco-tourism for very limited times and advanced bookings must be made through the Coconut Beach Rainforest Resort on 07 40980033 or 0409788370. The tours are not exclusive to the Resort's guests. The Australian Canopy Crane Research Facility also caters for educational organisations or environmental groups by offering short (1-3 days) on site courses consisting of modules that can be arranged to suit the client's particular needs and educational level.

A combination of lectures and field activities cover the following topics:

Lectures:

- *Evolution of Australian Rainforests*
- *An introduction to ecological principles and methods*
- *Mangrove ecosystems and local habitats*
- *Crocodile biology*
- *The Australian canopy crane and canopy research*

Field:

- *Tour through and above the rainforest canopy*
- *Plant identification*
- *Exploration of the rainforest's lower strata*
- *Mangrove forests and crocodiles*
- *Rainforest excursion*
- *Night spotlighting tour*

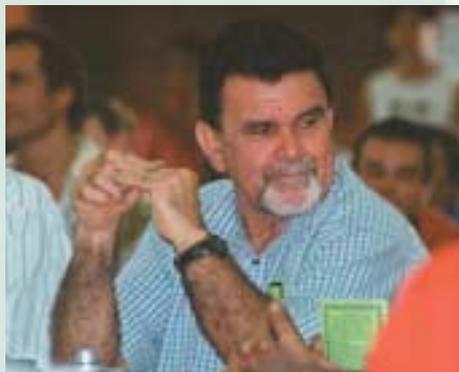
Interested parties should enquire directly to the Rainforest CRC.



Agenda For Collaboration

A Memorandum of Understanding covering the Wooroonoora National Park, including Mt Bartle Frere, the Topaz Road National Park and the Malanda Falls Conservation Park was signed in February between joint managers of the Wet Tropics Region's National Parks and the Malanda area's Ngadjon Jii people. Under the MOU a restricted access area within the Wooroonoora NP known as Bulubu Burrguna or Top Camp, as it known in the Ngadjon Jii language, has been created requiring visitors to seek permission from the Ngadjon Jii to enter the area.

Program 7 Leader Dr Sandra Pannell worked with the Ngadjon Jii on Buluba Burrguna and joined with elders and other community members to celebrate the MOU. Below are extracts from speeches made to commemorate the occasion.



Terry O'Shane
North Queensland Commissioner
of ATSIIC

RECOGNITION: Terry O'Shane wants people to remember those who have died while fighting for Native Title recognition.

It is a sad occasion in lots of ways. It requires we think of the tragedy of what was been taken away. After 230-odd years we get restricted recognition of country that we have owned for 40,000 years. Local, State and Federal Governments have done everything in their power to extinguish Native Title. This MOU means nothing unless it gives the proper rights back to the traditional owners. We can't have a situation where the theft of

country is incrementally given back with conditions. That is injustice.



Clive Cook
Manager Queensland Parks and
Wildlife Service

MANAGEMENT: Geoff Meadows (EPA), Clive Cook (QPWS), Russell Watkinson (WTMA) and Nigel Hedgcock (WTMA) go over the Ngadjon-Jii Memorandum of Understanding.
Pic: Roger Wilkinson

We believe it is time for the Queensland Parks and Wildlife Service to move forward in a positive way towards reconciliation by recognising the rights of traditional owners on their country. The tools of this MOU have existed for some time in the legislation and we haven't been game enough to use them. In some circumstances the existence of National Parks has been as alienating as Freehold and we want to turn that around. We are committed to developing the working relationships that this MOU forecasts. For some time our ears have been there but not open and our eyes have been open but we have not seen.



Warren Canendo
Ngadjon-Jii representative

YOUNGER GENERATION: Warren Canendo speaks for the next generation at the MOU signing.

This MOU is a step forward for us Ngadjon people to work back on our land. It is also an appreciation for these old people. They have been working very hard for the last 10-15 years. To keep the culture alive we need to get these young fellas to come up and help us to keep the old ways, hunting, fishing and gathering, alive for our younger generation.



Yvonne Canendo

DREAM: Ngadjon-Jii woman Yvonne Canendo wants non-Indigenous people to learn about her traditions.

We intend to move forward to show what our old people know of our tradition. This way we can all live in harmony. We can live your way, let the white people come and learn our way. We want you to come our way and learn what our old people have taught us. We have got generations coming up. We have got fifth generations dancing here today. This is amazing. I am really proud to think that these three little babies can get up and dance and learn culture.

