

COOPERATIVE RESEARCH CENTRE FOR



CATCHMENT HYDROLOGY



Cooperative Research Centre for
Catchment Hydrology Annual Report 2001-2002



Established and supported under the
Australian Government's Cooperative
Research Centres Program

Mission

The Cooperative Research Centre for Catchment Hydrology will deliver to resource managers the capability to assess the hydrologic impact of land-use and water management decisions at whole-of-catchment scale.



Hydrology is the study of the properties and laws of water, its distribution, movement across and impact on the earth's surface.

The CRC's main goal is to produce a region-appropriate Decision Support System (DSS) to predict the movement of water, particulates and solutes from land to rivers. This system needs to link the impacts of climate variability, vegetation, soil and water management in an integrated package.

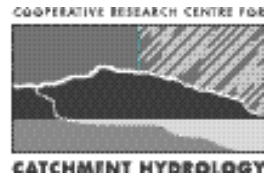
The industry-identified issues to be addressed by our research are:

- sustainable and efficient water allocation
- land-use impacts on rivers, especially after land-clearing
- climate variability (the potential to reduce hydrologic risk)
- urban runoff quality
- river restoration

Objectives

To achieve its mission, the CRC will:

- mount a quality research program, targeted to meet national objectives in catchment hydrology, by focusing on achieving predictive capability at whole-of-catchment scale
- maximise the synergies of collaboration among its Parties and with related organisations
- involve end-users in the identification, formulation, conduct and use of its research activities
- provide training to increase awareness of, and the national skill base available in, catchment hydrology
- train and equip postgraduate students as future leaders in land and water management
- seek to sustain continuity of research in catchment hydrology consistent with the widespread and persistent nature of land and water problems



A cooperative venture between:

- Brisbane City Council
- Bureau of Meteorology
- CSIRO Land and Water
- Department of Land and Water Conservation, NSW
- Department of Natural Resources and Environment, Vic
- Goulburn-Murray Water
- Griffith University
- Melbourne Water
- Monash University
- Murray-Darling Basin Commission
- Natural Resources and Mines, Qld
- Southern Rural Water
- The University of Melbourne
- Wimmera Mallee Water

Associate:

- Water Corporation of Western Australia



Established and supported under the Australian Government's Cooperative Research Centres Program

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Melbourne, courtesy
of 'The Age'

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The key goal for land and water managers and the CRC for Catchment Hydrology is to use research knowledge to link land management actions in whole catchments with their impacts on water quantity and quality in streams.

Competition for water resources and the consequences of land clearing on dryland salinity are presenting Australia's land and water managers with significant challenges. Integration of research outcomes to achieve predictive capability for large catchments remains the key driver of the CRC for Catchment Hydrology as it heads into the second half of its seven-year life.

Its main challenge is to integrate more knowledge into the simulation packages to ensure all process interactions are considered. It is also important to establish links with industry bodies that assist rather than duplicate existing partnerships.

In project terms, the initial three-year round of CRC core projects defined by industry needs is near completion and a process is underway to establish the second round of new projects to begin in 2003.

This strategic planning process began with a Future Issues workshop in May 2001 where industry and research leaders outside the CRC ranked land and water management issues in order of research priority. CRC parties were then asked for their assessment of issues. From this feedback, a Board meeting in November 2001 brought together priority areas to be addressed by the CRC in the second project round.

The effort spent on defining this second project round will ensure the needs of our fourteen participants as well as land and water managers are met.

Board Review

To ensure the Board is well focused for the task of delivering predictive capability, a review of Board performance was conducted in February 2002, seeking feedback from Board members and research Program Leaders.

It confirmed the Board was functioning well, but could further tap the wide range of skills and experience of members in its long-term performance role of identifying emerging issues and developing strategies to address key issues. As a result of the review, the Board has committed to participating more in CRC workshops, seminars and industry forums providing Board members greater opportunity to contribute their knowledge and interact with research staff. The Board will also play a greater role in reviewing implementation plans taking the research outputs through to adoption.

It was acknowledged that the Board is particularly strong in managing the CRC's short-term conformance, that is, its accountability and supervision of management. Role statements to assist strategic planning are being prepared for Board members as a review outcome.

Second Year Review

The Year Two Stage 1 and Stage 2 reviews of CRC activities were held in July and November 2001, respectively. Stage 1 was an independent review of the CRC's science. Stage 2 was an assessment of the CRC's strategic direction, cooperation and application of research, training, management, budget and performance.

Both reviews praised the CRC's efforts – the second labelling us a model CRC – and delivered positive and constructive comments to improve future operational aspects. Particular note was made of the degree of stakeholder involvement and the close relationship of knowledge generated by the CRC and its application by stakeholders.

The Board has accepted and responded to the recommendations made by both review panels.

Review of the Business Plan and research programs

The Board reviewed the CRC's Business Plan and research programs at a workshop in November 2001. CRC industry/user Parties provided their views on critical issues as part of the review.



Above
Dr John Langford,
Chairman

Board session at Annual Workshop

Board members Ross Williams, Chris Forster, Peter Jackson and I were pleased to be able to present our perspectives on strategic issues and direction of the CRC to researchers and industry Parties at the CRC's Annual Workshop in April at Ballarat. Ross Young was able to attend earlier sessions and provide valuable input.

The presentations allowed us to discuss and confirm the Board's role and responsibilities, talk about key land and water use issues and their relevance to second-round projects, and define the strategies put in place by the Board to keep bringing industry's reality to the research agenda.

Thanks

I would like to take this opportunity to thank all staff who continue to contribute so much to this CRC.

