Forest Matters

Rainforest CRC Newsletter

january 2005

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Established and supported under the Australian Cooperative Research Centres Program

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Are our plant and animal species under more threat than we thought? Rainforest CRC science hits top ten for 2004 - page 3. (Photo: Birgit Kuehn)

Front cover images (top) four-spined jewel spider (Photo: Birgit Kuehn); (bottom) the Mulgrave River, north Queensland (Photo: Tom Rayner).

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Extinction Risk from Climate Change in Science Top Ten 2004

A 2004 study, co-authored by Dr Steve Williams of Rainforest CRC and James Cook University, has been rated as one of the top ten international science breakthroughs of the year for 2004 by Science magazine (www.sciencemag.org/cgi/content/full/306/5704/2013).

Published in the science journal Nature on 7 January 2004, the article *Extinction risk from climate change* by Thomas *et al.* presents research undertaken by Steve together with eighteen other international scientists. The paper came seventh alongside scientific breakthroughs such as NASA's evidence of previous water resources on Mars, the discovery of the remains of *Homo floresiensis* in Indonesia, and advances in human cloning. The article attracted significant attention throughout 2004 and has been referred to widely by the scientific community, media, international organisations and governments – it also supported the development of the *National Biodiversity and Climate Change Action Plan 2004–2007* by the Australian Natural Resource Management Ministerial Council, Department of the Environment and Heritage.

The international study modeled regional field data and data released by the United Nations' *Intergovernmental Panel on Climate Change* under application of minimum, mid-range and maximum global warming scenarios, raising alarming results concerning species' aptitude to adapt to expected changes in temperature and rainfall, or to migrate. Results suggest that at least one million species – about nine percent of species in existence – are prone to extinction due to climate change by the year 2050. This is being referred to as the "sixth mass extinction" by media such as the BBC and *New Scientist*. Thomas *et al.* believe this minimum scenario could be an underestimate, according to *New Scientist* magazine. This concern is shared by Klaus Toepfer, Executive Director of the United Nations Environment Programme, who issued a statement in response to the study, pointing out additional extinction risk resulting from interdependencies between species, and in agreement with the authors, reconfirming the importance of bringing the Kyoto Protocol into force.

Funding to Continue for Rainforest Research

At the September 2004 Federal Election, the Coalition committed to continue funding rainforest and reef research in north Queensland through the establishment of a Commonwealth Environment Research Facility (CERF) – a fund that will be administered by the Department of Environment and Heritage. Details as to how it will be administered have yet to be decided by the Minister for the Environment and Heritage, Senator The Hon. Ian Campbell.

The Rainforest CRC expects discussion to start taking place involving research organisations and research users within the next few months. An excerpt from the Coalition's September 2004 press release:

"In recognition of the importance of environmental research, a re-elected Coalition Government will invest $100 million over four years to support national world class environmental research.

A Commonwealth Environment Research Facility (CERF) will provide funding to support important research work relating to issues such as environmental biotechnology, desertification, irrigation, bushfires, the Antarctic, weed management, greenhouse and dryland salinity.

The CERF will provide $40 million over four years from 2006 for a Marine and Tropical Sciences Research Facility to support important research relating to the Great Barrier Reef and tropical rainforest issues.

The remaining $60 million will be allocated nationally on a competitive tender basis.

The CERF will facilitate stronger synergies and the creation of National Research Hubs. This will build critical mass in areas of Australia's research strengths and national research priorities. It will also encourage the development of world-class research facilities by supporting proposals that draw on multiple disciplines, professional partnerships and prior research efforts.

The CERF will encourage sustainability in research efforts by encouraging industry contributions. Public sector organisations that utilise the benefits of research outcomes will also be required to contribute to the funding.

The CERF will specifically support quality environmental research proposals that do not qualify for assistance under the existing programs. The proposals must have a strong public good focus and demonstrate a strong public good outcome."

The press release also notes that the Marine and Tropical Sciences Research Facility will form part of the Tropical Sciences and Innovation Precinct at James Cook University.

We expect that there will be nodes of the new facility in both Townsville and Cairns and that this will include, in some form, the Australian Tropical Forest Institute, which is being built at James Cook University's Cairns Campus.

There is currently a funding shortfall for 2005-2006 for both the Reef and Rainforest CRCs. The Rainforest CRC has requested bridging finance so that there should be a smooth transition from the CRC to the new CERF-funded institution.

Associate Professor Steve Turton inspects carbon flux monitoring equipment at the Australian Canopy Crane at Cape Tribulation. (Photo: Birgit Kuehn)

Emerging Threats To Tropical Forests

There is much value in placing the Rainforest CRC's research in a global context. I recently reviewed the manuscript of a forthcoming book edited by Laurance and Peres (Emerging Threats to Tropical Forests and Biotas, Chicago University Press, 2005). The book is a result of a meeting of the Association for Tropical Biology held in Aberdeen, Scotland in July 2003, and includes contributions from several Rainforest CRC researchers. I would like to share with you some thoughts and ideas from this book, and how our research in the Rainforest CRC may contribute to the understanding and mitigation of some of these threats.

Laurance and Peres conclude that emerging threats to tropical forests and biotas may be defined in four ways:

1) Those that are relatively new, such as the emerging chitrid pathogen that is devastating some rainforest frog populations;
2) Those that are unprecedented in scale or rapidly growing in importance, such as tropical surface fires;
3) Those that are poorly understood, such as the environmental consequences of large-scale climatic and atmospheric changes; and
4) Those that are synergistic in their effects, such as the devastating combination of habitat fragmentation and chronic overhunting on vulnerable wildlife.

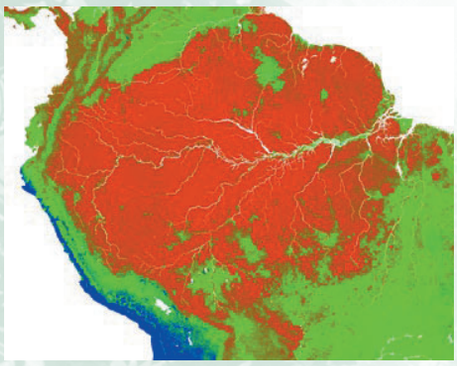
While some of these threats are specific to tropical forest regions outside Australia, many also apply to the Wet Tropics and Central Eastern Rainforest Reserves of Australia World Heritage Areas and to other remaining rainforest remnants along the east coast of Australia.

Four key themes may be identified from the various contributors to their book, which I shall discuss now.

Theme 1 – Many threats are hard to detect...

Despite many advances in the science of remote sensing, there are many threats to tropical forests that are not detectable, or are considered marginally detectable using available remote sensing techniques. Problems stem from having to deal with dense vegetation cover and many hidden effects. Common threats that cannot be measured include hunting or defaunation, harvests of many non-timber forest products, effects of pathogens, compositional shifts in plant communities from climate change, non-recent selective logging, narrrow roads and many secondary and higher order effects. Marginally detectable threats include recent selective logging, surface fires, effects of climate change on plant phenology, small-scale gold mining and

wider roads. As technology progresses, many of these marginally detectable and perhaps a few of the not detectable threats will become more readily detectable from remote sensing platforms. At present remote sensing is readily able to detect large-scale deforestation and habitat fragmentation, major forest fires and major highways, and continues to be the most effective method for monitoring such threats. Several of our Rainforest CRC projects are contributing to advances of remote sensing techniques in tropical forest regions, and how such techniques may be applied to monitoring changes over time.



As technology progresses, many marginally detectable threats to tropical forests are more readily detectable from remote sensing platforms. (Image: http://www.mongabay.com/brazil.html)

Theme 2 – Even cryptic degradation can have dire effects...