TechTrain

Dulguburra Yidinji Clan Group and CTR Indigenous Trainer Syb Bresolin has used Rainforest CRC funding through Program 7 to prepare and deliver Aboriginal Training for Capacity Building in partnership with The Queensland Parks and Wildlife Service, Centre for Tropical Restoration (CTR), Caring for Country and Tropical North Queensland Institute of TAFE.

For us as indigenous people, understanding the western scientific jargon can be very frustrating at times, so to deliver this kind of training was a major challenge, the first step was to recognize that training needed to be delivered by both indigenous and non-indigenous trainers, this was important as it gave a balance of understanding to the participants when western language is spoken, then we as indigenous trainers are able to translate into a language that relates to us.

Some examples of this are:

Healing Country = Ecological Restoration
 Watching Country = Monitoring Biological Species
 Sick Water/Sick Country = Degraded Catchment
 Kinship System = Plant and Animal Classification
 A Place That Heals = The Centre for Tropical Restoration

This comparative relationship to languages (which means the same thing) is one discovery in the process of working together and sharing culture.

In a collaborative effort CTR and TAFE developed a comprehensive study booklet titled 'Train the Technician'.

Training was under CTR Caring for Country/Helping to Heal Country Program, which was formed to enable indigenous land caretakers and land managers to receive skills in healing country. Participants were trained by CTR's indigenous and non-indigenous trainers. Training was offered to the

Traditional Owners of the Southern and Northern regions of the Wet Tropics.

We provided the participants with a wide range of skills associated with biodiversity monitoring. They learnt how to set out an animal trapping quadrat using four different cage types, handled small mammals, set up a vegetation transect line, gathered and recorded information along the transects, analysed collected data, and incorporated photo-point monitoring, and plant-pressing.

This allowed Indigenous Scientists/Traditional Owners to feel at ease and familiar with the why, where and how of western research.

There are many bridges still to be built between Traditional Owners and Researchers. It is only by building these bridges together that we will have a better future based on respect for each others science. I would like to encourage everyone of you to be a part of the Healing Country process.



Environmental History

Wet Tropics. Identified by the anthropologist, Norman Tindale, as the quintessential Aboriginal rainforest dwellers, Ngadjon-Jii people have continually occupied the Malanda region. As such, members of the Ngadjon-Jii community possess a social memory which spans more than 80 years of European and Indigenous interactions with the environment, a period in which vast areas of rainforest were cleared for European farming. Their cultural memories of the environment extend well into the past beyond these experiences of contact, at least, it appears, to the most recent volcanic activity in the region, some ten thousand years ago.

In the native title era, Indigenous people are increasingly involved in negotiations and new partnerships with a variety of environmental management agencies. Many, like Ngadjon-Jii people, are faced with the soon-to-be realised prospect of actually determining the future

management of their traditional country, perhaps for the first time since the arrival of Europeans. In this context, indigenous environmental histories, framed by local laws and customs, represent an important cultural resource in explaining and understanding the present landscape to Aboriginal and non-Indigenous communities. While Indigenous indicators of environmental change and continuity represent a culturally appropriate way to identify and monitor the health of country in the future. For the current generation of Rainforest Aboriginal people there is a time critical dimension to the recording and communication of Indigenous environmental histories, dependent as they largely are upon the knowledge and memories of a diminishing body of elders with direct experience of 'early days' and 'old people'.

The environmental history project will commence in July 2003, and will bring together Ngadjon-Jii people and Rainforest CRC personnel in innovative collaborative research strategies.



Ngadjon-Jii Elders listen during the ceremony to officially hand Malanda land back to traditional owners. Jesse Calico, Grace Kidner, May Morta, Emma Johnstone, Ena Gertz

Program 7 Leader, Dr Sandra Pannell, has been talking with Ngadjon-Jii people about a project aimed at extending a collaboration on elements of their native title for a consent determination by documenting the Indigenous environmental history of the Malanda region.

Ngadjon-Jii people have been witnesses to some of the more dramatic environmental transformations that have taken place in the rainforests of the



Pigeon Pie

Project 6.3 uses the measurement of movement patterns and the rate of passage of seeds through the guts of frugivores from eight functional groups in the examination of seed dispersal as a threatened ecological process. Dr Andrew Dennis reveals some birds have proved elusive.