Sadly, some people are leaving and I would like to pay special thanks to our Director, Russell Mein, who has dedicated an enormous amount of time and energy to the CRC. Russell's leadership, foresight and quiet ability to accommodate industry and research needs in guiding the first CRC for Catchment Hydrology, has been a major factor in its success and ability to become a successful second-round CRC. Congratulations to Rob Vertessy, who succeeded Russell on July 1. The Board has every confidence in Rob's ability to lead the CRC, coming as he has from a very successful research leadership role in the CRC.

My thanks go to Program Leaders, Tom McMahon and Tony Wong who are stepping down as Program Leaders in the CRC. They have contributed such a lot to its research outcomes.

Jim Miller, our Centre Visitor, is completing his three-year Visitor's term in June 2002, but will continue with further activity in the CRC Program in Chairing the Life Sciences Selection Panel. Jim has been a staunch supporter and wise adviser to the CRC and we wish him well. Thanks also to Graham Kelleher who has just completed his term as Chair of the Life Sciences Panel. Graham chaired the fifth-year review of the first Catchment Hydrology CRC and the selection panel that recommended granting a second term for the CRC.

Once again, my thanks go to Board members, who continue to support the strategic goals of this CRC and work enthusiastically to help us meet the challenges of developing predictive capability in catchments.

John Langford **Chairman**

A handwritten signature in black ink, appearing to read 'John Langford'. The signature is stylized and written in a cursive-like font.

Now three years into its current term of funding, the CRC's first round of core research projects are almost completed; we are thus in the period where research outputs start to flow.

Some benefits have been realised already and more will follow as the outputs of research projects take shape. For instance, the software package MUSIC (Model for Urban Stormwater Improvement Conceptualisation) has just been released, after a roadshow that attracted 700 people in five cities. The package will allow users to plan the appropriate combination and location of treatment measures on an urban catchment to meet target water quality objectives.

Training workshops have been strongly supported and interest in the software is high. Of particular note is the degree of interest from local government and consultants – quite a different group to the CRC Parties.

Second-Year Review

A major event for the CRC this year was our Second-Year Review. As with previous reviews, we saw it as a team-building opportunity and involved as many CRC groups as we could.

The First Stage considered the quality and relevance of the research program, its progress, and achievability over the CRC's life. In forming our Panel we placed particular emphasis on catchment scale prediction; panellists Professors David Maidment and Larry Band are world leaders in this field. Professor John Lovering, former Chair of the Murray-Darling Basin Commission, provided specialist skills related to the practical application and usefulness of the research outputs. Last but not least, our Centre Visitor, Jim Miller, brought highly relevant experience to the Panel as a former Director General of the Department of Primary Industries, Qld.

The CRC Board was very pleased with the Panel's assessment, in what was a very thorough review. In their report, the Panel made mention of the CRC's 'strong emphasis on the relevance of its research program, and on its adoption by stakeholders'. Examples where this is happening already were mentioned.

Overall, the Stage 1 Panel found 'the research plan is being executed as planned, and good progress is being made in all programs'. A comment from the two overseas panel members that they had seen nothing like the synergy achieved by our CRC between research and the user communities was particularly noteworthy.

Next Round of Projects

The August 2001, Board approved a staged process leading to the development of the next round of projects for the CRC. Following on the earlier Future Issues Workshop, a Board Workshop was convened to set the CRC's priorities.

In January 2002, Focus Catchment Coordinators (FCCs) and Program Leaders set out our expected capabilities relevant to land and water management – tools and methodologies coming from the first round of projects. The group also assessed the gaps to be addressed in the remaining four years of the seven-year funding term for the CRC to achieve its mission. This was used as input to a series of Technical Advisory Group (TAG) meetings, one for each Program, with extensive Party input.

Building on the January workshop, we have developed a set of linked project proposals and are working through a selection process, which meets our priorities and resources.

Annual Workshop

This year's Annual Workshop at Ballarat was the biggest to date, with more than 90 people attending. As has been our practice, the program was structured to bring participants up to date on research across the CRC, followed by planning groups on the application of our Catchment Modelling Toolkit, and other activities. It was pleasing that several Board members were able to attend some sessions and participate in a discussion of Board Perspectives.

Our Visitor (Jim Miller) gave a positive summary at the end of the Workshop, noting that the Second-Year Review's assessment (that we are a 'model CRC') gave him little room to say anything else.

I'd like to note here how important the Annual Workshop is to the spirit of belonging and cooperation in the CRC. Long may it continue!

Postgraduate Training Project Involvement

Nearly all our CRC postgraduate students are linked to core projects and, as part of project teams, are included in project meetings and interact with industry research and field staff. As a result, they tend to see more relevance to the big picture in their work. The extra resources allocated in project budgets enrich their research activities and provide support for them for conferences and other travel.



Above
Prof Russell Mein,
Director

It is CRC policy to include students in strategic discussions at the Annual Workshop and schedule special sessions for them to share their research. One student is profiled each month in *Catchword*; postgraduate work is also often reported under activities in *Catchword's* Research Program sections. As part of the corporate approach, students are issued with CRC business cards, a gesture they particularly appreciate.

This CRC has given active support for formal skills-based courses for its postgraduates. In conjunction with the Annual Workshop this year, we expanded this offering to include project management.

Leadership Training

We supported two postgraduate students, one of whom was later awarded a scholarship, to attend the special Leadership Training Course for CRC Postgraduates run through the Business School at The University of Melbourne in August, 2001. Their response to the one-week live-in course has been particularly positive, so we'll continue to offer these opportunities as resources allow.

Postgraduates' Careers

We monitor the early careers of postgraduates after they finish their studies, and can report none seeking work. Most have gone to consultants, government agencies and some to post-doctoral positions in CSIRO and universities. The segment "Where are they now" in *Catchword* features past postgraduates and is satisfying reading. Clearly, our postgraduates are in high demand.