As this theme would suggest, many hidden processes can have serious impacts on tropical ecosystems, for example, the surprisingly high tree mortality that results from surface (ground-layer) fires. During the 2002 drought many rainforest trees in the Cairns district suffered this fate as a consequence of understorey fires caused by exceptionally dry conditions. In many tropical regions outside Australia selective defaunation from overhunting, often in association with forest fragmentation and other forms of habitat deterioration, is also having deleterious impacts on ecosystems, with medium- and large-sized target species and top predators usually being the most vulnerable. This may lead to significant impacts on plant species that rely on larger animals for seed-dispersal services, perhaps resulting in long-term changes in plant community composition. Rainforest CRC researchers have contributed to our knowledge and understanding of seed dispersal in continuous and fragmented tropical forest landscapes. Researchers working in the Amazon have also documented the phenomenon of 'mesopredator release' due to selective defaunation, whereby populations of smaller omnivores explode following removal of the large, dominating predators.

In addition to widespread game hunting and commercial logging throughout most of the world's tropical forests, other extractive practices such as nut harvesting and fuel wood collection are having significant impacts. Small-scale gold mining in tropical forest regions now involves one million people worldwide, and is causing a multitude of ecosystem and human health impacts. Exotic pathogens are among the least understood of all the emerging threats in tropical forests, and their spread has taken a catastrophic toll in some species.

Large-scale climatic and atmospheric changes are almost certainly affecting tropical forests, although uncertainty remains over the magnitude of these effects and specific environmental drivers. Rainforest CRC researchers have provided a significant contribution to our understanding of the likely impacts of climate change on rainforest vertebrates and vegetation in the wet tropics region of Queensland, with many of these impacts likely to apply to other tropical forest regions around the world. Despite some excellent research, there is still considerable uncertainty about how tropical forests and biotas will respond to global warming and increased levels of carbon dioxide. More experimental research is required, such as free atmosphere carbon experiments that attempt to measure a range of biological and ecological responses to increased CO_2 conditions.

Climate modelling studies suggest an increased frequency and intensity of El Nino-like drought conditions in the future under global warming scenarios. Such events will have massive impacts on tropical forests worldwide, with increased forest burning during El Nino years.

Theme 3 – Tropical forest protected areas are in trouble...

Many of the insidious threats described above will also affect protected areas across the tropics, with many threats increasing in the future due to increasing fragmentation and associated edge effects. It is generally agreed that current investments in tropical protected areas are grossly inadequate to maintain reserve integrity, resulting in degradation due to illegal agricultural encroachment, surface fires, predatory logging, unsustainable harvests of fuelwood and non-timber products, illegal gold mining and chronic overhunting. Many protected areas are internally fragmented by roads and other linear clearings, which promotes species invasions and strong effects on wildlife sensitive to disturbance. Research within the Rainforest CRC has demonstrated the multiplicity of impacts from roads in tropical rainforest, including biotic and abiotic edge effects, linear barrier effects to fauna and changes in plant species composition near road edges.

Clearly, large tropical forest reserves are best for mitigating many threats, but large reserves are not necessarily protected by some threats. For example, large reserves cannot escape ecosystem- and community-level changes from large-scale climatic or atmospheric changes. Likewise, some exotic pathogens are able to penetrate large forest reserves, as are surface fires during extreme El Nino droughts.

Theme 4 – Focusing on frontiers...

With few exceptions (mainly limited areas of the Amazon, central America, central Africa, northern Borneo and eastern New Guinea) tropical forests have already been degraded by roads, infrastructure, widespread land transformation and sizeable human populations. Laurance and Peres argue that efforts to manage and protect nature reserves in regions that have already been substantially degraded will be far more difficult and expensive than in areas lacking such pressures. Hence there is a critical need to maintain large, intact expanses of tropical forest in a 'roadless' condition. This argument follows from the observation that roads are usually the first critical step in the frontier-colonisation process, as evidenced from recent work modelling impacts of planned road networks across

the Amazon Basin. Similar patterns are repeated across central Africa and parts of Southeast Asia, including the islands of New Guinea and Borneo.

Finally, Laurance and Peres present strategies to solve and mitigate emerging threats to tropical forests. There are many issues to be considered, such as who should pay for tropical forest conservation and how could the costs be met? Conservation incentive agreements are offered as an alternative to tropical forest exploitation. Nature-based tourism is suggested as a less serious threat to tropical forests than existing industries such as logging and mining. An interesting argument being put forward by climatologists is that conservation of large tracts of tropical forest in the Amazon Basin will mitigate some of the more serious impacts of climate change due to the moderating influence of the extensive forest cover on global weather and climate.

Associate Professor Steve Turton
Deputy Chief Executive Officer

Tropical forest south of Cape Tribulation, far north Queensland. (Photo: Birgit Kuehn)

From The Communications Team

Happy New Year everyone!

Welcome to a bumper issue of Forest Matters – it's been a while now since our last issue so we have lots of information about our activities over the past eight months to pass on to our participants.

First of all, we would like to welcome Ms Birgit Kuehn to the Rainforest CRC Communications team. Birgit commenced work with the CRC as Publications Officer shortly before our November conference, having previously worked with the Environmental Defenders Office here in Cairns. The team is complete once again, and we hope to get on track and push out a number of products within the next few months.

We have also had some staffing changes in Administration. Ms Trish O'Reilly moved into the position of Office Manager in November 2004, taking over from Ms Fran Repcsak, who has since retired to travel Australia.

To all of our participants, we wish you a productive and successful 2005.

So, who's who at Rainforest CRC Headquarters?

Staff Member	Role	Contact Details
Professor Nigel Stork	Chief Executive Officer	Nigel.Stork@jcu.edu.au Phone: (07) 4042 1246
Associate Professor Steve Turton	Deputy Chief Executive Officer and Leader, Program 9	Steve.Turton@jcu.edu.au Phone: (07) 4042 1292
Mr David Knobel	Business Manager	David.Knobel@jcu.edu.au Phone: (07) 4042 1251
Ms Trish O'Reilly	Office Manager	Patricia.Oreilly@jcu.edu.au Phone: (07) 4042 1246
Ms Shannon Hogan	Communications Officer	Shannon.Hogan@jcu.edu.au Phone: (07) 4042 1244
Ms Birgit Kuehn	Publications Officer	Birgit.Kuehn@jcu.edu.au Phone: (07) 4042 1253
Dr Sandra Pannell	Leader, Program 7	Sandra.Pannell@jcu.edu.au Phone: (07) 4042 1252
Mr Nigel Weston	Environmental Planner	Nigel.Weston@jcu.edu.au Phone: (07) 4042 1223
Ms Libby Larsen	Environmental Planner	Libby.Larsen@jcu.edu.au Phone: (07) 4042 1255
Ms Debra Harrison	Visiting Researcher	Debra.Harrison@jcu.edu.au Phone: (07) 4042 1255
Mr David Foster	Coastcare Facilitator	David.Foster@jcu.edu.au Phone: (07) 4042 1251

Natural Resource Management Planning Update

The Rainforest CRC is continuing its partnership with the new regional Natural Resource Management (NRM) body for the Wet Tropics, FNQ NRM Ltd, in preparing its new regional plan.

A brief recap

State and Commonwealth Government support for community-based natural resource management (NRM) is moving from a project-based approach to strategic investment at a regional scale. This is reflected in the National Action Plan for Salinity and Water Quality (NAP) and the Natural Heritage Trust (NHT), through which regional NRM Bodies in all Australian regions have been asked to develop integrated catchment/regional NRM plans. The regional NRM plans will form the basis for the development of investment stategies for each region to implement strategic actions and investment in NRM issues identified in the plans.

The Wet Tropics Regional NRM Plan is based around the primary assets of biodiversity, climate, land and water, as well as the human or social asset of community. There are also additional assets for Traditional Owners as defined in the Caring for Country chapter. Community is treated as an asset because it is recognised that the future health of the environment is dependent on the people of the region.

The plan takes shape

This Plan is presented in four sections. The first describes the purpose and scope, the second provides an overview of the Wet Tropics region and explains why and how the Plan was developed. The third section describes the assets, threats or challenges to these assets and the current management arrangements, both from a 'mainstream' and Aboriginal perspective. It identifies goals, intermediate targets for improvement in resource condition and management options that, if undertaken, could effect the changes needed to reach the targets and ultimately, the goal itself. For various reasons, it is not possible to protect every asset from every challenge it faces, so the fourth section identifies regional priorities for the investment of NRM funds. It provides details on the quadruple bottom line assessment of these priorities and the monitoring and evaluation framework.