Some birds have been easy to catch but others such as the large fruit pigeons and small fruit-doves have remained elusive. Although we still need a few more individuals for a good sample size, what we have achieved in recent times is a watershed. Our field data collection is close to completion, as are the community level seed shadows for continuous forest.

The next step is to complete the same work in fragmented landscapes. From experience these are likely to be an easier undertaking than in undisturbed forest.

The two sets of data – the movement patterns and rates of seed passage – are combined to produce seed shadows – an estimate of the proportion of seeds moved a given distance from a

source by a particular frugivore, which is representative of a functional group. This forms the core of a model that also uses data on visitation and consumption rates at fruiting trees to produce a map at a landscape scale of the distribution of seeds after handling by a whole community of frugivores.

While we have been able to collect good data on the bowerbirds, honeyeaters, silvereyes, metallic starlings, riflebirds, figbirds, barred cuckoo-shrikes, pied currawongs, cassowaries, flying foxes, musky rat-kangaroos and native rats, we had only managed to catch one wompoo fruit-dove out of the whole pigeon group, until recently (except for a bunch of brown cuckoo-doves, which aren't really seed dispersers but more on that later).

Following a successful collaboration with Queensland Parks and Wildlife Service and the Thorsborne Trust we have now captured nine pied imperial-pigeons, radio tagged seven of those and conducted gut passage rate trials on five of them using native tropical fruits.

We are currently in the process of finishing off the movement studies on these birds, who are foraging primarily in the Mission Beach area but roosting on Brooke Island. Soon though, we are expecting them to begin the northward migration back to New Guinea. While our telemetry equipment is not capable of tracking them that far we will at least hope to pick up the beginnings of the move north.

With the assistance of Earthwatch Institute volunteers we also undertook some intensive netting using large gauge mistnets hauled into the forest canopy and struck success with the capture of our first superb fruit-dove.

Having now been through several days of tender loving care in captivity being fed only the very best fruits on offer and producing a lumpy kind of fruit just a little later, the superb bird is now back in the wild carrying a transmitter and providing the world with a glimpse into the movement patterns of these important seed dispersers.



What Has Telecommunications Done for Tree Planting, and How Can You Find Out?

A pilot website providing statistical summaries of all NHT-funded natural resource management projects in the Wet Tropics region has been launched by the regional Natural Resource Management Board.

Designed by Rainforest CRC Program 5 researcher Debra Harrison with support from Program leader Carla Catterall, the website is a joint initiative with Brad Dorrington from the Wet Tropics Natural Resources Management Board.

Rainforest CRC Program Five leader Dr Carla Catterall said little attention had been paid to the routine task of record-keeping and monitoring in the rush to get revegetation schemes underway in the wake of the Howard Government funded Natural Heritage Trust scheme.

Financial compensation packages in support of the 1988 declaration of the Wet Tropics World Heritage Area were aimed at employing former timber workers in rainforest restoration and farm

forestry projects such as the Wet Tropics Tree Planting Scheme and Community Rainforest Reafforestation Program.

These programs in the Wet Tropics produced arguably the greatest concentration of government-subsidised tree-planting projects in the country.

"Following the Australian federal election in 1996 the Howard Liberal government won office on the strength of bold election promises such as the privatisation of the national telecommunications agency, Telstra, to fund environmental management and repair," Dr Catterall said.

"The resulting initiative, The Natural Heritage Trust (NHT) scheme with the bold aim of reversing the decline in Australia's tree cover by the year 2001, won the cautious support of many conservationists."

"A key component was the direct funding of local groups and landowners to undertake revegetation works through the Bushcare scheme, which disbursed some

\$323 million Australia-wide between 1997 and 2002."

"The Wet Tropics rainforest region received some \$6 million in Bushcare funding for revegetation works during this period."

Dr Catterall said well-kept, accessible records were essential if reporting requirements for the new regional planning arrangements were to be met and as a means of assessing the long-term effectiveness of replanting techniques.

The Wet Tropics Regional Directory aims to establish a website containing statistical summaries of all NHT-funded natural resource management projects and other information-sharing systems, such as systems for locating and accessing reports and other publications.

You can find the searchable website pilot on www.nrmbboard.org/regionalDirectory.html. The Directory is still under development, so feedback to Debra.Harrison1@jcu.edu.au would be welcomed.



Tropical Heat

Rainforest CRC researcher Dr David Hilbert has preliminary research indicating climate change is a particularly significant threat to the long-term preservation of the biota in the Wet Tropics World Heritage Area. Here Dr Hilbert, who is a CSIRO Sustainable Ecosystems researcher funded through the Rainforest CRC Program 6, looks at the potential global warming impacts on terrestrial ecosystems and biodiversity of the Wet Tropics.

