



# WHAT'S UP?

THE NEWSLETTER OF THE INTERNATIONAL CANOPY NETWORK

NALINI NADKARNI, EDITOR

DAVID FRANKLIN, EDITORIAL ASSISTANT

## Cairns 2002: 3rd International Canopy Conference Update

Following the great success of the Florida conferences, the 3<sup>rd</sup> International Canopy Conference will be held in Cairns, Australia from 23-28 June 2002. The Conference is a joint initiative of the Queensland Government and the Smithsonian Institution. The Conference will include four meeting days pivoting around the field day.

The organisers have adopted the subtitle 'Science, Policy and Utilisation' as the underlying themes for the meeting. Although canopy science will dominate the program, there will be sessions dedicated to valuation, education, utilisation and management of canopies around the world. A distinguished set of keynote and plenary speakers have accepted invitations to provide provocative and scene-setting presentations around the daily themes. Their presentations will be interspersed with sessions at which attendees will present papers and posters. There will be general sessions for contributed papers and a wide range of organised Symposia, each occupying one or more of these 'contributed paper' sessions.

The conference will start on Sunday afternoon, 23 June 2002. This will be followed by an opening, cocktail hour function.

*Plenary and Keynote Addresses.* The first day's invited speakers will provide summaries of canopy science, its development and application. Stuart Pimm, a distinguished ecologist from the Centre for Environmental Research at Columbia University, New York, known for his provocative writings on conservation, biodiversity and extinction, will present the opening address with an overview of canopy science. Plenary speakers on Day 1 include Hamdallah Zedam (Execu-

tive Secretary of the Secretariat of the Convention on Biological Diversity), John Grace (University of Edinburgh), Nalini Nadkarni (Evergreen State College and President of ICAN), Bill Laurence (STRI, Panama), and Chris Margules (CSIRO, Atherton).

On Day 2, a set of speakers will present the ecology of Australia, paying particular attention to forests and their canopies.

Each speaker has been asked to review current views on aspects of the topic. Tim Flannery (South Australian Museum) will present his often controversial views on the long-term ecological history of the continent. His keynote address will be followed by plenary presentations by Gwen Andrews (Greenhouse Office, Environment Australia), Peter Kershaw (Monash University), Roger Kitching (Griffith University) and Andrew Beattie (Macquarie University).

Thursday will focus on the economic, social and management aspects of the canopy. The day's plenary address will be given by Bob Costanza (University of Maryland), who will discuss the valuation of canopy services and related issues at the interface of ecology and economics. Keynote addresses by Phyllis Coley (Biology Department, University of Salt Lake City) and Ken Chapman (Skyrail, Cairns) will follow.

The last meeting day will be organised somewhat differently. The sessions will look to the exciting developments we may expect in our science and its application in the near and distant future. The Global Canopy Program will be launched at this time, and a keynote address will be delivered by Andrew Mitchell (Earthwatch, Oxford University). We will also examine the exciting scientific, educational, and

*(continued on page 2)*



(Cairns 2002, continued from cover)

management prospects afforded by the growing network of canopy cranes, walkways, and other access systems. There will be an emphasis on the value we gain by working collaboratively and cooperatively using these facilities.

Thematic Symposia. *More than twenty thematic sessions are under vigorous negotiation at this time (November 2001) and we welcome further suggestions (but soon, please!).*

The following Symposia are in more or less advanced stages of planning:

- The ecology of mistletoes  
(contact Dave Shaw, University of Washington);
- The ecology of epiphytes  
(contact Martin Freiberg, University of Ulm);
- Pollination and the floral landscape  
(contact Roger Kitching, Griffith University);
- Seed Dispersal & Frugivory  
(Contact David Westcott, CSIRO, Atherton);
- Volatile Hydrocarbons & Climate Change  
(Contact Ray Leuning, CSIRO);
- Eucalypt Canopies  
(Contact Jonathon Majer, Curtin University);
- Temperate Canopies  
(Contact Claire Ozanne, Roehampton Institute, London);
- Photosynthesis  
(Contact Steve Mucahy, STRI, Panama);
- Water Relations in the Canopy  
(Contact Rick Meinzer, Oregon State University);
- Economics and the Canopy  
(Contact Tor Hundloe, University of Queensland);
- Tourism and the Forest Canopy  
(Contact Nigel Stork, Rainforest CRC, Cairns);
- The Business of Eco-tourism  
(Contact Tony Charters, Tourism Queensland);
- Remote Sensing/Ground Truthing  
(Contact Stuart Finn, University of Queensland);
- Canopies as 3-D Environments  
(Contact Jess Parker, STRI, Maryland);
- The Emerging 'New' Science of the Canopy  
(Mark Moffett University of California, Berkeley).

We are actively seeking convenors for further sessions on Herbivory, Fungal Biodiversity, Ants, Fig-wasps, and Vertebrates in the canopy. Anyone interested in contributing to these thematic sessions should contact the persons named, or the Chair of the Program Committee. The Conference website (<http://www.premiers.qld.gov.au/about/science/canopyconference>) will be updated frequently as Symposia are 'locked in'.