Thanks to retiring Program Leaders

Two Program Leaders stepped down in 2002.

Tom McMahon led the Urban Program in the original CRC, and has been Leader of the Climate Variability Program for the current one. He leaves to take up an appointment as Head of the Department of Civil and Environmental Engineering at The University of Melbourne. However, I am pleased Tom is able to continue with the CRC as a Deputy Director.

Tony Wong has been Leader of the Urban Stormwater Quality Program for nearly three years, and acknowledged by our Second-year Review Panel as having built particularly strong links to industry. He is moving to the private sector in August 2002, but is staying connected to the CRC through a part-time Monash appointment, and will continue to direct the MUSIC software group.

Both Tom and Tony have been outstanding Program Leaders in the CRC. We thank them sincerely for their contributions.

Farewell Thoughts

This is my last Annual Report contribution before I step down as Director on June 30, 2002.

From my perspective, it has been a wonderful and challenging seven years: Wonderful, in being part of a successful venture and a team effort from such a talented group; Challenging, in having to deal with so many changes in the operating environment for the CRC and its Parties over the past decade. A highlight during my term in office was the successful re-bid with extra Parties; the support shown by the existing Parties in signing-up for another seven years was immensely satisfying.

I leave at a good time for myself and the CRC. I am approaching 60 and feel it is time to move on. The CRC is going well, with four years of its seven-year term to run. The new Director will have time to settle in and get established in the role before addressing the future role for the CRC after 2006.

My thanks to members of the CRC Board and Executive and to Program Leaders for their continuing support over my term as Director. I make particular mention of John Langford for his advice and friendship throughout, and John Molloy, CRC Business Manager. My best wishes to Rob Vertessy, incoming Director, for success in his new role. Given Rob's outstanding contributions already to the standing of this CRC, I'm really delighted with his appointment.

Russell Mein **Director**

Program Highlights

The second-year review panel noted the high degree of stakeholder involvement and the close relationship of knowledge generated by the CRC and its application by stakeholders.

Predicting Catchment Behaviour

Catchment Modelling Toolkit Well-advanced The Interactive Component Modelling System (ICMS) was launched on the CRC website, allowing model builders and users to access the technology in the public domain.

Researchers expanded the new TARSIER catchment modelling framework from 30% to 60% of its expected capability for use in building integrated modelling systems.

ICMS, TARSIER and The Invisible Modelling Environment (TIME) frameworks were expanded to build and link catchment hydrology models.

Land-use Impacts on Rivers

Land-use Impact Changes Viewed First-hand Catchment managers and researchers in the Fitzroy River Focus Catchment were able to examine the impacts of land-use change in the Fitzroy estuary for the first time at workshops in September 2001, and May 2002, held by the Cooperative Research Centre for Catchment Hydrology and the Cooperative Research Centre for the Coastal Zone, Estuary and Waterway Management. Researchers constructed a systems view of the catchment and estuary using an Adaptive Environmental Assessment and Management (AEAM) model.

Sustainable Water Allocation

Water Management Reviewed, Water Market Evaluated Having reviewed water management in Australia, researchers have produced four CRC technical reports on irrigator and community attitudes to water reform in three Focus Catchments and have developed a water market experimental methodology, MWater, to evaluate alternative water trading rules and procedures in mature water markets.

Urban Stormwater Quality

MUSIC Decision Support System Launched The Decision Support System MUSIC was launched to 700 urban stormwater managers in May 2002. About 150 packages have been ordered. The MUSIC software and methodology brings together the CRC's Water Sensitive Urban Design research on the operation, design and maintenance of vegetated swales, bioretention systems, constructed wetlands and ponds. MUSIC will support managers in a risk-based approach to water quality target setting and evaluating stormwater treatment options.

Climate Variability

Water Authorities Embrace CRC Weather Research The CRC's climate variability research package, plays a significant role in predicting and measuring storms in Australia, and the CRC's remote-sensing rainfall research, used by the Bureau of Meteorology, has resulted in world-first climate prediction technology and has been applied internationally.

Rainfall measurement research has improved the Bureau of Meteorology's capability for remote sensing through its national radar network. The Bureau of Meteorology can now more accurately measure the amount of rain falling in storms, providing valuable data for flood warning services and water management authorities.



Above Left
Water Sensitive Urban Design demonstrated to Second Year Review Stage 1 Panel

Above Right
Teri Etchells – award for best “student” presentation at 27th Hydrology and Water Resources Symposium 2002

River Restoration

Stream Flow Recommendations Adopted

The CRC's Flow Events Method is being included as part of the standard methodology adopted by the Victorian government for environmental flow design.

Research on the impact of riparian vegetation on stream temperature in south-east Queensland streams showed up to 10°C water temperature differences between vegetated and unvegetated streams, with implications for stream ecology.

Researchers helped organise the biggest river-related conference in Australia, the Third Australian Stream Management Conference in Brisbane (with more than 400 delegates), in August 2001, and published a 130-paper Proceedings.

After holding a workshop on Environmental Flows (November 2001), (understood to be the largest such event in Australia to date) the team published a special issue of the “Australian Journal of Water Resources, on Environmental Flows”.

Communication and Adoption

EMSS Applied in the Brisbane River Focus Catchment

The Environmental Management Support System (EMSS), a regional water quality model, has been applied across south-east Queensland to predict sediment and nutrient fluxes through the river network and into Moreton Bay. EMSS is also being used by the Brisbane-based consultancy group WBM Oceanics, as part of the South East Queensland Regional Water Quality Management Strategy.