Climate change is sometimes discounted in the debate surrounding biodiversity in the tropics. Globally, forest clearing is thought to be the greatest threat, but temperature is central to any discussion of rainforest types and the kinds of organisms found in these ecosystems.

If the upper range of predicted global warming occurs, in the vicinity of 5.8°C, no appropriate environments would remain within the Wet Tropics.

In the Wet Tropics region one degree of warming can increase the potential area of rainforests as a whole, as long as rainfall does not decrease. However, large changes in the distribution of forest environments are likely with even minor climate change and the relative abundance of some types could decrease significantly. Increased rainfall favours some rainforest types while reduced rainfall increases the area suitable for woodlands and forests dominated by sclerophyllous genera like *Eucalyptus* and *Allocasuarina*.

The area of lowland, Mesophyll Vine Forest environments increases with warming while upland, Complex Notophyll Vine Forest environments respond either positively or negatively to temperature, depending on rainfall. Highland rainforest environments (Simple Notophyll and Simple Microphyll Vine Fern Forests & Thickets), the habitat for many of the region's endemic vertebrates, decrease by 50% with only a one degree warming.

Using this model, we have mapped the current and potential future distributions (1°C warming and - 10% rainfall) of upland and highland rainforest types. Environments suitable for these forest types decline greatly and become very



fragmented in this climate change scenario. Ecosystem services such as clean and reliable water could be severely affected by climate change and in turn the biodiversity and regionally endemic species may be under severe threat over the next few decades.

A massive loss of habitat leading to significant loss of biodiversity is possible.

The Wet Tropics is dominated by mountain ranges with altitudes varying rapidly from sea level to over 1600m. Environmental gradients associated with this complex topography largely determine species composition and general patterns of biodiversity.

Partly due to extensive clearing in the lowlands, most rainforest is above 300m and most of the regionally endemic species are cool-adapted upland species.

Warming can have a particularly strong impact on mountainous regions like the Wet Tropics. Many of the Wet Tropics endemic species live only in these cooler regions.

The mountain tops and higher tablelands can be thought of as cool islands in a sea of warmer climates, separated from each other by the warmer valleys forming a scattered archipelago of habitat for organisms that are unable to survive and reproduce in warmer climates.

An additional likely affect of warming is a significant lifting of the base of the cloud bank on tropical mountains.

Global climate simulations with a doubled CO₂ scenario show that the relative humidity surface is shifted upwards on

tropical mountains by hundreds of metres during the winter dry season.

This is the period when these forests are most reliant on the moisture from cloud contact. Because of their great sensitivity to climate, cloud forests are likely to display climate change effects in the very near future.

Palaeo-ecological studies in the Wet Tropics have demonstrated extensive biogeographic changes due to past climate change events.

The extent and distribution of forest types, defined by structure and physiognomy, will be important future indicators of potential changes in biodiversity.

Recent work (Hilbert et al. 2001a, Hilbert et al. 2001b, Ostendorf et al. 2001) found north Queensland tropical forests highly sensitive to climate change within the range expected early in this century.

Overall, the location and extent of rainforest is determined by rainfall and its seasonality, with some influence of soil fertility and water holding capacity. But the type of rainforest and the kinds of organisms found there depends more on temperature. In the Wet Tropics, one degree of warming can increase the potential area of rainforests as a whole, as long as rainfall does not decrease. However, large changes in the distribution of forest environments are likely with even minor climate change and the relative abundance of some types could decrease significantly.

Dave Hilbert's work will be the subject of one of the first series of issues papers soon to be released by the Rainforest CRC.

Our Fish Don't Jump!

Rainforest CRC, Department of Main Roads and James Cook University are developing and testing culvert fishways as part of a CRC sustainable roads project. Researcher Ross Kapitzke discusses the effect on fish stocks of culverts that prevent migration.

Barriers to fish passage can severely deplete populations and alter species diversity within a catchment by obstructing migration to critical spawning or growth habitats.

The Rainforest CRC and Department of Main Roads (DMR), through James Cook University (JCU) School of Engineering is developing and trailing a full-size culvert fishway and monitoring experiments on University Creek on the James Cook University Townsville campus suitable for Queensland streams and fish species.