*The Field Day.* The scholarly core business of the meeting will be leavened with other activities, including the Field Day on Wednesday. This day will be an opportunity to see natural areas and research sites around Cairns within the Queensland World Heritage Area. Participation in the activities of this day is part of the meeting registration. A range of alternatives is available (full details are on the website), which have been organised around four themes: the connection between canopy science and environmental policy; the biodiversity of the forests and their canopies; economic/social/management aspects of canopies; and, the importance of comparative studies and benchmark sites. Within these themes participants may choose to visit the North Queensland Canopy Crane site at Cape Tribulation, go spotlighting for mammals on the Atherton Tablelands, visit the Rainforest Cableway, or visit a number of key forest sites. We have organised a number of pre- and post-conference tours that will take you farther afield to view the natural wonders of North Queensland. These excursions will allow you to experience Aboriginal rock-art, outback 'safari' experiences, the wet and dry sides of Cape York Peninsula and the Great Barrier Reef. Details are on the website.

*The Conference Dinner and Public Forum.* On the evening of the first full day will be a conference dinner. Australia's best known science journalist, Robyn Williams, has agreed to be the after-dinner speaker at this event. (Note that this is 'THE' Robyn Williams – not to be confused with the Hollywood-based namesake and look-alike!). Finally, on Thursday evening, we are negotiating a public forum or debate where some of the conference's results and personalities can interact with the public. The details of this evening are not yet finalised but, again, will be placed on the website as they develop.

*Cairns for the Visitor and Naturalist.* The meeting will be held in the capital of Queensland's tropical northern region. Cairns is a modest-sized city located on the Coral Sea coast and backed by rainforest-covered hillsides. In June you'll experience an equable climate with warm days and cooler nights. This will be the drier time of the year, although the Wet Tropics Region can experience coastal rain at all times of the year. Cairns is situated in the middle of Australia's most biodiverse region and is a delight for the visiting naturalist. The Barrier Reef is just offshore, and patches of rainforest are scattered throughout the region.

So, come for the science, come for the natural history, or even for the seafood and wine (or all of the above) – but do come. See you in Cairns!

Roger Kitching, Chair, Program Committee; <<<http://www.premiers.qld.gov.au/about/science/canopyconference>>>

## EDITOR'S CORNER

[Editor's note: This is a new feature to provide comment on the content of the current newsletter and recent activities of the ICAN. We welcome your responses via e-mail or letter].

As we go to press with this issue of "What's Up?", we bring our eighth consecutive year of publishing the ICAN quarterly newsletter to a close. Our readership has grown, as has the breadth of activities encompassed by our network.

Despite this growth in content, our operations remain at this time fairly similar to the conditions under which the first volume was created in 1994. A small but dedicated staff pulls together materials and information gathered through ICAN's e-mail bulletin board, the scientific literature, and other sources within our lab space at The Evergreen State College.

With the establishment of the Global Canopy Programme (see page 6 of this issue), ICAN has the potential of expanding our current operations. The Director, Andrew Mitchell, articulates a large-scale and long-term vision of what a global canopy research and education program might be as he reflects the ideas of a number of international canopy researchers that were discussed in workshops starting in 1999 (see What's Up? Vol. 6:2). It may take some time to pull the funds needed to implement these visions from the international community, but a course has clearly been set.

One manifestation of that vision is the upcoming Cairns Conference (see cover). Growing from the tradition of the two previous international canopy conferences at The Marie Selby Botanical Gardens (see What's Up? Vol. 5:1), in which a fairly small and highly specialized group of researchers and educators gathered to exchange ideas and information about tropical and temperate forest canopy biology, the Program Committee for the 3<sup>rd</sup> International Canopy Conference in Australia has deliberately broadened the base from which to launch their meeting. In addition to the traditional participants from academia, we will interact with participants from government agencies, corporations, partners, and ecotourism groups. It promises to be a stimulating mix.

Another indication of the changing scope of canopy studies is that researchers are developing new techniques to make unprecedented measurements of forest canopy attributes. Dr. Roman Dial describes his measurements of the airspace of forest canopies - the "negative space" of the forest - taken in collaboration with a variety of established forest canopy research projects around the world. This is an excellent example of a researcher seeing the forest in new ways, of continuing to push back the borders of our "last biotic frontier",

## Forest Giants of the Pacific Coast

by Robert Van Pelt

Available Fall 2001!

