

This Program facilitates the rapid uptake of CRC research outputs.

All research programs are required to plan and implement a tailored Communication and Adoption (C&A) strategy to meet the needs of end-users. In 2000-2001, Program Leaders developed their strategies, in consultation with their project teams and stakeholders, based on a C&A framework developed during 1999-2000.

This Program aims to achieve Best Practice for C&A and adds value to each research program and project by developing collaborative communication projects with CRC Parties and Focus Catchment Coordinators.

The CRC is committed to measuring the effectiveness of its C&A activities through reviews by independent consultants in years one, three and five – the first review was completed in May 2001. Complementing this – in years two, four and six – will be a workshop on Best Practice in communication and adoption.

PROGRAM HIGHLIGHTS 2000-2001 STAKEHOLDER AND END-USER INVOLVEMENT

The CRC is committed to ensuring that its Parties are involved in the planning, development, implementation and delivery of its research

- Jointly with Melbourne Water, the Urban and Regional Land Corporation (Lynbrook Estate) and Brisbane City Council, the CRC won its second CRC Association Award for Excellence in Technology Transfer in three years. The CRC's winning application involved Program 4's research into Water Sensitive Urban Design (WSUD) and its use in Australian urban developments (more detail is provided in the Program 4 section of this report). The award is presented annually to three CRCs demonstrating innovative research that has arisen from the CRC Program, been applied or commercialised with significant benefits to Australia, and has strong end-user support. The CRC for Catchment Hydrology Urban Stormwater Quality Program has been successful in its involvement of end-users – including urban planners, council engineers, water industry engineers, property developers, and state water and environment agencies – in its research. This has led to the rapid adoption of WSUD principles and the development of best practice guidelines and policies across Australia.
- CRC industry Parties were well represented at the CRC Annual Workshop at Cobram-Barooga in April 2001 with more than 20 delegates among 90 participants. The workshop provided an excellent opportunity for researchers and practitioners to meet and exchange information in an informal atmosphere.
- In its first year, the new CRC established five Focus Catchments, each with a Coordinator, across NSW, Vic and Qld, as an integral part of its C&A strategy. In 2000-2001, the Focus Catchments provided demonstration sites for collaborative investigations into major aspects of catchment behaviour (climate, sediment movement, water runoff, river flows, reforestation impacts, etc), proving grounds for integrating the various multi-disciplinary research programs, opportunities for large-scale experiments that would not otherwise be undertaken and an opportunity for end-user involvement throughout the research process.
- In March 2001, Program 4 trained Brisbane City Council and Melbourne Water staff in using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC).



Left CRC Association Technology Transfer Award, a joint effort – (Left to Right) Bernie Porter, Urban and Regional Land Corporation; Senator the Hon. Chris Ellison, Minister for Justice & Customs; Ross Young, Melbourne Water; Russell Mein, CRC for Catchment Hydrology; André Taylor, Brisbane City Council

Below Communication and Adoption Program Leader, David Perry



FOCUS CATCHMENTS

A range of research and C&A activities began in the Focus Catchments, in:

- Brisbane River, Qld
- Yarra River, Vic
- Fitzroy River, Qld
- Goulburn Broken Rivers, Vic
- Murrumbidgee River, NSW

Staff selected as coordinators from the CRC's Parties coordinate each Focus Catchment and work with the C&A Program Leader and regional groups to ensure two-way information flow, help define research problems and desired research outcomes, and facilitate access to data and field sites. They meet as a group twice yearly (including the Annual CRC for Catchment Hydrology Workshop) to discuss progress and common issues.

Highlights and challenges for the Focus Catchment Coordinators (FCC) during 2000–2001 included:

Mr Tony Weber, Senior Waterways Program Officer – Water Quality, Brisbane City Council and FCC, Brisbane River, said the partnership between Brisbane City Council and the CRC continued to be productive and led to several beneficial outcomes during the year.

"The Council was awarded the inaugural Healthy Waterways Government Award for the Bridgewater Creek Water Quality Improvement Project, involving gross pollutant traps, a constructed wetland, and restoring natural conditions in a downstream channel," Tony said.

"Through partnership with the CRC and the local community, best practice principles were used to design the project and addressed issues including flooding, water quality improvement, habitat, community access and improving the areas of green space. Without the CRC's involvement, addressing the issues while trying to achieve the overall objective of improving water quality would have been much more difficult.