The R&D program incorporates adaptable designs which allow modification and upgrade as the research proceeds. On-site physical and biological monitoring of the hydraulic characteristics of the fishway devices, their effects on fish migration and behaviour provide information on the overall effectiveness of the facility.

Research findings presently available for culvert fishways relate mostly to stream and fish conditions in the northern hemisphere. Very few examples exist in Queensland where provision has been made for fish passage at culverts. Hydraulic modelling in the laboratory is used in conjunction with the prototype facility to examine the flow characteristics of various fishway components, and to develop and test the range of culvert fishway designs used in the prototype.

The culvert fishway R&D program aims to provide an understanding of fish behaviour in culvert fishway structures. From this, design parameters and planning and design protocols suitable for Queensland streams can be developed. These protocols will take account of fish distribution and stream habitat conditions, fish behaviour and swimming capabilities, crossing type and configuration, and stream flow and geomorphic characteristics.

Freshwater fish provide significant commercial, recreational and traditional



LOOKING UPSTREAM: University Creek prototype culvert fishway



CATFISH: "Plotosid Catfish - Hyrtl's Tandan (*Neosilurus Hyrtlii*)", one of the species under study in the University Creek facility.

cultural values for humans. Migration is a natural process for most freshwater fish. Lifecycle stages, such as adult spawning and juvenile growth dispersal, play a major role in the physical and biological function of aquatic ecosystems, and represent significant biodiversity and conservation values for streams. These values make the provision of fish passage at road-stream crossings a significant natural resource management issue.

Large structures such as dams and weirs represent significant fish migration barriers throughout Australia, as do the high velocities and excessive exit drops

of culverts and causeways at road-stream crossings.

The conventions of fish passage design focus on the transport and drainage functions of crossings. This emphasis on flood capacity, structure integrity and stream stability makes fish passage difficult. The objective for road designers should be low velocities, clear fish pathways, and diverse streambed habitat.

Unfortunately, many of the techniques proposed for remediation or mitigation of barriers are expensive. Other attempts at fish passage are largely speculative, mostly unproven, and

commonly fail to meet multipurpose criteria, as they are based on poorly developed planning and design protocols and remediation techniques.

The problems that these crossings present for fish passage can be overcome through innovative designs, which meet multipurpose requirements relating to fish passage, hydraulic capacity, transport function, operation and amenity.

Ross Kapitzke is a Rainforest CRC Senior Research Engineer (Environmental) at James Cook University School of Engineering.



Coming in the August edition:

Pig Action Agenda
Climate Policy

Wet Tropics Natural Resource Management Plan
Canopy Research

Perception Is Everything For Wet Tropics Roads

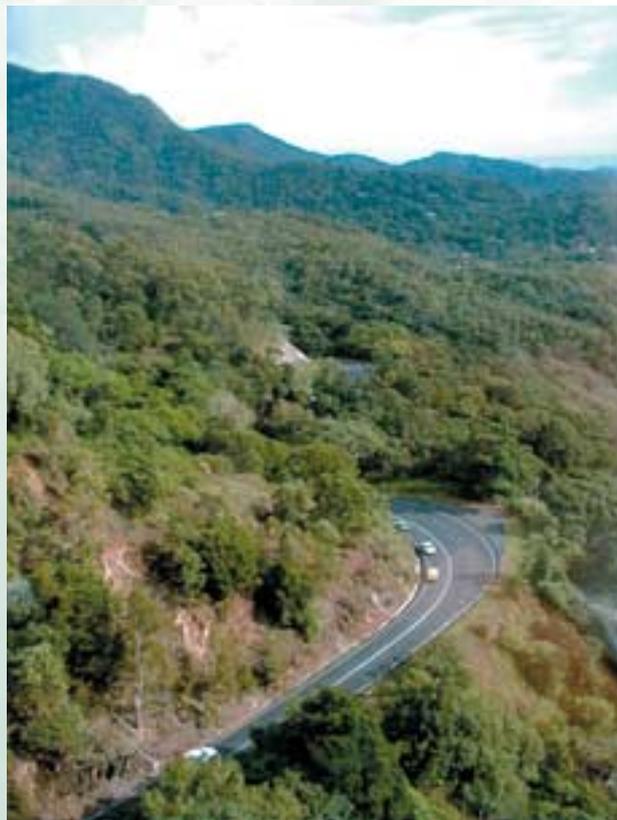
Project 4.1 researcher Dr Joseph Reser warns the interdependence of roads and vistas, landscapes and land use provide a classic set of questions and challenges for geographers, planners, highway engineers, landscape architects, and environmental psychologists working on the Wet Tropics World Heritage Area roads.