Apart from preparing the Wet Tropics Regional NRM Plan, released for public consultation in September 2004, the Rainforest CRC NRM Plan team has been involved in a range of other associated activities. Members have facilitated or presented at public meetings, industry forums and State, National and international conferences on behalf of FNQ NRM Ltd. They have also produced a raft of written material, including the Background Report and Condition Report Series, which were released as supporting documents to the Plan earlier this year. These reports (and other documents) are available on the Rainforest CRC website.

Aboriginal cultural and natural resource management is a recurring theme in the plan, but is primarily dealt with in the Caring for Country chapter. Much of the information on Aboriginal issues and interests in the plan is sourced from the Wet Tropics Aboriginal Cultural and Natural Resource Management Plan (The Aboriginal Plan), which was developed in conjunction with the Regional NRM Plan. The Wet Tropics Regional NRM Plan is intended to be dynamic and responsive to community and regional needs and will be improved as more information becomes available, feedback is obtained and on-ground change takes place. A Regional Investment Strategy (RIS) will also be developed annually to complement the Plan. The purpose of the RIS, essentially a business plan, is to attract funds from State and Commonwealth Governments and other sources for priority actions that need to be taken.

The Wet Tropics Regional NRM Plan was released in September 2004 for public consultation and will late be accredited by both the State and Commonwealth Governments.

Plan Team Leader, Professor Geoff McDonald (left), with Nigel Weston and Cath de Voil. (Photo: Geoff McDonald)

Aboriginal Cultural and Natural Resource Management Plan

In March 2002, Wet Tropics Traditional Owners identified that they were not adequately involved in current natural resource management (NRM) planning processes. The recognition of this lack of involvement has lead to the development of a Wet Tropics Aboriginal Cultural and Natural Resource Management Plan (the Aboriginal Plan), to complement the overarching Wet Tropics Regional NRM Plan and provide Traditional Owners with a voice in how Country is managed. The process is innovative and unique in recognising Indigenous interests in regional NRM planning and is supported by Wet Tropics Traditional Owners, the Rainforest CRC and FNQ NRM Ltd.

Traditional Owners have actively participated in a three-year consultation and negotiation process to develop the Aboriginal Plan, which is due to be finalised by the end of 2004. Through this process Traditional Owners were decisively involved in creating their own consultation process, with advisory groups including the Indigenous Working Group and Indigenous Technical Support Group.

Aboriginal Cultural and Natural Resource Management Plan researchers Libby Larsen (left) and Jean Fenton, who is now based at the Kimberley Land Council in Derby, WA. (Photo: Shannon Hogan)

Over ten local workshops and six regional workshops have been undertaken as part of the process. The Aboriginal Plan will provide strategies and actions to address natural and cultural resource management issues for the region's Traditional Owners and identify opportunities for increased participation in management and decision making processes. The process aims to ensure each of the region's numerous Traditional Owner groups enjoy equal access and opportunity for participation in natural and cultural resource management in the region.

Water Quality Targets For Wet Tropics NRM Plan

For several years, the determination of realistic water quality targets for rivers draining into the Great Barrier Reef lagoon has been a source of substantial conflict, triggered mainly by Great Barrier Reef Marine Park Authority's release of quantitative load targets for each river (*Great Barrier Reef Catchment Water Quality Action Plan*). Subsequently, the Australian Industries Commission and the Baker Science Panel reviewed the situation and the Commonwealth and State Governments released the *Reef Protection Plan (2003)*. While this work provided useful information and principles, the vexed question of what the targets should be was still not resolved. The *Reef Protection Plan* however gave substantial responsibility for determining targets and actions to regional natural resource management bodies. As NRM body for the Wet Tropics, FNQ NRM Ltd, in partnership with the Rainforest CRC, is developing a Wet Tropics Regional NRM Plan, which includes water quality targets and actions.

FNQ NRM Ltd and the Rainforest CRC sponsored a two-day workshop in Cairns in May 2004 to ascertain whether industry, government and science representatives could reach agreement on water quality targets and priority management actions. The workshop program was designed around presentations of the best available science, and provided time for all participants to consider the most practical and effective targets for water quality improvement and for discussion of the most cost-effective actions to achieve the targets.

Scientific presentations highlighted several of the most critical concerns for the resource condition of both the Reef and the Wet Tropics rivers including:

- The majority of the 2900 reefs of the Great Barrier Reef are in good condition, however 450 inshore reefs are impacted by water quality decline (*Reef Water Quality Protection Plan*).
- While many waterways of the Wet Tropics are in good condition, six out of the eight river systems (75%) pose medium to high risk to the Reef from catchment impacts including nitrogen and sediment export from primary production together with development and construction pressures (*workshop background paper*).
- The Wet Tropics supports 42% of all freshwater fish in Australia and this diversity is of national significance (*Professor Angela Arthington*); water quality decline is impacting on these values.
- Even with decisive action, some sources of pollution will take several decades to eliminate, for example persistent pesticides. Another concern is the estimated thirty year supply of excess nitrogen stored in agricultural soils as a result of fertilising practices (*George Rayment*).

The task of setting specific targets in the spirit of driving NRM planning and investment in the right direction, and with the right amount of effort by all stakeholders was a challenging one.

While the concept of regional targets was endorsed in principle, the attendees agreed that no specific load target could

be set from our understanding of reef science at this time. Loads need to be reduced - the more the better - but there are no key target levels emerging from our scientific knowledge.

Reflecting the difficulty of setting meaningful and achievable load targets, strong preference was given to a target derived from modelling the anticipated changes in sediment and nutrient trends delivered through agreed adoption rates for Best Management Practices (BMP) by industry. This condition target would be calculated by catchment. In effect the approach involved science and industry determining the benefits of specific management practices to water quality, and then agreeing on improved adoption rates of beneficial practices with measurable water quality benefits.

In addition it was agreed that investment was needed in modelling and monitoring for improved accuracy in water quality management and in making better connections between management actions and responses in the resource condition; improvements in information flow and access arrangements were also required.

This approach, which has received strong support from science, industry and the community, breaks the long running dispute over water quality targets for the Reef and provides a framework for effective progress in improving the quality of water discharging from catchments in the region.

Regional groups in other reef catchments have now adopted a similar approach for their catchments.

The Wet Tropics World Heritage Area (WTWHA) receives approximately five million visitors per year. As such, the tourism industry contributes considerably not only to the local economy, but also to biophysical and psychosocial impacts associated with visitation and use of the Wet Tropics World Heritage Area.

The Tourism and Visitor Management in the Wet Tropics World Heritage Area Workshop, held at the Rainforest CRC 10th Annual Conference, addressed several issues associated with visitation and use. Organised and chaired by Dr Joan Bentrupperbäumer and Dr Joseph Reser, the workshop was attended by approximately thirty media, research, tourism, Indigenous and environmental management agency representatives.

The workshop focused on topics such as access and use of the WTWHA, design and layout of recreation sites, and psychosocial and biophysical impacts of visitation and use. The psychological, social and economic impacts of tourism on Indigenous communities located adjacent to WTWHA sites were also examined. Strategies and case studies were evaluated with respect to such communities.

Overall, the workshop provided an ideal forum and opportunity for all who attended and in particular the tourism and environmental management agency representatives to become familiar with the extensive research in WTWHA visitation and use issues undertaken by the Rainforest CRC Project 4.1, and to engage in discussion on these topics, in addition to guiding and providing some input into future tourism and visitation research.

Photo: Thomas Rayne

Catchment To Reef News

The Rainforest CRC would like to welcome Mr Tim Prior to the Catchment to Reef team. Tim was appointed as Communication/ Liaison Officer for the joint Catchment to Reef Program with CRC Reef recently to provide project and administrative support for the Program and ensure the smooth flow of communication between the Program's researchers and stakeholders involved.