Education and Training

Active Postgraduate Program

Teri Etchells won the Australian Postgraduate Award for Best Presentation at the 27th Hydrology and Water Resources Symposium in Melbourne, in May 2002 for her work on *A Methodology for Calculating Water Trading Exchange Rates in the Murray-Darling Basin*.

Lucy McKergow gained second prize in the Department of Conservation and New Zealand Limnological Society PhD Student Presentation Awards at *Just Add Water*, the Joint Conference of the New Zealand Hydrological Society and New Zealand Limnological Society, Massey University, Palmerston North, New Zealand, in November 2001. Lucy's PhD is entitled *Monitoring riparian lands for water quality improvement*.

45 postgraduates studied across CRC Programs, including nine new 2001-2002 students

Ten postgraduates were employed in water management industry agencies and research organisations, or pursued further studies.

Structure and Management



Centre Structure

The Centre brings together, in an unincorporated joint venture, the following Parties:

Land and Water Management Authorities

Department of Land and Water Conservation, NSW
Department of Natural Resources and Environment, Vic
Goulburn-Murray Water
Murray-Darling Basin Commission
Natural Resources and Mines, Qld
Southern Rural Water
Wimmera Mallee Water

Urban Water Authorities

Brisbane City Council
Melbourne Water

CSIRO

CSIRO Land and Water

Universities

Griffith University
Monash University
The University of Melbourne

National Meteorological Body

Bureau of Meteorology

Governing Board

The Board is responsible for short-term conformance, that is accountability and supervision of management, and long-term performance or policy formulation and strategic thinking.

Board membership as at 30 June 2002 was:

Dr John Langford (Independent Chairman), Executive Director, Water Services Association of Australia
Mr Barry Ball, Manager Water Resources, Urban Management Division, Brisbane City Council
Professor Mike Brisk, Dean, Faculty of Engineering, Monash University
Mr Geoff Earl, Manager, Production and Catchments, Goulburn-Murray Water
Ms Christine Forster (Independent Board Member) replaced Mrs Bobbie Brazil from November, 2001
Mr Graham Hawke, Director, Technical Services, Southern Rural Water (non-voting participant)
Professor Jane Hughes, Faculty of Environmental Sciences, Griffith University replaced Professor Bill Hogarth from February, 2002
Mr Denis Hussey (Independent Board Member), Senior Associate, ACIL Consulting
Mr Peter Jackson, Manager of Technical Services, Wimmera Mallee Water (non-voting participant)
Mr Scott Keyworth, Director Landscapes and Industries, Murray-Darling Basin Commission replaced Mr Kevin Goss from February, 2002
Professor Rao Kotagiri, Associate Dean – Research, Faculty of Engineering, The University of Melbourne (Professor Clive Fraser, has succeeded Professor Kotagiri as Associate Dean and as CRC Board member from July 2002)

Professor Russell Mein, CRC Director, Monash University (Professor Rob Vertessy, CSIRO Land and Water, has succeeded Professor Mein as Director from July 2002)

Dr Chris Moran, Manager – Program Initiation, Healthy Country Flagship Program, CSIRO Land and Water

Ms Rae Moran, Senior Hydrologist, Catchment and Water Division, Department of Natural Resources and Environment, Vic

Mr Chris Robson, Executive Director, Natural Resources and Sciences, Natural Resources and Mines, Qld, replaced Mr Don Begbie, who took over from Mr Frank van Schagen, from August 2001 to February 2002

Mr Bruce Stewart, Assistant Director Climate, Consultative and Hydrological Services, Bureau of Meteorology replaced Dr Geoff Love from May, 2002 (Alternates – Dr Mike Manton, Dr Alan Seed)

Mr Ross Williams, General Manager, Centre for Natural Resources, Department of Land and Water Conservation, NSW

Mr Ross Young, General Manager Planning, Melbourne Water

The Governing Board met on these dates:

31 August, 2001
23 November, 2001
22 February, 2002
31 May, 2002



Facing Page
Far Left: Governing Board participants, at May 2002 meeting in Canberra

Centre Presentation by Dr John Langford to retiring Director Prof Russell Mein at Annual Workshop

Right New Director, Prof Rob Vertessy



This Page
Above Left: Stage Two Panel of Second Year Review in session with postgraduates

Above Right Executive, Program Leaders and Focus Catchment Coordinators at Woodend workshop, January 2002

Centre Management

The Centre's Director and office are based at Monash University, Melbourne. As of 1 July 2002, the Director will be based at CSIRO Land and Water, Canberra.

The main research facilities are at Monash University, Clayton, Vic; CSIRO Land and Water, Canberra; Griffith University, Brisbane; and The University of Melbourne, with significant activity in several other Party locations.

The three Deputy Directors oversee operations at the Brisbane, Canberra and Melbourne sites.

Strategic Directions

The Centre's strategic direction and operations are guided by its Business Plan, developed during the bid for the new CRC. The CRC Board reviewed the Business Plan in November 2001 and identified strategic directions consistent with the Business Plan.

Second Year Review

A Second Year Review was held for the Centre, with the Review being conducted in two stages.

Stage 1 of the Second Year Review of the CRC for Catchment Hydrology was a scientific and technical review of the Centre conducted on 24, 25 and 26 July 2001 at Melbourne.

The Panel comprised:

Prof David Maidment (panel Chair), University of Texas

Prof Lawrence Band, University of North Carolina

Prof John Lovering, The University of Melbourne

Mr Jim Miller, CRC Visitor

Stage 2 which addressed strategic directions and the management of the Centre, was undertaken on 1 and 2 November by the following panel:

Mr Graeme Kelleher (panel Chair),

Graeme Kelleher & Associates

Dr Graham Allison (independent panel member)

Mr Jim Miller, CRC Visitor

Ms Caryl Treloar, CRC Program

Mr Adrian Linehan, CRC Program

(Outline details on this positive review are contained in the Chairman's Foreword, and the Director's Report).