There is a tendency to forget how perceptions, experience and behaviour fit into the discussion of the impact roads and infrastructure have on protected areas like Wet Tropics World Heritage Area.

This is unfortunate, because it is roads that provide access to the scenic vistas of protected landscapes, channeling and articulating human impacts via constructed infrastructures. These impacts raise a number of questions for road planners and architects. Central is the screening out of politically uncomfortable land use practices while providing a reassuring and pleasant roadside vista for passing motorists.

How can these roads be planned and laid out to take advantage of topography and scenery, while retaining the aesthetically pleasing aspects of the passing landscape?

The aesthetic properties of 'natural' environments need to be identified and measured if the perception of adverse environmental impact is to be managed. These concerns have stimulated considerable research in the social sciences in the contexts of environmental perception, cognition, evaluation, aesthetic response, and environmental impact assessment and monitoring.



Recent discussions of the impacts of roads in the WTWHA have paid scant attention to the substantial relevant body of literature dealing with the subject of the ways roads mediate the experience of landscape.

Visitors, residents, and planners perceive and assess the value of changes to the character of passing landscapes viewed from the road. These aspects of the roadscape appear to be missing from current research and are critical if effective environmental monitoring and reporting of changes to the perceived amenity value are to be factored in to the presentation of the WTWHA.

Environmental psychology provides analytic, theoretical, and measurement

clarity to the assessment of the scenic elements of landscapes, drawing as it does on what is known of human perceptual, cognitive, and affective processes. The complex nature of human aesthetic judgments, psychophysics and psychometrics can assist in achieving reliable and valid 'measures' of landscape judgments. Environmental psychology has been directly involved with the human behavioural and ergonomic side of driver behaviour and road design. It allows for informed and sensitive consideration of the information processing and behavioural responses taking place as a driver or passenger moves along a WTWHA roadway.

How does all of this translate to what is needed to complement research already underway or envisioned in the context of roads and the WTWHA?

In brief, there seems to be a real need to standardise measures and implement a monitoring strategy and database on how residents, visitors and experts assess the environmental quality, identify landscape features and properties, and respond to the aesthetics of the roadside verge at sites along WTWHA roads. This standardised, observer-based, assessment and appraisal inventory could then be employed in the context of multiple research and planning projects involving managed or encountered landscape or roadscape changes, as well as constituting an overall monitoring protocol which could complement instrument-based assessments.

Travel Bursary Pays Off



What David Temple-Smith saw on his travel bursary trip to Oregon.

PhD student David Temple-Smith used a Rainforest CRC Travel Bursary to visit the United States Department of Agriculture (USDA) Forest Service in Corvallis Oregon and to attend the Urban and Regional Information Systems Association's (URISA) 40th Annual Conference in Chicago, Illinois between September and November 2002.

My paper "Decision Support for Ecosystem Management in Local Government: An Australian Case Study" won an honourable mention in the main category of the Horwood Critique Prize at the URISA 2002 Conference in Chicago. I was one of 800 people from around the world at the conference between 26-28 October 2002.

Papers were judged on candor, critical insights, conclusions, and methods employed in the critical analysis of an urban or regional information system design, implementation or application; technology; policy or issue; or contextual environment.

The conference was part of a seven-week stint alongside the world's leading experts in sustainable forestry, ecosystem management, and decision support systems at the Pacific Northwest Research Station (PNWRS) forest ecology lab, located beside the College of Forestry at

Oregon State University. I was looking for an opportunity to share my research into decision support systems for ecosystem management with world leaders in the area of forest management. The main reason for my visit was to undertake theoretical work with leading researchers in my field and have access to their materials and resources, and learn from their expertise. Working at the USDA Forest Service research station gave me a greater understanding of the complexity of ecological theory.

Overall, to meet and share ideas with scientists with related research interests over an extended period of time will help me build strategic links between the PNWRS, the Rainforest CRC, and the University of Queensland.

Dave is studying Decision Support Systems for Ecosystem Management in Local Government through Queensland University and was also funded by University of Queensland Graduate School, University of Queensland School of Geography, Planning and Architecture, and the Queensland Government.