Based in Townsville, Tim has spent the last few months developing a Communication Strategy and Plan, which includes details such as the target audiences who will benefit from Catchment to Reef research outcomes, and proposed methods for communication within the Program's network.

Tim also played a major role in the coordination of the Healthy Country, Healthy Reef Conference, held at the Cairns International Hotel from 23-25 November 2004.

Tim may be contacted on (07) 4781 5369, or by email to Tim.Prior@jcu.edu.au

Catchment to Reef Communication and Liaison Officer, Tim Prior. (Photo: Neil Young. Photo sourced from CRC Reef website)

Visitors to the field day enjoy a light lunch before exploring the crane site further. (Photo: Michael Cermak)

Canopy Crane Open Day

Members of Rainforest CRC Program 3, *Canopy Processes and Dynamics*, had the opportunity in April 2004 to share the results of their research with each other and showcase canopy research at the inaugural Australian Canopy Crane Field Day. Organisers, Kylie Goodall and Sarah Boulter from Griffith University, said the response to the field day was overwhelming with attendance by over forty representatives from Queensland Parks and Wildlife Service, James Cook University, CSIRO, Daintree Discovery Centre, Cape Tribulation Research Centre, Skyrail and local tourist operations.

Presenters on the day included Rainforest CRC researchers Dr Mike Liddell and Sarah Boulter, crane users Dr Peter Franks of James Cook University and PhD candidate, Christian Geyer of Leipzig University. The Australian Canopy Crane Research Facility Manager, Mr Michael Cermak, commenced the presentations with a general overview of the crane's facilities and capabilities.

Despite competing noise from heavy rainfall, Dr Mike Liddell described his exciting work on carbon and water flux from the forest around the crane site. Dr Liddell's research, which gained considerable media interest, documents the change in function of rainforest from CO2 sink to CO2 source during times of low rainfall. Dr Peter Franks focused in on the role of plants in respiration and transpiration, and demonstrated the response of individual canopy tree species to changes in atmospheric conditions. Dr Franks also highlighted the importance of the crane in his research to ensure the safe transport of expensive equipment to the canopy of many rainforest trees.

Sarah Boulter reported on a variety of animal–flower interactions, which she can now explore from the vantage point of the crane. Ms Boulter said that, while many canopy study techniques were well established, difficulties in accessing the canopy had meant that the reproductive biology of canopy trees were only be estimated until now. The results of pollination studies to date have highlighted the role of a variety of insect groups in canopy reproduction. Visiting student researcher, Christian Geyer, described the new results from ongoing phenological monitoring of the crane plot over the past twelve months.

For many visitors, this was their first experience of the canopy from the vantage point of the crane. Alan Curtis, coordinator of the Daintree Discovery Centre, complimented field day organisers, adding that staff of the Daintree Discovery Centre found the day thoroughly enjoyable and informative, and now hoped to become further involved in research projects at the crane facility.

Rainforest CRC Researcher Sarah Boulter talks with an ABC reporter . (Photo: Michael Cermak)

Overview of Joint Conference

Dr Steve Williams discussed the possibilities for ecological and evolutionary adaptation in reaction to climate change as part of Community Forum 1. (Photo: Shannon Hogan)

Conference Provides Guiding Light For Future Research

Feedback following our recent Healthy Country, Healthy Reef Conference indicated the joint event with CRC Reef was our best yet. Held from 23-25 November 2004 at the Cairns International Hotel, the Conference showcased Catchment to Reef research, and provided the Rainforest CRC a unique opportunity to explore options for the future of CRC research following our official close of operations in June 2006.

Over two hundred delegates participated in case studies, workshops and forums over the three days. Day One kicked off with an introduction to the Catchment to Reef Joint Program by Program Leader, Professor Richard Pearson. The Program comprises seven individual projects, all of which were overviewed by project leaders. Four case studies were included in the day's events, including an exploration of a new Integrated Area Wide Management (IAWM) process within the Fitzroy Basin, and an overview of the Douglas Shire Water Quality Improvement Program. Workshops focusing on natural resource management processes provided delegates with opportunities to learn from the experiences of others and contribute ideas and opinions in group discussions.

Around forty delegates opted to attend field trips on Day Two, which were held as part of the Catchment to Reef research showcase concurrently with a two day Tropical Futures forum and discussion sessions. Three main sessions were held over Day Two and Day Three involving a number of invited speakers representing different sectors to present new scientific information or provide stakeholder comments and ideas.

Outcomes for Catchment to Reef Program

The Conference provided a glimpse of how the community as a whole must cooperate to address issues relating to water quality decline. Community members joined industry personnel, private and government employees, Traditional Owners and scientists in presenting and discussing practical initiatives being used to improve water quality within the north Queensland region.

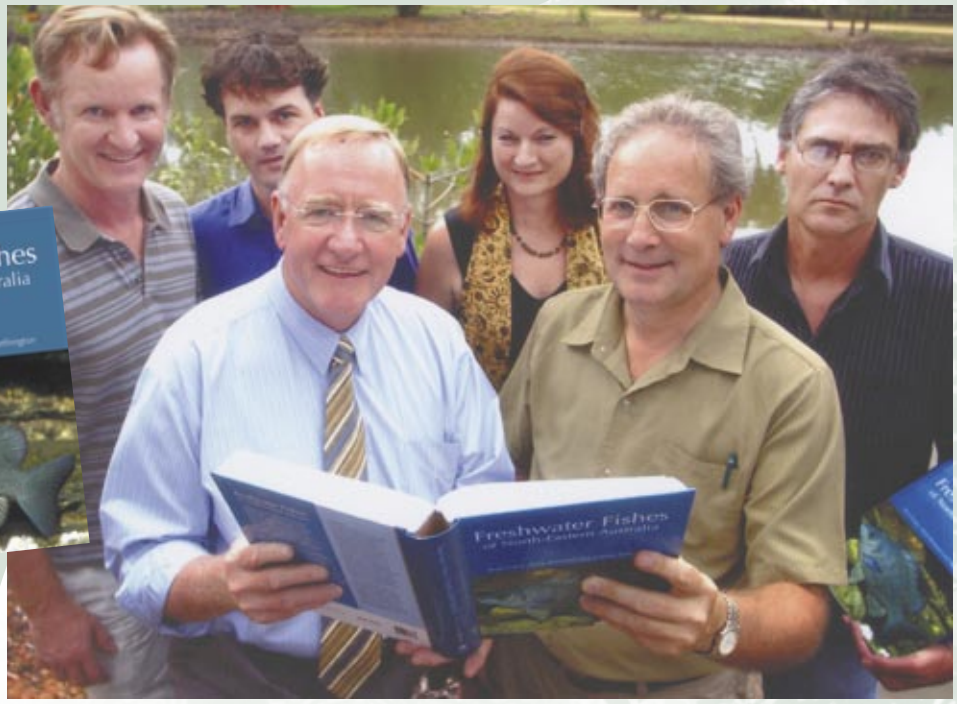
Discussions during workshop sessions focussed on financial assistance and incentives for land management. Representatives from Canegrowers, GrowCom and Griffith University indicated a discussion paper examining incentives is currently being developed and will be circulated widely. Other workshop outcomes included the identification of ways to involve the community in water quality monitoring and the importance of such inclusion, and the steps graziers in the upper catchments are taking to improve ground cover and reduce erosion on their properties.

The Natural Resources and Mines conference display on feral plants and animals. (Photo: Shannon Hogan)

A conference summary document is currently being compiled and will contain information on the presentations given at the conference, workshop content and outcomes and field trip overviews.

Delegates who attended the Welcome Reception enjoyed drinks and nibbles by the pool. (Photo: Shannon Hogan)

Milestone Reached In Freshwater Fish Research



Hard work pays off... (from left) Dr Nick Schofield of Land and Water Australia, Dr Mark Kennard of Griffith University, Senator Ian Macdonald, Professor Angela Arthington of Griffith University, Professor Nigel Stork of Rainforest CRC and Dr Brad Pusey of Griffith University. (Photo: The Cairns Post)

***Freshwater Fishes of North Eastern Australia*, a 684 page hardcover book, was officially released by Senator Ian Macdonald, Minister for Fisheries, Forestry and Conservation on 23 November 2004 as part of the Rainforest CRC's Annual Conference activities.**

Researchers Brad Pusey, Angela Arthington and Mark Kennard from Griffith University compiled the text following ten years of extensive studies on the ecology and management of freshwater fish in far north Queensland. The text also provides a review of existing literature and field research carried out in Queensland over the past twenty years.