Published by University of Washington Press  
and Global Forest

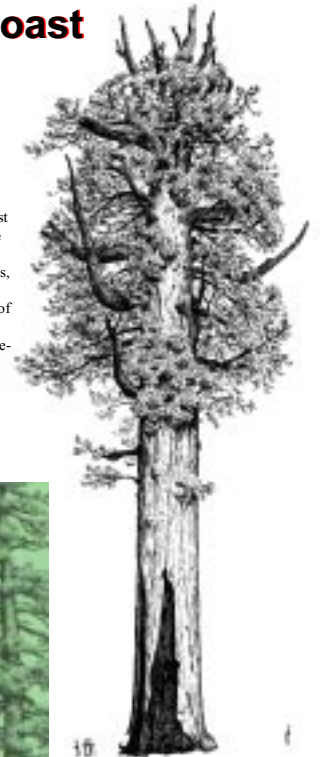
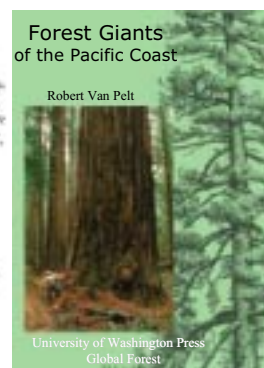
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and working jointly with others to articulate a more complete vision of complex forest ecosystems.

When and how the dreams of canopy work "going global" articulated in this volume will be realized is difficult to predict. These visions are big, and will take a phase shift in the way that we canopy researchers have traditionally worked - at small spatial scales, with low levels of funding, and alone or in small groups. Stepping up to the kinds of collaboration that will be necessary to address the big questions that the GCP proposes to tackle will take different sorts of efforts - of communication, data-sharing, collaboration, and interdisciplinary thinking.

The ICAN will continue to serve its members and associates to fulfill its mission of enhancing communication among researchers, educators, and conservationists concerned with forest canopies in all ways that we can.

—Nalini Nadkarni, President

## Seeing the Forest and the Trees-and the Air

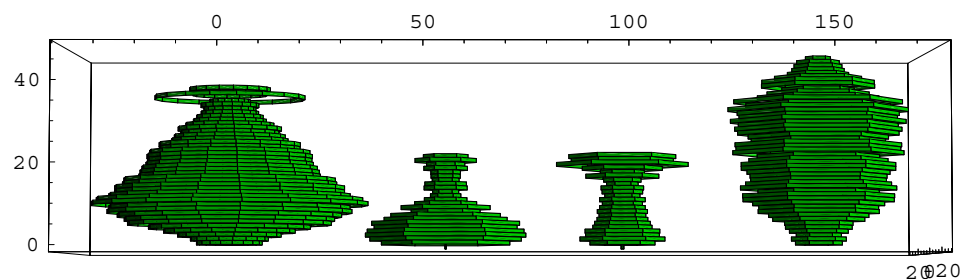
Picture your favorite canopy. Maybe it is a mossy, old Douglas-fir grove, a set of towering redwood crowns, a domed copse of oak, or a tangled, tropical cacophony of hardwoods, bromeliads, orchids and philodendrons. What, exactly, is that delightfully airy world composed of? By definition, it is composed of trees and epiphytes. But there is a lot of empty space up there, too.

In fact, it is that empty space that makes the canopy so exhilarating and demanding. Humans are not the only ones who navigate the distances down and across. Most arboreal animals must devise ways to deal with this empty space, either by reaching, jumping, gliding or flying. As for trees and epiphytes, empty space plays an important role in the availability and abundance of key resources such as light, rain, and dispersal routes. What is a classical “canopy gap?” It is only one of eight different canopy structures (defined by the presence or absence of foliage), the one where foliage is missing entirely to ground level. In other words, the classical gap is empty space at all heights.

Recently, Mike Lefsky and his colleagues published ground-breaking research using LIDAR laser technology to quantitatively characterize forests and their empty space. By flying a small plane carrying a new class of laser sensor that measures the distribution of reflected energy from a forest canopy, the research team quantified not only forest height distribution, but also the abundance and distribution of space devoid of solid canopy elements.

Inspired by the technology and techniques of Steve Sillett’s canopy lab at Humboldt State University and encouraged by Nalini Nadkarni’s and Judy Cushing’s Canopy Database Project at The Evergreen State College, my students and I have begun measuring canopy air space without the use of airplanes. We use laser range finders and tyrolean traverses. Our research has been supported by grants from Global Forest Foundation and the National Geographic Society.

Steve Sillett and his group are among the most prolific “big tree” scientists working today. Their pioneering work in the redwoods of northern California provided me with the tools and techniques to move between trees and measure the space there. Steve and his colleagues use laser range finders (Impulse 200 LR, manufactured by Laser Technology, Incorporated, Glenwood, Colorado) to measure and map reiterations, limbs, moss and fern mats and other epiphyte distributions. To get there, they use split-tailed lanyards, mini-grapnels, collapsible crossbows, and magic missiles.



These three dimensional stacks represent median areas of open space sampled along canopy transects at one meter vertical intervals. The vertical axis is height above forest floor in meters. For the 3 figures on the right each layer is a regular hexagon whose area is the median area for that height; the left figure has 18-sided polygons for each layer. The left figure is from a 100 year old Douglas-Fir forest in Washington (Martha Creek in the Wind River Experimental Forest). The second figure from the left is a mature western hemlock forest near Girdwood, Alaska. The second figure from the right is a mature sitka spruce forest, also from Girdwood. The right figure is from old growth Tropical Lowland Rain Forest in Costa Rica (Llorona Plateau, Corcovado National Park). The horizontal axis provides horizontal distance in meters.