Research Programs

The Centre supports 14 core projects within the following six research programs:

Program 1 Predicting Catchment Behaviour

Program 2 Land-use Impacts on Rivers

Program 3 Sustainable Water Allocation

Program 4 Urban Stormwater Quality

Program 5 Climate Variability

Program 6 River Restoration

Program and Project Leaders meet regularly, generally monthly, in conjunction with the Centre Executive. Five Focus Catchment Coordinators provide ongoing feedback to the Executive and Board about progress and issues within each catchment.

Review panels, made up of independent research and industry specialists allied to each project, help monitor progress against milestones and generally meet twice-yearly with project teams to ensure each is on track to producing stated outcomes. Technical Advisory Groups for each project were re-formed in 2002 to help identify and develop the second three-year round of projects starting in 2003.

Structure and Management



Far Left (L to R) Second Year Review Stage 1 Panel – Prof John Lovering, Prof Larry Band, Prof David Maidment and Mr Jim Miller

Left Chair of Stage Two Panel of Second Year Review, Mr Graeme Kelleher

Annual Workshop

More than 90 people attended this year's staff workshop at Sebastopol, Ballarat, Vic, from 16-18 April, 2002.

The program was structured to update participants on the spectrum of CRC research as a prelude to forming planning groups to implement the Catchment Modelling Toolkit and future activities. Several Board members attended sessions and participated in a presentation and discussion session outlining their perspectives of the CRC.

The workshop again proved a useful way to share information between researchers, Parties and management. It also provided a forum for postgraduates and researchers to outline their work and an opportunity for all to become more familiar with the big-picture perspective of CRC activities.

The Centre Visitor, Jim Miller, summarised key issues from the workshop, noting the difficulty of integrating solutions for land and water management problems across catchments, but praising the CRC for working to tie processes together. He commented that catchment issues will still exist at the end of the CRC's life and a re-bid may need to be considered. He noted the Second-Year Review panel (including international experts) were impressed with several world-class research activities in the CRC. He also noted the high level of industry involvement as evidenced by Board and Party participation at the workshop.

Participation Arrangements

Organisations are offered participation in the CRC via the following arrangements:

CRC Party – with direct involvement in research and technology adoption and a full range of benefits.

CRC Associate – direct involvement with a selected project and outcomes, plus other benefits.

CRC Research Affiliate – provides an opportunity for major research collaboration with organisations outside the CRC.

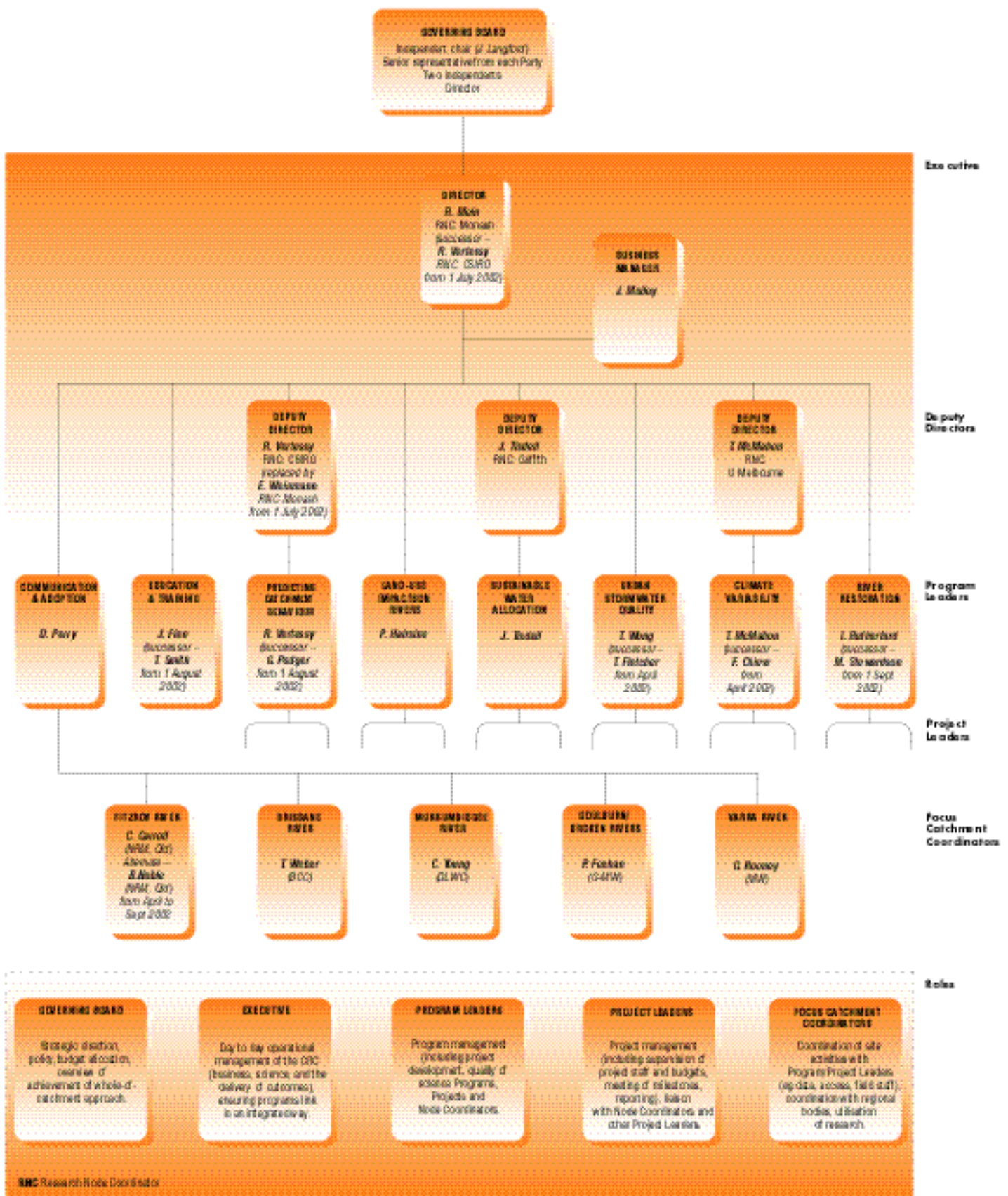
CRC Industry Affiliate – provides an opportunity for collaboration with industry, essentially commercial organisations, outside the CRC.