Features include information on species identification, evolutionary history, breeding biology, feeding ecology, movement patterns, habitat use, water quality tolerances, conservation status, current threats and management recommendations, along with high quality ink illustrations.

The authors have made an exceptional effort in production of the impressive hardback, which may be ordered online through CSIRO Publishing (www.publish.csiro.au).

The Rainforest CRC took advantage of the official launch, using the opportunity to raise awareness of a report by Dr Damien Burrows of the Australian Centre for Tropical Freshwater Research, funded by the Wet Tropics Management Authority and Rainforest CRC.

Entitled *Translocated Fishes in Streams of the Wet Tropics Region, North Queensland: Distribution and Potential Impact*, the report reveals that native fish do not occur throughout all river systems in Australia, and that even within one river, they may be restricted to certain sections. For example, within the Wet Tropics many native fish species have been moved, or 'translocated', to above waterfalls where they have not occurred naturally. Translocations such as these may cause significant environmental changes such as loss of numbers of naturally occurring species to more predatory species.

The report is available online at www.rainforest-crc.jcu.edu.au, or in hard copy (contact Rainforest CRC Headquarters on (07) 4042 1246).

Fishing... For Science

Honours candidate, Paul Thuesen, called in to the Rainforest CRC Headquarters in September 2004 to share some exciting news – his discovery of an undescribed species of the genus *Stiphodon* – a family of tiny cling gobies belonging to the subfamily Sicydiinae, located in a lowlands stream near the Daintree in far north Queensland.

Paul's research focuses on genetic population structuring within freshwater systems. Freshwater ecosystems around the world are under heavy pressure due to large scale agricultural developments driven by human population growth. The Wet Tropics bioregion in far north Queensland houses an extremely high freshwater fishes species richness, providing Paul with opportunities to study a number of different species during his research.

Following research by members of the Queensland Museum, it appears that the new species discovered by Paul closely resembles *Stiphodon atratus* from Papua New Guinea, however there are marked differences, and the Queensland Museum is confident the Daintree specimen represents a new taxon. If the Daintree specimen does represent a new taxon, further research would prove invaluable as the current known distribution of the specimen shows it to be endemic to one small creek between the Daintree and Bloomfield River. Even within the creek, a number of individuals have only been found in two small pools, despite extensive surveys of the area.

Paul had an article published in ANGFA News (Australia New Guinea Fishes Association) in September 2004, describing his discovery, copies of which may be obtained from treasurer@angfa.org.au

Based at James Cook University in Cairns, Paul may be contacted on (07) 4042 1213 or by email to paul.thuesen@jcu.edu.au.

The Rainforest CRC provided competitive funding to support Paul's Honours research.

James Cook University Honours candidate, Paul Thuesen. (Photo: Paul Thuesen)

Here little fishy fishy... a male Stiphodon from the Daintree lowlands. (Photo: Paul Thuesen)

Food Webs of Wet Tropics Freshwater Fish

If the Gidyea bugs and mango stalks are anything to go by, this should be a good wet season – one bound to make life interesting for PhD candidate, Tom Rayner, during the next few months.

Tom is set to complete his last round of sampling in April, bring his two-year field study of the Mulgrave River in far north Queensland to an end. His work has focussed on the feeding habits of around fifty freshwater fish species in the lowland section of the Mulgrave River, with the aim of answering one of science's most common questions, 'Who eats whom?'.

Researchers from a range of disciplines and organisations around the world are focussing on the dynamics of complex feeding interactions. The most common approach is to construct food webs and analyse their various properties, such as food chain length. Tom hopes to use food webs, generated from his seasonal samples, to determine the possible effects of climate change on the feeding dynamics of Wet Tropics freshwater fishes.

Volunteers check gill nets for fish during one of Tom Rayner's field trips. (Photo: Tom Rayner)

Roadside Heavy Metals Impacts On The WTWHA

Residential development, tourist impacts and the presence of feral animals and plants are just some examples of well-documented threats to the Wet Tropics World Heritage Area (WTWHA) of far north Queensland, but a potential and lesser known threat is posed by the diffuse release of traffic contaminants into roadside corridors within the region.

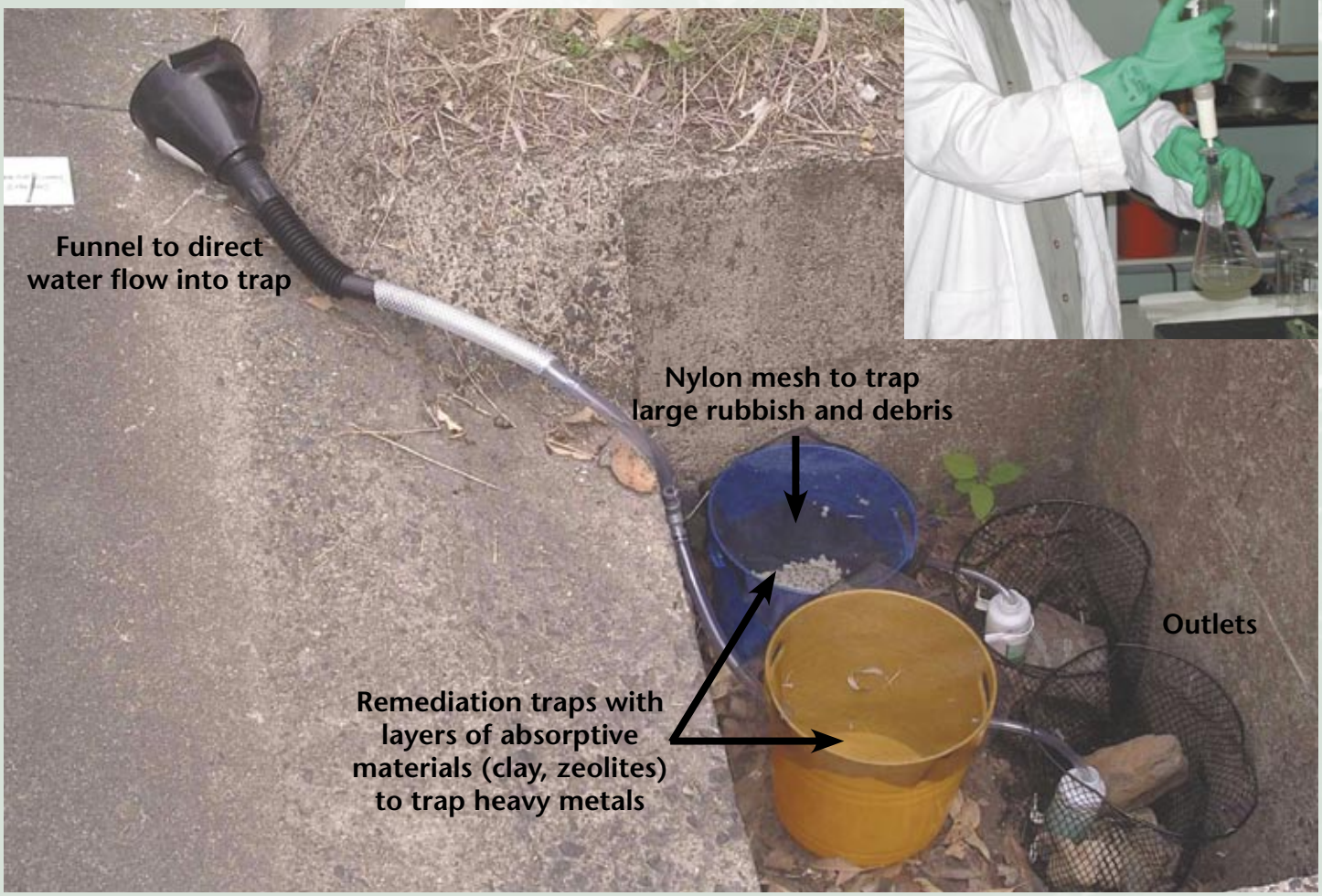
As part of his PhD studies, Chris Pratt is studying the impacts of heavy metals released from motorised vehicles in the WTWHA, as these potentially toxic contaminants are renowned for their tendency to bioaccumulate.