"The CRC's seminar series in the Brisbane Catchment began this year, with two seminars so far and more on the way. Research in the Catchment has involved CRC Programs 1, 2, 4 and 6. Given the amount of research underway, further seminars will update key stakeholders on results so far and may assist in future planning.

"Winning the CRC Association's Technology Transfer Award has stimulated much discussion in Council about the benefits of the CRC partnership in providing a sound scientific basis for implementing new practices."

(Mr Weber took over the role of Coordinator from Mr André Taylor, who left Brisbane City Council in May 2001 for a new position in Perth.)

Mr Pat Feehan, Manager, Natural Resources, Goulburn-Murray Water and FCC, Goulburn-Broken River said a highlight had been the report from Program 3 on water trading surveys.

"It has given us great feedback on irrigator and community attitudes to water trading and allocation in the catchment," he said.

"We're seeing progress on projects and research happening on the ground, e.g. stream structures in the Granite Creeks for Program 6 and the Project 2.3 work on catchment water yield.

"The Annual CRC workshop at Cobram-Barooga was a highlight, especially seeing the new postgraduate students. I'm looking forward to hearing what they have to say next year."

Ms Carolyn Young, Environmental Officer, Department of Land and Water Conservation (DLWC), NSW, and FCC, Murrumbidgee River, said she had been impressed by the energy at the CRC Annual Workshop.

"It was generated by the motivation and passion of the participants towards their research and the CRC goals," she said.

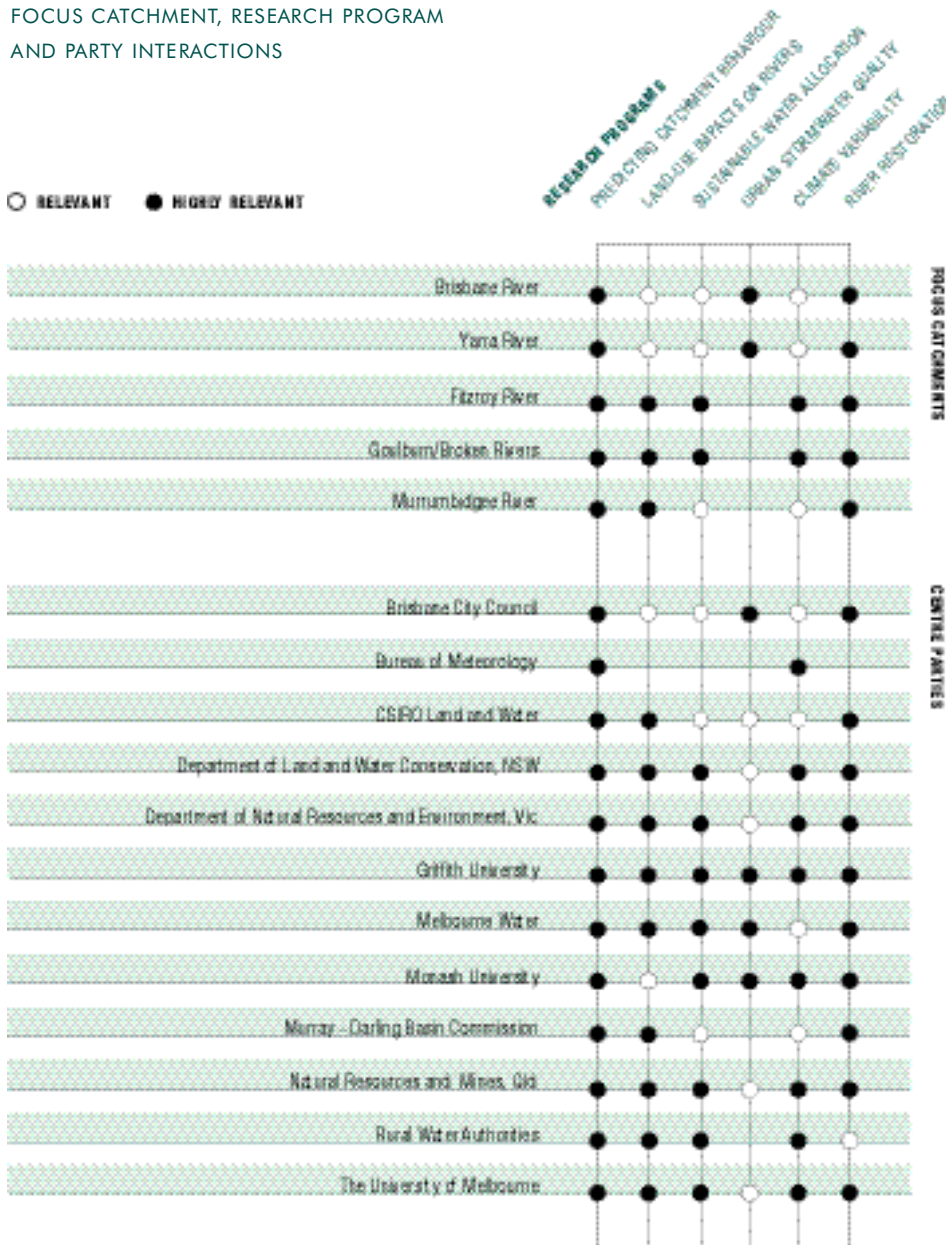
"I have enjoyed participating in the CRC research in the Murrumbidgee, especially helping out with a Project 2.1 river survey on a perfect summer's day! The project is investigating improved methods for targeting river restoration works, to determine the relationship between river habitat and landscape attributes. From this, the CRC will develop a habitat classification useful for river management".