I was fortunate enough to collaborate with Dr. Sillett and his former student, Jim Spickler, in the development, manufacturing, and deployment of magic missiles. The magic missile helps solve the age-old tree climber problem of how to transfer to a tree more than 10 meters away. In 1999, Steve and I made an unassisted, magic missile-based transfer of 25 m. In 2001, Steve, Jim, and I made a 40 m transfer. Both of these were made without using a ground crew or even descending to the ground.

One of our goals is to develop methods of canopy movement that bring us closer to the ideal of total canopy freedom. Using the canopy raft is a bit like a boat over a coral reef, and single-tree access like clinging to a diving bell to have a look around. “Canopy trekking,” Steve’s nickname for the technique of unaided horizontal movement through the forest canopy, reaches for the ideal of snorkeling and scuba. Recently, the National Geographic Society’s Expeditions Council funded my proposal to take Steve, Jim, and me to the tall

hardwood forests of Australia and Borneo to explore the biota and structure of canopies using our new technology.

Nevertheless, canopy trekking is not crucial to measure canopy open space – or what Nalini Nadkarni likes to call “negative space.” Nalini was once a dancer, and she relates how a dancer’s position often communicate to the audience using the “negative” space surrounding the positive space of the dancer herself. In analogy, the negative space around and among forest trees may provide insights about crucial forest attributes. A canopy’s negative space is where light shines, rain falls, wind blows, and animals fly or glide.

For example, the greater predominance of open space in southeast Asian tropical rainforests compared to those of Amazonian canopies may have led to the evolution of gliding in many Oriental region vertebrates, but no Neotropical ones. Intrigued by this hypothesis, and having heard about the laser technology from Sillett, I realized that laser range finders would provide an excellent way to test this hypothesis. What was needed was a way to calculate the openness of a forest.

The Global Forest Foundation funded my lab’s proposal to devise and implement a method of measuring empty space within the forest canopy. We began with an arbitrary 60 meter length traverse (we now follow Bob Van Pelt’s protocol of making traverses with a length equal to 3 times the tallest tree in the grove), suspended as high as we dared in an Alaskan temperate rainforest (25-27 m). The traverse line is an 11-12 mm static nylon rope linking the highest trees in our chosen grove. We choose tall trees to get the traverse as high as possible. We also try to keep the traverse in a straight line.

Tied with butterfly knots and clipped to chains, cables, or slings, the traverse line links several trees. Because of the accelerating force placed on anchors with a near horizontal line stretched between them, we usually do not use mechanical advantage to tighten the ropes in non-old growth trees (large old growth trees often have large diameter stems and branches near their tops). Both ends of our traverse in non-old growth forests are guyed to the ground to prevent the end anchor-trees from folding inward.

Once the traverse line is in place, we attach vertical transect lines to the traverse line. We begin with these transects attached to the same anchor as the traverse line and so sample the anchor trees. We do this so that our sampling system can be “calibrated” with a known entity – a tree. We then move the transect line out five meters along the traverse and sample again. We sample at 5 m intervals along the length of the traverse line.

Our samples are taken at 1 m intervals along these transects. At each interval the observer, hanging from ascenders, locates

a preset azimuth (at multiples of 20 or 60°), levels the laser, and then measures the distance to the nearest object in that direction. The identity of the object is recorded along with its direction and distance. These samples are taken along each transect, generating a large grid of data, estimating not only the size of empty space at each interval, but the objects that form these polygon vertices. Our data portrays what objects we observed and estimate how large the space is between objects.

After collecting and digesting the data (Figure 1), I sent Nalini Nadkarni our preliminary results. Nalini perceived our portrayal of forest canopies by their negative, empty, or free space (this latter term borrowed from the benthic intertidal literature as a place free of organisms) as novel and possibly enlightening. Her collaborator, computer scientist Judy Cushing, also saw this as a complementary method to represent canopy data, and one that the Canopy Database Project at the time did not account for.

With support from the National Science Foundation, a travel grant from the National Geographic Society, and additional instrumentation awards from Global Forest, I will be taking the traverse lines, lasers, and Steve Sillett and Jim Spickler to the tall Mountain Ash eucalypt forest of Victoria, Australia, and Dipterocarp Forests of Danum Valley in Sabah Malaysia.

In January, February, and March, we will investigate the tall Mountain Ash forests of Victoria. Victoria has five of the six species of gliding marsupials plus the old growth specialist, Leadbeater’s Possum (*Gymnobelideus leadbeateri*), with its vestigial gliding membrane (Strahan 1998). Similarly, the state of Sabah in northern Borneo has several species of gliding frogs, lizards, and snakes as well as the mammalian Colugo (*Cynocephalus variegates*) and 11 species of “flying” squirrels. We will visit Sabah in April and May to sample a traverse similar in size to the one in Victoria.

We anticipate both forests will be at least 80 m tall requiring 240 m traverses. Besides taking spatial measurements, we will measure the tree architecture and epiphyte loads of the larger trees along the traverse.