A particular focus of Chris' research is lead – widely considered as one of the most toxic heavy metals. While the primary source of lead in motor vehicles was leaded petrol, prior to its phasing-out in Australia in 2002, this heavy metal is still released into roadside environments from a number of other sources on vehicles including tyres, brake pads and oils. Results from Chris' research undertaken on the Kuranda Range road north of Cairns, which transgresses a section of the WTWHA, indicate that lead exhibits a lingering presence in the environment. Sediment sampling shows a mixture of natural background lead and manufactured lead, indicating contamination from motor vehicles. As lead in road-deposited sediments has the potential to be mobilised over soils by rainwater runoff, it thus comes into direct contact with soil-dwelling plants and animals. Results from sampling of lead concentrations in the root tissue of a feral roadside grass species suggests lead in soils close to road edges is taken up by plants.

Chris is currently investigating strategies for limiting the dispersal of lead and other metal contaminants into sensitive roadside environments. To date, the most suitable method Chris has identified to achieve this outcome is the use of filter traps that can absorb heavy metals from road runoff during rainfall events.

Chris's findings show there is a continuing release of manufactured lead into roadside environments along the Kuranda Range road, and that there is an observable elevated lead content in grass root tissue next to this road compared with lead concentrations in the root tissue of grass specimens collected further away from the road edge. The implementation of readily portable remediation traps incorporating absorptive materials, Chris believes, is an effective way to treat heavy metal contamination in roadside environments.

The Forest Matters camera captured PhD candidate, Chris Pratt, hard at work with his studies on the effect of heavy metals on the Wet Tropics World Heritage Area.



Chris' trial design for remediation traps to lower heavy metal concentrations in road runoff in the Wet Tropics World Heritage Area. (Photo: Chris Pratt)

Research Support Scheme Grants

Reminder: Round 13 Research Support Scheme

Rainforest CRC postgraduate students are reminded that applications for funding under Round 13 of the Research Support Scheme close on 11 March 2005.

Students wishing to apply for competitive funding should download guidelines and application forms from http://www.rainforest-crc.jcu.edu.au/research/fundingSchemes.htm

The Rainforest CRC contributed $104,000 in Research Support Scheme grants to its registered students in the 2003/2004 financial year.

Students who received funding in Round 12 (September 2004) are as follows:

Student	University	Project Title
Sandra Abell	JCU	Distribution of truffle fungi, principle resource of the endangered *Bettongia tropica*, along a wet to dry gradient of sclerophyll forest
Peter Byrnes	JCU	Impacts of roads on medium-sized, ground-dwelling rainforest mammals in the Wet Tropics World Heritage Area
Paul Ferraro	JCU	Taxonomic status and population structure of the Mahogany glider
Naima Fine	GU	Effects of fragmentation on seed predators and plant recruitment in remnant rainforests of the Big Scrub
Sam Fox	JCU	Demography and population genetics of the spectacled flying-fox, *Pteropus conspicillatus*
Kim Hauselberger	JCU	Ecology and environmental interactions of Wet Tropics microhylids, and their responses to the chytrid fungus *Batrachochytrium dendrobatidis*
James Hill	JCU	Determining mechanisms that enable plant co-existence within tropical rainforests
Conrad Hoskin	UQ	The roles of historical isolation and ecological gradients in regenerating diversity in the Wet Tropics
Katie Jones	JCU	Dietary selectivity in a rainforest possum: the effect of climate change on the interaction between plant toxins and foliage intake
Lynne Jones	JCU	Genetic diversity and gene flow within and between populations of the rare tropical forest tree, *Idiospermum australiense* (Diels.) S. T. Blake
Anna Koetz	JCU	Cultural and genetic divergence of a rainforest endemic, the Chowchilla, *Orthonyx spaldingii*
Akihiro Nakamura	GU	Development of soil and litter arthropod assemblages in rainforest restoration
Jennifer Parsons	JCU	Cycles of resource use in the spectacled flying-fox (*Pteropus conspicillatus*) in relation to landscape context
Catherine Pohlman	JCU	Edge effects of linear canopy openings on rainforest understorey microclimate and seedling dynamics in the WTWHA
Chris Pratt	JCU	The dispersal and bioavailability of heavy metal traffic contaminants in a section of WTWHA
Billie Roberts	GU	Habitat characteristics of flying-fox camps in south-east Queensland
Ilyas Siddique	UQ	Effects of community composition on tree functional responses to nitrogen and phosphorus limitation in degraded soils

Australian Farm Forestry Financial Model

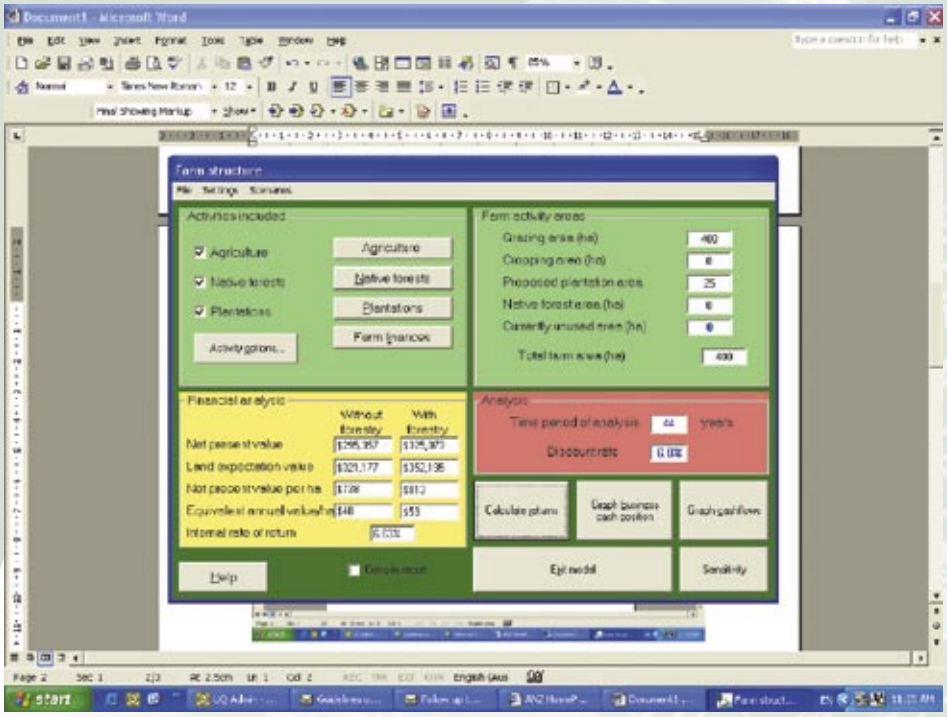
Researchers from Rainforest CRC Project 5.3 hosted a free, hands-on demonstration of their new Australian Farm Forestry Financial Model (AFFFM) on 6 August 2004 at James Cook University's Cairns Campus. The AFFFM is a recent outcome for researchers Dr John Herbohn, Mr Nick Emtage and Dr Steve Harrison of The University of Queensland, following extensive research into the options available to small-scale farm forestry investors.