International MOU Benefits Natural and Cultural Research in East Timor

An International consortium has come together to explore opportunities for students to investigate the settlement and development of East Timor. Rainforest CRC Program 7 Leader Dr Sandra Pannell is working with United States and East Timorese colleagues to develop archaeological, social and environmental research training and education in East Timor.

The Rainforest CRC has signed a five-year Memorandum of Understanding with research and government partners to support study into the use and management of natural and cultural heritage in the world's newest nation. The MOU establishes a partnership between research institutions in East Timor, Australia and the United States to promote archaeological, social and environmental research training and education.

The signatories are the Ministry of Education, Culture, Youth and Sport of

the Democratic Republic of East Timor, The Research School of Pacific and Asian Studies at the Australian National University, The University of Washington College of Arts and Sciences and The Rainforest Cooperative Research Centre.

Rainforest CRC Program 7 leader Dr Sandra Pannell said East Timor had a great potential for archaeological, social science and environmental science research that can further our understanding of human migrations, occupation and human-environment interactions. Information generated by research of this nature is also an important resource for the people of East Timor and can assist in the sustainable use, management and conservation of their natural and cultural heritage.

The project will utilise collaborative research, capacity building and benefit sharing to improve the understanding of natural and cultural history in the region with the signatories to the MOU initiating and facilitating collaborative research projects like the study of the history

of human occupation and settlement of East Timor, the cultural history of the people of East Timor, human-environment interactions and contemporary land use patterns."

Students will be assisted by signatories to the MOU to take up study in the identified areas in order to progress capacity building and benefit sharing across the disciplines of field archaeology and social and environmental training. There will be opportunities for students to learn site and data recording techniques, data creation and management and museum collections management and conservation. They will also have opportunities to explore emerging industries such as natural and cultural heritage protection and management."

The MOU signatories intend to share research findings in an effort to expand community understanding of the natural and cultural heritage of East Timor.

ESA Conference 2002

The second Joint Meeting of the Ecological Society of Australia and the New Zealand Ecological Society took place at the Cairns Convention Centre from 1-6 December, 2002. The Rainforest CRC was a Diamond Sponsor for the event and also hosted a welcome reception before the conference dinner.

Many centre participants took on active roles at the conference, including positions on the organising committee and leading and assisting with field trips. Over 600 people attended what must be described as the most successful ESA conference ever staged, and congratulations are to be given to Dr Jill Landsberg, her organising committee and student volunteers from JCU Cairns.

Rainforest CRC researchers were prominent in talk and poster sessions: many topics on climate change, ecosystem services, threatened species and ecosystems, amphibian declines, rainforest macroecology, forest restoration (including restoration in the Wet Tropics), GIS applications, GIS and landscape change, weed ecology, human ecology, population ecology, pollination & dispersal, animal behaviour, infrastructure corridors, and tree kangaroos.

Prizes of \$500 for the best Rainforest CRC student posters were awarded to the following students: Jane Skrandies-Martin (UQ), Catherine Pohlman (JCU) and Karen Coombes (JCU).

Don't Call Me Boffin

The use by the media of terms such as boffin to describe researchers inhibited wage growth in the sector and hindered the recruitment of young scientists, the President of the Federation of Australian Scientific and Technological Societies (FASTS) has warned.

FASTS spokesman Professor Chris Fell used the launch of a 10-point plan for better wages, conditions and scientific career path security to criticise the media's use of the term in headlines.

The word Boffin reinforced a negative perception of a sector which generated wealth by finding solutions to problems and creating new industries and new jobs, Professor Fell said.

"The word is jaded and offensive," he said.

"It conjures up images of Doc Brown in the 'Back to the Future' movies. Weird old men in flapping lab coats, pouring strange chemicals into test-tubes.

"It inhibits young students looking at science as a possible career."

Professor Fell said the 10-point plan focused on getting more scientists working in industry.

"We're proposing a new program to bring more science into Parliament, with scientists seconded to work for a year with Parliamentarians on crucial issues," he said.

"We want to change the HECS scheme. Young science and mathematics graduates who go teaching currently take home less pay than their colleagues teaching history or art or woodwork.

"It is time to transform Australia into a competitive modern economy."



An example of the introduced species Pond Apple. Photograph: Peter van Haaren

Weeds Collaboration

Researchers from Rainforest CRC and the CRC for Australian Weed Management will collaborate on projects to improve the management of weeds of rainforests and associated ecosystems.