Our intention is to use these data to compare and contrast forests and forest types and to integrate these data with other data, such as microclimatological, forestry, and habitat. As data accumulates, we will observe patterns and the explanations that follow.

Roman Dial; Alaska Pacific University, Department of Environmental Science, 401 University Drive, Anchorage, AK 99508; (907) 333-2321; <borneo@alaska.net>.

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## FEATURE ARTICLE: GLOBAL CANOPY PROGRAMME UPDATE

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The Global Canopy Program (GCP) is a collaborative alliance of governmental and non-governmental institutions that are integrating forest studies around the world into a program of research, conservation, and education. Our focus is to understand the critical role of forest canopies in biodiversity and climate change. The GCP also aims to identify societal benefits from forest canopies and to transmit information to key policy stakeholders.

This initiative evolved from the Oxford Canopy Workshop held in England in November 1999, which was funded by the National Science Foundation and the European Science Foundation. At the workshop, a template for the GCP was produced by 29 international experts from 10 countries and published by The International Canopy Network (ICAN). The workshop concluded that by working together, canopy researchers could leverage significant funding for major collaborative project to investigate "nature's last biotic frontier". They called for significant new funding on the scale of that already funded for large physical science projects (US \$20-50 million) to undertake this pioneering task.

Such a program is now urgently needed to fill major gaps in our knowledge. The structure, function, and resilience of the world's forest canopy environment is poorly understood. The potential influence of climate change on biological diversity in forest canopies also needs immediate investigation. Although forest/atmosphere research and canopy ecology are strongly connected in forest canopies, the two communities of researchers carrying out these studies seem to rarely communicate because their funding sources and communication pathways have traditionally been separate.

The Kyoto Protocol to limit greenhouse gas emissions has focused attention on the role of forests in sequestering carbon. Carbon futures markets are becoming a financial reality. Yet how, whether, and which forests act as a sink or a source of carbon is based on very few studies and almost none on a comparative basis. The economic value of canopy ecological services to society has not been quantified, nor has the value of its products for human health or its eco-tourism potential for local communities been established. The latter is the priority of many national governments that provide funding for research and development in forests. Whilst most of us seek to understand primary forest ecosystems, a growing need is to understand the function and benefits offered to the ecosystem and human society from disturbed or managed forest canopies, as this may form the bulk of future forest cover.

Following the workshop, and in close partnership with ICAN, the GCP Secretariat was established in Oxford in

October 2000 with funding from the UK's Rufford Foundation and the Maurice Laing Foundation. A Steering Committee has been organised, comprising representatives of canopy research initiatives in Brazil, Panama, Venezuela, the USA, Malaysia, Japan, Australia, the UK, Germany, Austria, and France. The GCP now seeks to create a new international effort to throw light on the issues described above. It also aims to serve specific governmental requirements under the Conventions on Biological Diversity and Climate Change.

This is very much an inclusive project. Anyone from any country who wishes to join our efforts as a national representative for the GCP or as a Principal Investigator on joint programmes of research is welcome. Contact the ICAN office in the US or the GCP Secretariat in Oxford, England.

The GCP works in close collaboration with ICAN, which has been the lead organisation in raising the profile of canopy studies worldwide for nearly a decade. At the Oxford Workshop, the participants proposed building on ICAN's existing network of contacts and expertise (especially in the US). ICAN's protocols, expertise and also the Big Canopy Database under development at The Evergreen State College by ICAN's President Nalini Nadkarni and Judy Cushing are vital assets. To support this process, the resources of ICAN must be strengthened, internationalised from its largely US base, and broadened to include a wider range of disciplines. ICAN is currently seeking funds for this purpose from NSF.

In a complementary way, the GCP acts as an umbrella structure connecting the alliance of organisations willing to participate in joint collaborative projects to be included as part of the programme. The GCP and its Secretariat is guided by the GCP Steering Committee (listed below), which is made up of representatives of organisations within the GCP alliance, of which ICAN is a key part. The Secretariat of the GCP is hosted by the Global Canopy Foundation based in Oxford, UK. The Global Canopy Foundation, which was created to help support the GCP, can also act as a European node to help expand ICAN into Europe. Analogous nodes for ICAN-US and GCF-UK can be developed in other regions of the world in the future. The GCP structure is very much 'work in progress' and is open to new organisations and individuals.

To help create the right "authorising environment" for the GCP, Andrew Mitchell attended the meeting of the Subsidiary Body on Scientific, Technical, and Technological Advice (SBSTTA) of the Convention on Biological Diversity (CBD) in Montreal last November. The CBD is a powerful international governmental instrument of compliance on

biodiversity. After late-night lobbying efforts, our team introduced new language that specifically calls for studies of forest canopies in relation to biodiversity and climate change. This will be part of the work programme for the Convention, beginning in 2002, and should be approved at the next Conference of the Parties (COP6) at The Hague next April. National governments who have signed the convention will be required to report on what they have done to implement this aspect of the Convention's work plan. It may be that your own research could therefore have a new national significance.