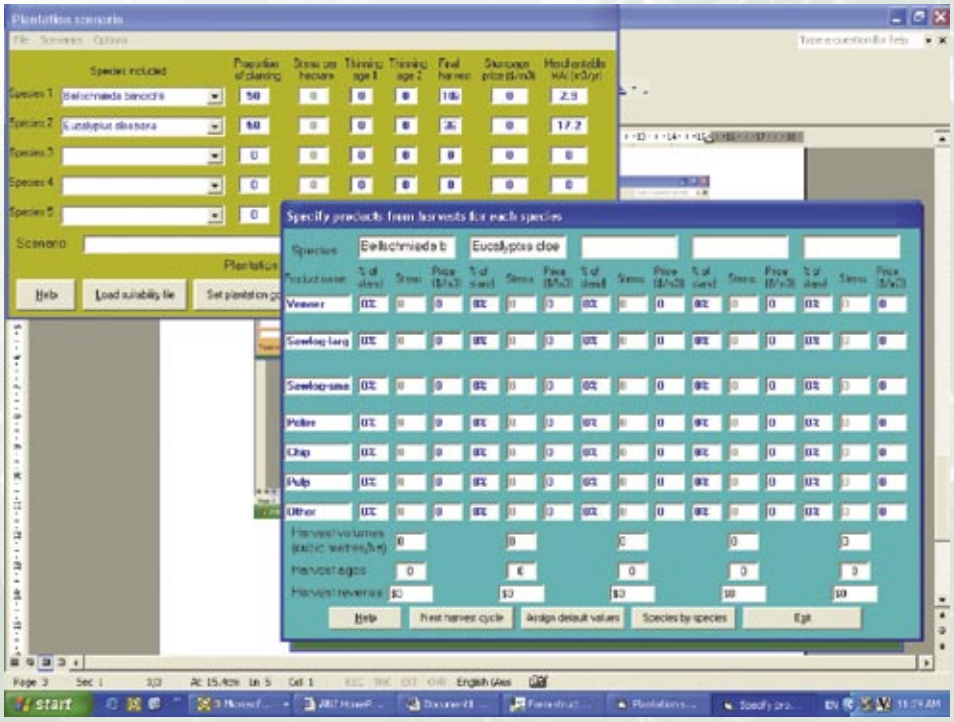
Included in the AFFFM are substantial datasets for establishment and maintenance costs, growth rates and potential timber products of a number of tree species for north Queensland, southeast Queensland and northern New South Wales.

For landholders, the decision to take up farm forestry is a major investment decision – a decision that, for many, is only undertaken once in lifetime. The AFFFM is a user-friendly, powerful tool for the financial appraisal of farm forestry options. The Model uses discounted cashflow analyses to provide users with a variety of measures of the financial performance of a hypothetical farm enterprise, comparing the financial performance of a farm with and without forestry activities.

The workshop was well received, with attendance by forestry researchers, private landholders and staff of James Cook University. Attendees reviewed case studies and undertook hands-on exercises using the model including the opportunity to evaluate their own data.

Further information about the AFFFM may be obtained by contacting Dr John Herbohn (j.herbohn@uq.edu.au) or Mr Nick Emtage (s4014101@student.uq.edu.au), of the School of Natural and Rural Systems Management, The University of Queensland.





Screen shots from the Australian Farm Forestry Financial Model

Species Survival Questioned In Public Forum

Around fifty guests attended a special public lecture, hosted by the Rainforest CRC, by prominent American scientist, Dr Peter Raven, on 18 August 2004.

As Director of the Missouri Botanical Gardens, and a science and technology adviser to US President George W. Bush, Dr Raven was invited to present his views on species survival and sustainable environments in the 21st Century, following his plenary talk at the 22nd International Congress of Entomology in Brisbane.

Dr Raven has authored or co-authored more than four hundred scientific articles and sixteen books and is an elected member of national science academies in nine countries.

Entitled *How many species will survive the 21st Century?*, Dr Raven's talk raised issues directly relating to the Wet Tropics regional area, noting that despite current efforts to preserve areas such as the Wet Tropics, further work was still required if future generations were to enjoy and learn from the regional environments as we have – a recurring common theme known only too well by environmentalists, conservation groups and the community in general.

Guests were treated to drinks and nibblies prior to Dr Raven's talk. (Photo: Shannon Hogan)

Rainforest CRC Chief Executive Officer, Professor Nigel Stork, enjoys a quiet yarn with Dr Raven. (Photo: Shannon Hogan)

Rainforest CRC Deputy Chief Executive Officer, Associate Professor Steve Turton, chats with Mrs Raven, who accompanied Dr Raven during his stay in Australia. (Photo: Shannon Hogan)

CRC Bids 'Farewell' to Distinguished Professionals

The past twelve months saw many successes for the Rainforest CRC, but also sad losses.

One of the founders of the organisation Trees for the Evelyn and Atherton Tablelands (commonly known as TREAT), ecologist Geoff Tracey, passed away in July 2004. Geoff will always be remembered for his readiness to share his outstanding knowledge of the rainforests of far north Queensland.

Botanist and ecologist, Garry Werren, passed away in October 2004. Garry was a valued member of the Australian Centre for Tropical Freshwater Research and the Rainforest CRC. Garry will be missed for his freely expressed love of the natural world and all things within.

Stamp Out Phytophthora!

Based on research carried out by Stuart Worboys and Paul Gadek (both based at James Cook University) for the Rainforest CRC, the Wet Tropics Management Authority has produced a new information leaflet to help combat the risk of spread of *Phytophthora cinnamomi* in the Wet Tropics World Heritage Area.

So, what is Phytophthora?

Phytophthora is a micro-organism that destroys the fine root system of plants by stopping water intake, eventually killing the plant. It has the capacity to seriously damage plant species susceptible to dieback in the Wet Tropics and has already caused small patches of forest dieback in the area. Hygiene measures employed by recreational and commercial users of the World Heritage Area, as well as guidelines for land managers and contractors, are mentioned in the brochure to help reduce the risk of spread.

The Stamp out Phytophthora *brochure is available from the Wet Tropics Management Authority.*

Brochures may be downloaded from the Wet Tropics Management Authority website at www.wettropics.gov.au, or email deanna.belbin@epa.qld.gov.au.

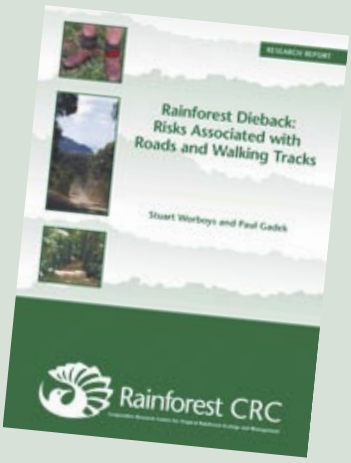
CRC Phytophthora research

Released in April 2004, the Rainforest CRC Research Report *Rainforest Dieback: Risks Associated with Roads and Walking Track Access in the Wet Tropics World Heritage Area* (ISBN 0 86443 712 9) by Stuart Worboys and Paul Gadek (James Cook University) provides guidance on how to manage and minimise the risk of spreading or activating *Phytophthora cinnamomi* as a result of human access and associated activity in the Wet Tropics World Heritage Area.

Key findings from the study include:

- *Phytophthora cinnamomi* was detected at all sites where aggressive outbreaks of this disease were evident.
- The trigger to aggressive behaviour of *Phytophthora cinnamomi* is at present unknown.
- A survey of literature failed to identify any current guidelines for soil pathogen management in natural tropical ecosystems, although such documents have been developed for use in temperate zone situations.
- A list of tree species that persist on dieback sites in a health state is provided – these species may prove useful in further studies.

PDF copies of the report may be downloaded from the Rainforest CRC website at www.rainforest-crc.jcu.edu.au, or hard copies may be obtained by contacting shannon.hogan@jcu.edu.au.



Cassowary Awards Reveal True Heroes Of Wet Tropics

Recent news from the Wet Tropics Management Authority revealed the winners of the 2004 Cassowary Awards, who have made outstanding contributions in conservation of the Wet Tropics World Heritage Area. Held at the beautiful Paronella Park near Innisfail on 4 December 2004, the event was attended by around 150 guests. Winners included rainforest researchers, conservationists, nature-based tourism operators and Rainforest Aboriginal People, all of who were presented with prestigious awards by The Hon. Desley Boyle, Queensland's Minister for the Environment.