"Developing closer links between the CRC and its stakeholders in the DLWC has been one of my intentions and I have organised and been involved in several meetings about planning for communication and adoption."

UTILISATION AND APPLICATION OF RESEARCH

PROGRAM 7 COMMUNICATION AND ADOPTION

FOCUS CATCHMENT, RESEARCH PROGRAM AND PARTY INTERACTIONS



Mr Graham Rooney, Manager, Water Environment Research, Melbourne Water and FCC, Yarra River, saw the training in Program 4's Model for Urban Stormwater Improvement Conceptualisation (MUSIC) and the Technology Transfer Award as major highlights.

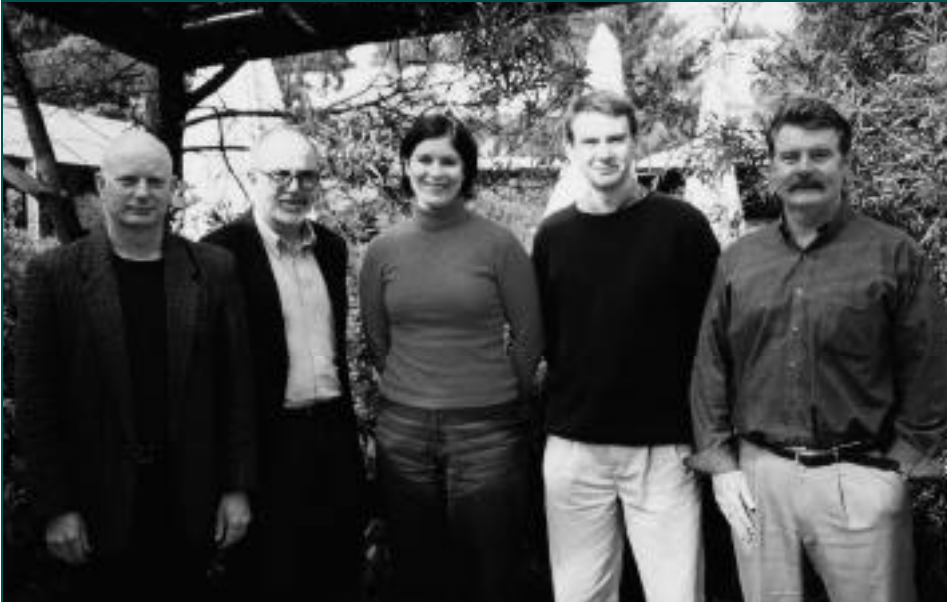
"A highlight was definitely the two days' training in the use of MUSIC, involving nine Melbourne Water staff. Their enthusiastic response was extremely satisfying, along with the subsequent installation of the software on their work computers".

"Melbourne Water made a significant contribution to the technology transfer award won by the CRC for its urban stormwater research. Apart from its association with the Urban Land Corporation in the Lynbrook Estate, Melbourne Water supported development of the best management practice guidelines for urban stormwater".

"A successful and happy team environment is apparent within the Urban Stormwater Quality team and the willingness of its leader to embrace collaboration and acceptance of technology adoption planning is inspiring".