Below is a snapshot of key GCP activities over the last year:

#### Contacts with Potential GCP Partners:

In early 2000, we focused on finding the most advanced activities in the canopy science field and who the main protagonists were. We contacted many individuals and institutions and dispatched staff to key meetings and conferences to make presentations on our vision. We became aware of 10 canopy cranes (3 newly installed this year), over 100 towers, and many other canopy investigation initiatives led by institutions such as the Smithsonian, NASA, and universities.

#### Forming a Global Canopy Alliance:

We found two distinct camps that work in canopies - ecologists and atmospheric scientists. Communication between them is poor. The former group investigates the biodiversity and ecology of the canopy - plants, animals and their interactions - using ropes, walkways, and cranes. They are poorly co-ordinated globally and generally poorly funded. The latter group investigates the ecophysiology of the canopy - gas fluxes, carbon, climate - using towers and remote sensing. They are well co-ordinated into networks such as EuroFlux and AmeriFlux and are well-funded with collaborative projects (\$20 to \$30 million level). The challenges for the GCP are to first create a framework for the first group to work together for mutual benefit, and second, to bridge the gap between these two communities and encourage them to work together for mutual benefit.

We have proposed that the GCP help establish an alliance between these groups and institutions. This has been greeted with enthusiasm, provided a mechanism for managing such an alliance and a means of funding it can be found. All parties agreed that their effectiveness could be better accomplished and greater funding leveraged through global partnerships, rather than acting independently.

#### Forming a GCP Steering Committee:

We formed a Steering Committee and Science Advisory Board comprising of leading canopy research and conservation figures around the world. The GCP funded its first Steering Committee in Bangalore in July 2001 as part of the Asso-

ciation for Tropical Biology Meeting. Representatives from the UK, US, Japan, Germany, France, Brazil, India, Australia, and Panama participated in the meeting. We determined the "Core Values" of the GCP and outlined its "Core Project" areas:

#### **1. Gathering "Concept Papers"**

"Concept Papers" were invited from the Steering Committee members and others to provide a framework within which individual research, conservation and education "Core Projects" will be carried out. Examples include:

- a. Biodiversity in the Canopy - Prof. Roger Kitching, Griffiths University, Australia.
- b. Social Value of Canopy Research - Prof. David Pearce, University College London, U.K.
- c. "Canopy Grid" - A new Modelling and Data Management tool for forest canopies. Dr. Judy Cushing, Evergreen State College & Dr. Robert Muetzfeldt, Centre for Carbon Management.

#### **2. Testing 'Pathfinder' Projects**

Two field projects were supported by GCP in its first year:

- a. Forest Canopy Structure: Jointly supported with the Smithsonian and led by Dr Geoffrey Parker (Smithsonian Environmental Research Center), this project is using a hand-held laser distance measuring device known as LIDAR, to "CAT-Scan" the forest at 16 locations. This will provide the first detailed digital 3D structure of forest canopies. The results will be presented at the 2002 Canopy Conference in Cairns.
- b. Epiphytic Fern Communities: Dr William Foster, University of Cambridge, and his team visited Barito Ulu in Central Borneo to compare animal communities in the giant bird's nest fern, *Asplenium*. This is a joint project with the Natural History Museum, London.

#### **3. Publications**

Several publications have resulted from collaborations with GCP activities.

- a. *Tropical Forest Canopies - Ecology and Management*, published by Kluwer, August 2001 - The introduction by Andrew Mitchell calls for setting up of the GCP. Papers by many ICAN members. Also in *Plant Ecology*, Vol: 153 Nos. 1 - 2. April 2002.
- b. *GCP 6 Month Reports* x 2, available from our office.

A canopy series due out in 2002:

- c. *Part I - International Canopy Crane Network*. Edited by Vibeke Horlyck.

Describes the current network of canopy cranes and how they are meeting the requirements of the Conventions on Biological Diversity and Climate Change.

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d. *Part II – The Global Canopy Handbook*. Edited by Andrew Mitchell

A new edition of *Reaching the Rainforest Roof*, published 20 years ago by the same author, on techniques of access and study in the forest canopy.

This is a collaborative effort between Smithsonian Tropical Research Institute (STRI) and GCP supported by many contributing researchers. It is funded by United Nations Environmental Program (UNEP) and the Rufford Foundation.

#### 4. CORE projects in development

The GCP Steering Committee approved nine Core project areas for the GCP. The following projects are currently in development:

- A canopy biodiversity rapid assessment programme to assess the value of the life forms in different forested environments.

- FluxCAN, an initiative to investigate the relationship between biodiversity and climate change and the process of carbon sequestration in the forest canopy.

- An economic assessment of the social value of forest canopy research.

- A Canopy Training School to offer capacity-building courses for scientists, forest managers, and conservationists in biodiversity-rich nations that need extra skills.

Online information is available to the public, policy makers, and scientists through The Big Canopy Database, currently being developed at Evergreen State College with funds from the US National Science Foundation.

- CanopyWorld, an interactive virtual rainforest website for schools.