Centre Visitor

In the past three years, the CRC has benefited greatly from liaising with Mr Jim Miller, the Centre Visitor. Jim has helped the CRC with national CRC Program requirements, as well as with more specific strategic directions and outcomes.

On 30 June 2002, Jim completed his term as Visitor for the CRC for Catchment Hydrology. He has now assumed the role of Chair of the Life Sciences Selection Panel in the CRC Program.

Centre Structure and Links Between Programs



Cooperative Linkages

Links with CRC Parties, between CRC Programs, with collaborating organisations and with land and water industry users are a key part of the development of the research and its communication and adoption.



Collaboration Across Programs

The integrated approach adopted by the CRC relies on the concept of climate, land-use and water management driven catchment response. All of which give rise to impacts, which, if understood, can be managed.

To provide predictive capability which takes account of and measure all of these impacts, research programs must interact closely, each providing crucial information to outputs that achieve this goal.

A key part the development of the CRC's research, and its subsequent communication and adoption, is the links with CRC Parties, collaborating organisations and land and water industry users, as well as the links between the CRC's Programs.

Links Between Parties

The cooperative involvement of Centre Parties continues and is reflected in the following:

- research and industry representatives jointly formulate research projects
- all projects involve at least two Parties
- focus research sites bring research, industry and regional representatives together
- the Parties participate in project review panels about every six months
- staff are seconded from industry to research sites and vice versa
- postgraduate supervisory panels include non-university members
- an annual CRC-wide workshop is organised for staff and Parties
- regular information exchange is encouraged through email, the newsletter *Catchword* and the internal newsletter *CatchUp*

Parties interact within programs in various projects and activities:

The Environmental Management Support System (EMSS) to manage water quality across south-east Qld, funded by the South East Queensland Regional Water Quality Management Strategy, involves the CRC and CSIRO Land and Water.

- Project 2.5 looks at the movement of potential pollutants through the landscape in the Brisbane River Focus Catchment. This involves Natural Resources and Mines Qld and is co-funded by the CRC for Coastal Zone, Estuary and Waterway Management.
- Program 3's (Sustainable Water Allocation) industry Parties reviewed the Integrated Quantity and Quality Model (IQQM) and the REALM model for their ability to take account of climate variability and hydrological constraints on catchment yield and water supply.
- Brisbane City Council and Melbourne Water are actively testing and developing Program 4's MUSIC model in their organisations. MUSIC helps users evaluate stormwater management systems to meet water quality objectives.
- Program 4's (Urban Stormwater Quality) work with the Freshwater Ecology CRC continues to monitor water flows and biological quality. Collaboration with researchers in Project 6.2 also continues.
- Several studies undertaken in Program 5 (Climate Variability) involve one Catchment Hydrology CRC - funded researcher working at the Bureau of Meteorology, Melbourne and two Bureau staff working full-time in the Program. The studies relate to forecasting short-term rainfall, space-time characteristics of rainfall and improving land-surface models within the Bureau's climate forecast models.

Cooperative Linkages



Cooperative Linkages



Previous Page Participants from CRC Parties at Annual Workshop, Ballarat, April 2002

Far Left (L to R) Board members at Annual Workshop – Mr Ross Williams (DLWC); Ms Christine Forster and Dr John Langford (independent Board members); and Mr Peter Jackson, (Southern Rural Water)

Left Joint briefing with CRC for Freshwater Ecology to Board of Southern Rural Water, October 2001

- In Program 6 (River Restoration), evaluation of riparian vegetation in a south-east Queensland catchment is being undertaken by SEQRWQMS, Natural Resources and Mines, Qld, and Brisbane City Council.
- Another Program 6 project looks at the nature and effectiveness of environmental flows in the Campaspe River, Vic, and involves Goulburn-Murray Water in its role as the river operator and a CRC industry Party.
- Postgraduate student, Lindsay White (Program 6) spent two months conducting field work at Yarrowonga and Torrumbarry Weirs, owned by the Murray-Darling Basin Commission and operated by Goulburn-Murray Water.
- Melbourne Water is working in Program 6 to optimise urban stream rehabilitation.
- Program 7, Communication and Adoption, and Program 8, Education and Training, enjoy active input from all Parties. The Program Leader for Education and Training also performs this role for the CRC for Coastal Zone, Estuary and Waterway Management. Postgraduate student Rebecca Bartley is based at CSIRO's Tropical Forest Research Centre in Atherton, Qld, to do collaborative work.