Dr Mike Hopkins, former OIC of CSIRO in Atherton and Deputy CEO of the Rainforest CRC, is awarded the Cassowary Award for Science by Queensland Environment Minister, Desley Boyle. Mike has written over 100 publications on the Wet Tropics rainforests, and is considered a world authority on the effects of disturbance on rainforest and its resilience. (Photo: Wet Tropics Management Authority)

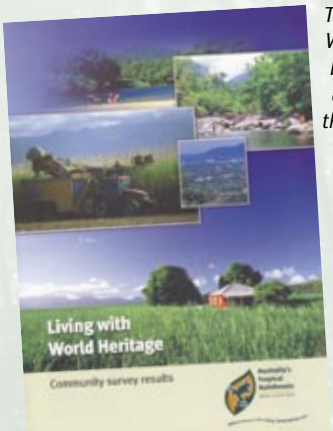
Community Support Strong For Wet Tropics

Findings from surveys on community attitudes towards the Wet Tropics World Heritage Area were officially released by the Wet Tropics Management Authority on 28 October 2004 in Cairns.

Designed to provide an insight into the opinions of people living in the Wet Tropics region and the role the World Heritage Area plays in their lives, community surveys were undertaken by Rainforest CRC researchers over recent years with funding from Tourism Queensland. Results were published in the brochure ***Living with World Heritage***, which was launched by Queensland Minister for Tourism, Margaret Keech. The final report will be published by the Rainforest CRC in 2005. Copies of supporting documents may be downloaded from the Rainforest CRC website at http://www.rainforest-crc.jcu.edu.au/research/project4.1.htm.

The survey area covered seventy regional towns and suburbs in the Wet Tropics region, with a second survey conducted at ten key visitor sites in the Wet Tropics World Heritage Area. Key findings include an increase in support for the World Heritage Area by the regional community, and that the community is not satisfied with the current standard of on-ground management.

Copies of the brochure may be obtained by contacting Deanna Belbin on (07) 4052 0531.



The Living with World Heritage brochure, now available from the Wet Tropics Management Authority.

Wet Tropics researcher and co-author of the survey report, Dr Joan Bentrupperbäumer, with Queensland Minister for Tourism, Margaret Keech, and Wet Tropics Management Authority Board Chair, John Grey (Photo: Wet Tropics Management Authority).

Yalanji Fire Management Practices Defined

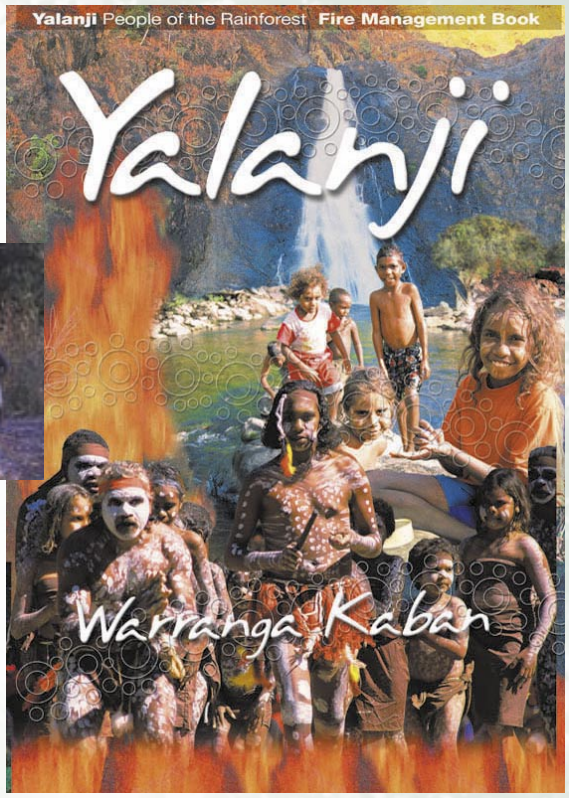
A new book entitled Yalanji Waranga Kaban Yalanji People of the Rainforest Fire Management Book was launched by Traditional Owners of the Daintree rainforest on 20 December 2004 in Cairns. Stunning images of Yalanji people, their country and culture, and a captivating story presented in both Kuku-Yalanji language and English provide a rare glimpse into the depth of knowledge and the spiritual connection behind fire management practices that have sustained the values of the rainforest for millennia.

Yalanji Traditional Owners Edward Barney and Roy Gibson observe a fire. (Photo: Steven Nowakowski)

Led by Dr Rosemary Hill of the Australian Conservation Foundation, the project is a culmination of nearly ten years' research, and was proudly partnered by the Rainforest CRC, Cape York Land Council, Wujal Wujal Community Council and Bamanga Bubu Ngadimunku, with support from the Australian Conservation Foundation, Natural Heritage Trust, James Cook University and publisher Little Ramsay Press.

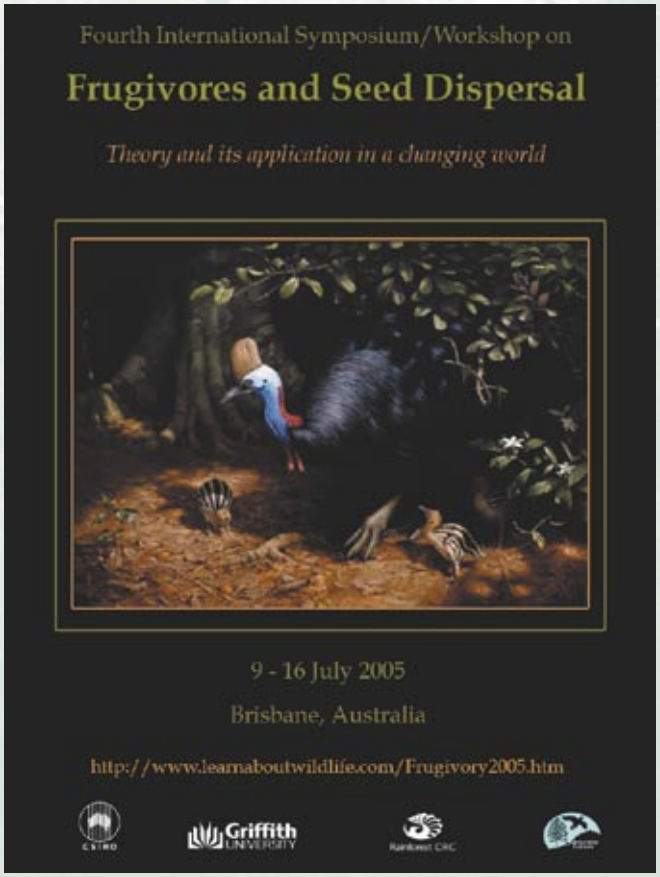
Invited guests, Traditional Owners and their families filled the Cairns Cruising Yacht Squadron club house to witness the special milestone for Yalanji people, and were treated to live dance performances by Bamanga Bubu Ngadimunku Dancers.

Copies of the book are available for $29.95 and may be ordered through Little Ramsay Press (email ramsaypress@ozemail.com.au). All proceeds from the sale of the book return to Yalanji organisations to support ongoing land management and cultural projects.



Spectacular artwork and photography complement personal recollections, stories and recorded history contained in the Yalanji People of the Rainforest Fire Management Book. (Image: Steven Nowakowski)

Visit the Conference websites at www.rainforest-crc.jcu.edu.au



Weed Management – Making A Difference

The **8th Queensland Weed Symposium** will be held in **Townsville** from **19-22 June 2005**, and will include presentations on:

- community and government initiatives;
- policy matters;
- new innovations;
- new potential weeds;
- the latest research;
- the National Weeds Program; and
- Weeds of National Significance (WONS).

Trade displays will show new products and the latest technologies, and delegates will have the opportunity to attend field trips within the Townsville region.

Latest information about the Symposium is available on the Weed Society of Queensland website at www.wsq.org.au.

To obtain a registration form in early 2005, register your details with the Symposium Secretariat:
Conference Planners NQ
PO Box 771
Townsville QLD 4810
email: easy@conferenceplanners.com.au

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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