Phase I of the GCP to form the Steering Committee and SAC, to prioritise key science questions, develop GCP CORE Projects, and identify lead institutions to carry them out is almost complete. Phase II of the GCP is due for launch at the 3rd International Canopy Conference in Cairns, Australia in June 2002. Phase II of the GCP will raise funding at the \$5-6 million level for the period 2002-5. Phase III will aim for \$20-30 million for the period 2005-2010. We welcome your feedback and participation.

Contact: Andrew Mitchell, Global Canopy Foundation, Halifax House, University of Oxford, 6-8 South Parks Road, Oxford OX1 3UB, UK; Phone: +44(0)1865-271036; Fax: +44(0)1865-271035; <[a.mitchell@globalcanopy.org](mailto:a.mitchell@globalcanopy.org)>; <<<http://www.globalcanopy.org>>>

#### GCP Steering Committee:

Dr Joseph Wright, Smithsonian Tropical Research Institute, Panama  
Prof Dieter Anhuf, University of Sao Paulo, Brazil

Professor Nigel Stork, James Cook University, Australia  
Dr Nalini Nadkarni, The Evergreen State College, USA  
Dr Pierre Charles Dominique, COPAS, France  
Professor Roger Kitching, Griffith University, Australia  
Dr Meg Lowman, Marie Selby Botanical Gardens, USA  
Dr Toru Nakashizuka, University of Kyoto, Japan  
Dr Geoffrey Parker, Smithsonian Environmental Research Centre, USA  
Dr David Shaw, Wind River Canopy Crane Facility, USA  
Talita Fontoura, University d'Estadul, Brazil

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## ANNOUNCEMENTS

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**The Lincoln Park Zoo Neotropic Fund** supports field research in conservation biology throughout Latin America and the Caribbean. The fund emphasizes support of graduate students and other young researchers, particularly those from Latin America. Between five and 15 projects are supported each year. Awards are seldom greater than US\$7500, and most awards fall in the range of \$3000-\$6000. Initial support is for up to 12 months from the date of award. Maximum duration of support is two years. Deadline for receipt of Neotropical proposals is 1 September. For information and application procedures, contact: *Lincoln Park Zoo Neotropic Fund, Department of Conservation and Science, Lincoln Park Zoo, Chicago, IL 60614*; <[conservation@lpzoo.org](mailto:conservation@lpzoo.org)>; <<[www.lpzoo.com/conservation](http://www.lpzoo.com/conservation)>>.

**Adopt an Acre Program.** The Nature Conservancy is working to protect Ecuador's Antisana Ecological Reserve, home to the spectacled bear and Andean condor, both of which are in serious danger of extinction. The Conservancy is using its Adopt an Acre® program to purchase 16,000 acres in Antisana and continue to work with the local community and government to protect this ecologically important area. Now you can help too. For only \$75, you can Adopt an Acre® of the Antisana Ecological Reserve.

Located in the mountains 100 miles from Ecuador's capital city of Quito, these 300,000 acres of cloud forest and tropical highlands are also the primary source of Quito's water supply. More than 1.4 million people live in Antisana's area of influence, and the reserve is increasingly threatened by new human settlement, illegal hunting, and unsustainable fishing and agriculture practices.

During the past few years, The Nature Conservancy and the Ecuadorian group Fundacion Antisana (FUNAN) have been working with the Ecuadorian government and local communities to protect Antisana through such projects as training local villagers to become park rangers, promoting sustainable economic development and ecotourism, and teaching the importance of habitat protection and management.

Learn more about the more than 600,000 acres of rainforest already protected by the Adopt an Acre® program in Latin America and the Caribbean at <<[http://nature.org/rain\\_forest\\_conservation.html](http://nature.org/rain_forest_conservation.html)>>.

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**WEBSITES**


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**Forestry Images**

Looking for a close-up of a bark beetle to show your forestry class? Need a shot of bamboo or acacia for your educational webpage? Look no further than this resource for people teaching forestry, ecology, or similar topics. A joint venture by the US Forest Service and the University of Georgia, Forestry Images holds nearly 4,500 color .jpeg images of forest plants, insects, silvicultural practices, invasive organisms, and general natural scenes. Each image page includes a catalog number, Latin and vernacular nomenclature, and photographer's name. Images can be viewed and downloaded in a variety of sizes, but only registered members can access images with a resolution of 1536x1024 pixels or above (registration is free). All images are copyrighted by The University of Georgia, may only be used for nonprofit, educational purposes, and must bear appropriate citations. Visit <<<http://www.forestryimages.org>>>.

From The Scout Report, Copyright Internet Scout Project 1994-2001. <<<http://scout.cs.wisc.edu/>>>.

**CalPhotos**

This site, with access to nearly 35,000 images of plants, fungi, animals, people and culture, and landscapes and habitats around the world, is part of the University of California Digital Library Project. Many of these spectacular photos may be used freely for non-commercial purposes as long as the source is credited and CalAcademy.org is notified of the use. Photos are searchable by type, name, location, California county, U.S. State, Country, Continent, Collection or Photographer. <<<http://elib.cs.berkeley.edu/photos/>>>.