A joint workshop between the two CRCs in Cairns on the 6th and 7th of November included representatives of CSIRO, Queensland Department of Natural Resources and Mines, Griffith University, James Cook University, the Cairns and Far North and Environment Centre, the Regional Organization of Councils, Environmental Protection Agency, the World Wide Fund for Nature and Greening Australia.

Some of the major themes of proposed projects included research into: better management of early incursions, ecological processes of weed invasion (particularly in relation to riparian systems, and disturbances), and the social issues of environmental weeds, as well as the development of a comprehensive weed information database.

It is anticipated that some of these ideas will be developed further and taken up as new R&D activities by the two CRC's.

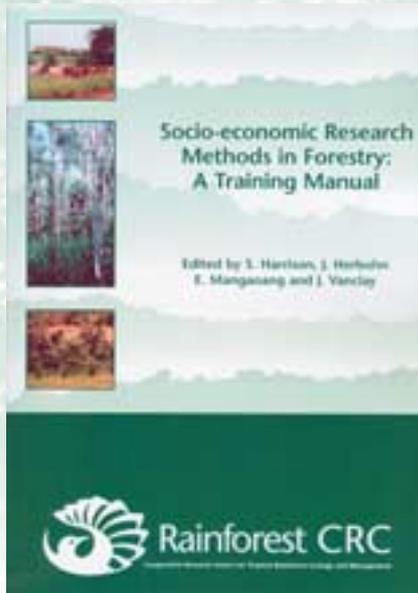
Publication of the workshop proceedings are currently in production. Stay tuned to the Rainforest CRC website at www.rainforest-CRC@jcu.edu.au for availability.

Rainforest CRC Research Reports

The Rainforest CRC has produced a number of research reports. These contain either the results of key Centre research, the proceedings of workshops or seminars, or are outcomes of contract research undertaken for external agencies.

Many of these publications can be downloaded as PDF files directly from our website. Hard copies of others can be purchased for a nominal sum from Rainforest CRC Headquarters.

Check out a comprehensive list of Rainforest Research reports available at: <http://www.rainforest-crc.jcu.edu.au/publications/publications.htm>



Blitz

Skyrail Joins CRC In Canopy Education

Tourism and research icons, Skyrail and Rainforest CRC, have come together to support forest education programs, launching the Schoolyard Blitz Native Garden competition at the Cairns Garden Show over the Mothers Day weekend, May 10 and 11.

Yarrabah High School took out the Golden Trowel award, jointly sponsored by Rainforest CRC, for the best Native garden at the School Yard Blitz competition. The Yarrabah Yardies beat out three other finalists in the competition representing the Trinity Anglican School, Cairns High and Peace Lutheran College.

Rainforest CRC Deputy CEO, Dr Steve Turton, said this was the first of a series of Rainforest Canopy Education Projects designed to introduce the next generation of researchers, land managers and forest users to the ecological importance and beauty of rainforest environments.

"We are two organisations in the same business of bringing people closer to the forest canopy," Dr Turton said.

"This is a great opportunity for the Rainforest CRC to be involved with a valuable corporate partner in a community based project.

"The Cairns Garden Show is the perfect launching pad for this exciting new venture because it is a very popular community based festival, celebrating one of the most popular recreational activities enjoyed by so many in the far north.

"It also gives us the opportunity to make contact with vital commercial interests in the Nursery industry."

This is the third year of the School Blitz competition and defending Champions The Trinity Anglican School (TAS) will face stiff opposition from the other finalists.

Skyrail General Manager Tony Baker said the blitz was a great opportunity for local school students to learn more about native plants.

"Skyrail is pleased to be associated with the Cairns Garden Show as a community event, and specifically the School Blitz," Mr Baker said.

"Skyrail is a rainforest experience and we are proud to support an event which will foster and encourage student interest and interaction with native tree and shrub species and the local environment."



Rainforest CRC

Forest Matters is edited and produced by the Cooperative Research Centre for Tropical Rainforest Ecology and Management (Rainforest CRC). Articles and stories can be used with permission. If you have ideas, contributions or comments, please contact the Communications Officer at Rainforest CRC headquarters.

Headquarters located at:

James Cook University
McGregor Road
Smithfield Cairns AUSTRALIA

PO Box 6811
Cairns QLD 4870 AUSTRALIA

Telephone 07 4042 1246
International +61 7 4042 1246
Facsimile 07 4042 1247
International +61 7 4042 1247

Email rainforest-crc@jcu.edu.au
Website www.rainforest-crc.jcu.edu.au

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