Collaboration with other Research Groups

The Centre adds value to its research outcomes by working with other CRCs and land and water management authorities with complementary research aims, strategies and skills. They are:

- the Freshwater Ecology CRC (River Restoration Program), sharing skills in aquatic ecosystems and environmental flows
- the Coastal Zone, Estuary and Waterway Management CRC sharing modelling capability of flows, sediment and nutrients
- Land and Water Australia, facilitating projects involving riparian zone and dryland salinity management, and sustainable forestry
- three CSIRO Divisions participating in a major Murray-Darling Basin land-use initiative
- the Water Forum CRCs, to assist training across the water industry

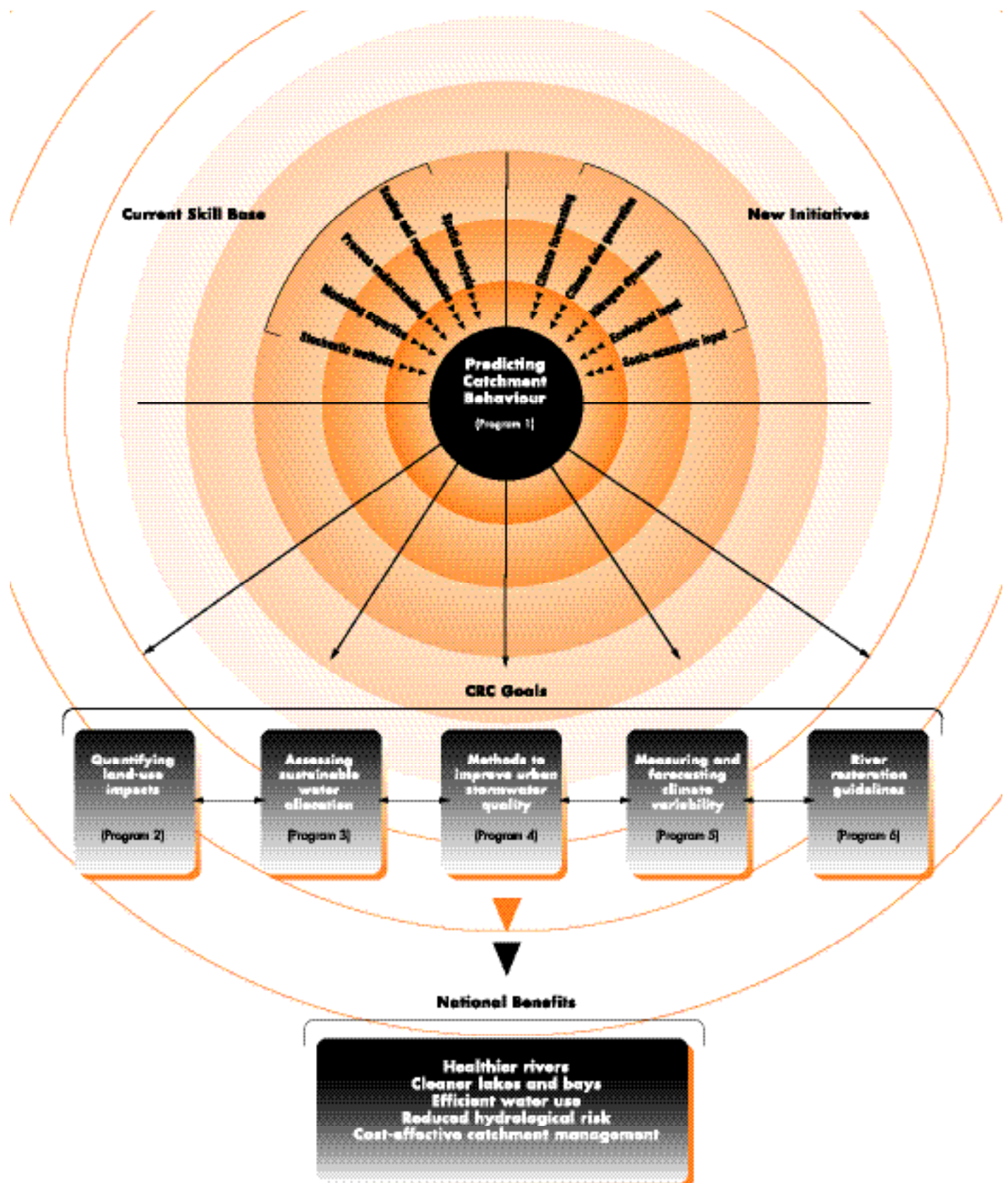
The Freshwater Ecology and Coastal Zone CRCs are involved in Project 2.5: Riparian zone transport and transformation of nitrogen. Further, the Freshwater Ecology CRC is collaborating in six of the seven projects in Program 6: River Restoration.

International Collaboration

The Centre continued its international collaboration with enhanced links across several areas :

- The UK Meteorological Office, in developing and applying weather production 'nowcasting' methods. Dr Alan Seed, Program 5 (Climate Variability) spent time at the Meteorological Office in March 2002.
- Catholic University of Leuven, Belgium with continued interaction in Program 2, 'Land Use Impacts on Rivers'. Kristof van Oost from U C Leuven's laboratory for Experimental Geomorphology collaborated with Dr Peter Hairsine, Program 2 Leader in Canberra in June 2002.
- University of North Carolina, Prof Larry Band who took part in the Centre's Second Year Review, Stage 1 and spent time at the CRC Canberra node, CSIRO Land and Water, particularly in furthering the Catchment Modelling Toolkit being developed with Program 1 'Predicting Catchment Behaviour'. These discussions followed a visit by the Toolkit Group to the United States in June/July 2001 with joint activity with Prof Band and other United States collaborators.

Integration and Collaboration Across Programs



Cooperative Linkages



Other Toolkit collaboration occurred with the visits of Prof Ralf Denzer (HTW Saarlandes, Germany) and Michel Blind (RIZA, the Netherlands) to Dr Robert Argent, Project Leader: Project 1.1 'Development of a Catchment Modelling Toolkit' in August and December 2001 respectively.