**Climate Change: Science, Strategies, and Solutions  
"Facts and Figures"**

An online sneak preview of the "Facts and Figures" section of this forthcoming book from the Pew Center for Global Climate Change (of the Pew Charitable Trusts) is now available. The book, *Climate Change: Science, Strategies, and Solutions*, conveys the latest information and analyses from experts on a number of global warming issues: the scientific evidence that human activities are changing climate; present and projected impacts of climate change on agriculture, sea level, and water resources; the main determinants explaining projected costs of addressing climate change; and US and international policies and initiatives addressing global warming. The .pdf file contains visually pleasing, simply stated chapters on global and national greenhouse gas and emission levels, along with a section of conversion tables and Web links. This is a good reference for college students taking an introductory environmental science course. <<<http://www.pewclimate.org/book/>>>.

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**PUBLICATIONS**


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**Non-Timber Forest Products of the North-West  
District of Guyana**

This book is in two parts, containing an inventory of 587 useful plants, a description of their uses, harvesting and processing methods, and an account of their abundance in various forest types. A unique document for all practitioners and indigenous people with an interest in sustainable forest use, particularly for those working in the Guyana Shield.

"Woody Plants in North America" is an interactive multimedia identification tutorial for woody plants found throughout North America. The two-CD set is split into angiosperms (hardwoods) and gymnosperms (softwoods). The software includes a morphology section that familiarizes you with terms used in the identification of plants. The main body of the tutorial contains over 9,500 pictures and full-text descriptions of leaves, twigs, fruit, flowers, bark, and form for 470 species of woody plants. Contact Kendall/Hunt Publishing at (800) 228-0810 to order this product.

(Reprinted from NEC-ISA Arboricultural Quarterly, No 01-1, Winter 2001)

**Seeds, Seedlings and Gaps—Size Matters. A Study in  
the Tropical Rain Forest of Guyana**

This study sheds light on how gap size and light intensity affect the species composition and, therefore, the future availability of commercial tree species in the rainforest of Guyana. On the basis of the results, the author recommends limiting the gap size to a maximum of 800 m<sup>2</sup> and keeping logging damage to seedlings and saplings to a minimum.

(Reference: Rose, S.A. (2000). *Seeds, seedlings, and gaps - size matters. A study in the tropical rain forest of Guyana*. Tropenbos-Guyana Series 9. Tropenbos-Guyana Programme, Georgetown, Guyana. ISBN 90-393-2555-5. Price: NLG 17.50)

**Streetscape Design Video**

The USDA Forest Service Northeast Center for Urban and Community Forestry, in cooperation with the University of Massachusetts Department of Natural Resources Conservation, has completed an 18-minute video that addresses the use of trees along streetscapes in urbanized areas. Titled "From Sketch to Streetscape," the video, which will also be available in CD ROM format, is intended to provide designers, landscape architects, and planners an introduction to the physiologic, aesthetic, and functional use of trees as an element of the urban streetscape. Contact Dr. David Blonjiaz <[dbljoniarz@fs.fed.us](mailto:dbljoniarz@fs.fed.us)>.

(Reprinted from Oregon CommuniTree News, Volume II, Number 1, Spring 2001)

## RECENT CITATIONS IN CANOPY SCIENCE

[Ed. note: Since there is no central journal on canopy science, it is useful to publish citations on canopy studies in the recent literature. Some of the papers listed below were obtained from ICAN subscribers sending in reprints; most were discovered through monthly literature searches (AGRICOLA, CAB, and FORESTRY ABSTRACTS).

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- Basset, Y., Charles, E.L., Hammond, D.S. & Brown, V.K. 2001. Short-term effects of canopy openness on insect herbivores in a rain forest in Guyana. *Journal of Applied Ecology* 38:1045-1058.
- Behan-Pelletier, V.M., & N.N. Winchester. 1998. Arboreal oribatid mite diversity: colonizing the canopy. *Applied Soil Ecology* 9:45-51.
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- Ritters, K., J. Wickham, R. O'Neill, B. Jones, & E. Smith. 2000. Global-scale patterns of forest fragmentation. *Conservation Ecology* 4:1-22.

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- Nadkarni, N. 2001. Enhancement of forest canopy research, education, and conservation in the new millennium. *Plant Ecology* 153:361-367.

## CONTRIBUTE TO WHAT'S UP?

The International Canopy Network (ICAN) is currently seeking articles and information for the upcoming issue of *What's Up?*, set for publication in March, 2001. ICAN accepts articles, meeting and workshop announcements, related website addresses, and citations. Contributions can be sent via e-mail attachment, fax, or snail mail. Articles up to 1500 words are accepted (WORD format preferred) and graphics are welcomed (.jpg format preferred). The deadline for submissions is February 15, 2002. For further information, please contact the ICAN office:

David Franklin, Outreach Coordinator/Editorial Assistant;  
(360) 866-6788; <canopy@evergreen.edu>.

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