- Prof Geoff Pegram, University of Natal, South Africa, continued the collaboration with the CRC through his work during January 2002 in Program 5 'Climate Variability' and as CRC-sponsored keynote speaker at the 27th International Symposium on Hydrology and Water Resources held in Melbourne in May 2002.
- Dr Mike Stewardson (Program 6) established cooperative linkages with the French national science agency CEMAGREF while working at the Hydro-ecology Group, CEMAGREF, in Lyon, France during April - June 2002. Links are being developed in the area of ecological responses to changes in the hydraulic and hydrologic conditions of streams.

International Visitors

- Till Seyfarth, a software engineer from Germany, visited The University of Melbourne node from January to June, 2002, as a visiting scientist to Project 1.1. Till worked on design and development of a module management system for the Catchment Modelling Toolkit.
- Fred Watson, based at California State University Monterey Bay, visited the Project 1.1 team at the CRC's Canberra node in December to work on the Toolkit.
- Albert VanDijk, based at the Free University, The Netherlands, worked with Dr Rob Vertessy (Program 1) and Dr Peter Hairsine (Program 2) on erosion modelling until December 2001.
- In December 2001, Gorana Capkun from EPFL (Ecole Polytechnique Federale de Lausanne), Switzerland, visited The University of Melbourne to discuss her stochastic climate generation models.
- From July-September 2001, the CSIRO site in Canberra hosted PhD student, Mark Kramer, from the University of Cincinnati. Mark worked on the adaptation and application of the TOPOG model for stormflow simulation in forested catchments.
- In July 2001, Professor Larry Band, of the University of North Carolina, spent two days in the CSIRO Canberra laboratory. He gave a seminar on his nutrient budget modelling in the Baltimore part of the National Science Foundation's "Long-Term Ecological Research Network" (LTRN) in Maryland and then joined discussions on the Toolkit with Dr Rob Vertessy, Dr Peter Hairsine, Dr John Gallant, Trevor Dowling and Joel Rahman. Larry inspired the Program 1 team and claims to have been inspired by our CRC.
- Kristof van Oost, from UC Leuven, Belgium, Laboratory for Experimental Geomorphology visited Dr Peter Hairsine (Program 2) at CSIRO Land and Water, Canberra in June-July 2002.
- In December 2001, Dr Zhou Zaizhi from the Research Institute for Tropical Forestry, Guangzhou visited Jim Morris (Program 2) in Canberra and Melbourne for three weeks of training in the use of the 3PG forest growth model and economic modelling techniques.
- In February-April 2002, Zhang Ningnan from the Research Institute for Tropical Forestry, Guangzhou visited Jim Morris (Program 2) for 12 weeks for training in forest water use measurement.
- Michel Blind, RIZA, The Netherlands, visited Dr Robert Argent (Program 1) in December 2001. Discussions were held on further integrating the Toolkit project with similar activities in Europe.
- Professor Ralf Denzer, HTW Saarlandes, Germany, visited The University of Melbourne in August 2001 and discussed design of model component management and information systems with Dr Robert Argent.



Facing Page

Far Left Dr Mike Stewardson and CEMAGREF colleagues on field work, Semine River, France

Right Dr Geoff Pegram, Univ Natal – collaborated in Climate Variability research

This Page

Below Till Seylarth, CRC visitor from Germany, at Univ Melbourne

Left Mark Kramer, PhD scholar from Univ Cincinnati at CSIRO Canberra



International Visits

- Dr Alan Seed (Program 5) was Visiting Professor to the Technical University of Catalonia, Barcelona, Spain, in March-April 2002, where he conducted research on radar data quality control with Professor Sempere-Torres. In March, he visited the Met Office Joint Centre for Hydro-Meteorological Research, Wallingford, UK, to develop stochastic nowcasting methods with Dr Pierce. In April, he visited the South African Weather Services, Pretoria, South Africa, to test the Spectral Prognosis (S-PROG) nowcasting system using South African data with Dr Terblanche.
- In late June and early July 2001, Dr Robert Argent, Dr Rob Vertessy, Sue Cuddy, Joel Rahman, Shane Seaton and Roger Braddock (Program 1) described the CRC's Catchment Modelling Toolkit at seminars around the United States. The group's schedule took in Redlands, California, presenting to ESRI; Austin, Texas, with Prof David Maidment and his water engineering colleagues at the University of Texas; and Solomons, Maryland, presenting to University of Maryland and North Carolina University scientists.
- In April 2002, Andrew Western (Programs 1, 5) visited the Department of Civil Engineering, University of Salerno, Italy, and the Institut für Hydraulik, Gewässerkunde und Wasserwirtschaft, Technische Universität Wien, Austria.
- Associate Professor Brian Finlayson (Program 6) was the Australian national delegate to the Council of the International Association of Geomorphologists held in Tokyo in August 2001.
- Bernard Powell (Program 2) visited the Department of Natural Resources, Ohio State University, Columbus Ohio, in October 2001 and presented an invited seminar entitled, *Acid Sulfate Soils of Queensland, Australia*
- In September 2001, Jim Morris and Richard Silberstein (Program 2) visited the Research Institute for Tropical Forestry, South China Institute of Botany, China Eucalypt Research Centre, and Leizhou Forest Bureau, Guangdong province, China, for research collaboration and training in connection with Project 2.7, Eucalypts and Water.
- From April-June 2002, Mike Stewardson (Program 6) worked at the Hydro-ecology Group, CEMAGREF, in Lyon, France.
- In May 2002, Rob Vertessy (Program 1) visited the Environmental Engineering Department at Pusan University in South Korea. He presented two seminars on the CRC's Catchment Modelling Toolkit and the Environmental Management Support System (EMSS).