"The successful signing-off of Project 6.2 was also a highlight; all parties are raring to go and find the ecological principles behind river rehabilitation priorities."

Mr Chris Carroll, Natural Resources and Mines, Qld, and FCC, Fitzroy River said projects within the Fitzroy focus catchment are progressing well.



Left Focus Catchment Coordinators, Graham Rooney, Pat Feehan, Carolyn Young, André Taylor, and Chris Carroll at Canberra workshop, October 2000

“The first phase of Project 3.2 conducted a survey of irrigator and community members on water reform, allocation and trading in the Fitzroy. Findings from the survey have been reported and presented to people in the region, and will be useful information to help draft Resource Operations Plans for the Fitzroy Basin. Project 2.2 is making good progress following an intensive planning and consultation stage. Important linkages with the toolkit project have been identified, and a joint Communication and Adoption Plan is being developed for Projects 2.1, 2.2, and 2.3.

An AEAM approach has been promoted to link stakeholders (including other research groups and CRCs) in the Fitzroy catchment, with a workshop planned for September 2001.”

EFFECTIVE COMMUNICATION

The first of three reviews of the C&A Program was conducted in early 2001 by Brisbane-based communication consultancy, Econnect. The review included feedback on the CRC’s communication performance, benchmarks against which future activities can be measured, and suggestions to help achieve the CRC’s aim of best practice in communication and adoption.

The Review Report in its Executive Summary stated: “*Compared to other similar organisations, the CRC for Catchment Hydrology is a leader in its approach to planning, implementing and evaluating communication*”. The report also said, based on Econnect’s experience in evaluating and working with other similar organisations over the past decade, “... *we believe the results of our evaluation show the CRC for Catchment Hydrology is performing at a high level with its communication activities*”.

CATCHWORD AND CATCHUP

The CRC’s flagship publication for stakeholders – *Catchword* – and internal bulletin – *CatchUP*, provide information on forthcoming water industry events; CRC seminars, field days and workshops; Technical and Industry Reports and videos; research progress reports; international visits and visitors; and awards and grants.

Catchword now has 1300 subscribers. It is distributed monthly via mail and email and is posted onto the CRC Website. 780 subscribers receive a printed copy and 345 an email version.

CatchUP is distributed fortnightly via email to more than 160 CRC staff, consultants and Parties.

WEBSITE

The CRC continued to maintain and update its Website to provide information for end-users and include new features, such as the ability to access program pages directly. Details about the CRC’s Website are provided in this report under the chapter on Public Presentations, Public Relations and Communication.

INDUSTRY SEMINARS, TECHNICAL SEMINARS AND WORKSHOPS

The CRC continued its successful seminar series. The industry seminars have a reputation for providing practical information of immediate relevance to catchment managers, based on highly regarded research. The technical seminars are attended by researchers and practitioners from the different disciplines (including hydrologists, meteorologists, ecologists and engineers) involved in the CRC’s integrated projects.

Positive feedback was received from the three ‘Hydrology and Hydraulics for Floodplain Managers’ workshops conducted for floodplain managers, covering Design Flood Flow Estimation, Flood Level Estimation and Design of Flood Mitigation Measures.

PUBLICATIONS AND VIDEOS

The Centre continued to produce high-quality and well-regarded publications and videos under its Industry Report, Technical Report and Industry Video series. The demand for these products is reflected in strong, consistent sales and increasing requests for electronic downloads from the Website.

An example of well-received and comprehensive material produced as a result of long-term research was the On-Farm and Community Scale Salt Disposal Basins on the Riverine Plain report series.

The project, a collaboration between the CRC, CSIRO Land and Water and the Murray-Darling Basin Commission, was led by Dr Glen Walker and Dr Kumar Narayan. It formed part of the initial CRC's Salinity Program. Outputs included a 15-report series covering key issues in the use of salt disposal basins, distributed to more than 100 key stakeholders Australia-wide. The reports were made available on the CRC Website and on CD-ROM.

Project sheets for all programs during the year provided a brief overview of project aims and expected outcomes. They were made available in printed form and on the CRC Website.

A list of publications produced in 2000-2001 is provided later in this report.

FIELD TOURS, DEMONSTRATIONS AND CONTINUING PROFESSIONAL EDUCATION

The CRC maintained its successful program of field tours and demonstrations, which provided an opportunity for CRC researchers to meet industry practitioners, community groups and landholders, share information and gain feedback about local issues, knowledge gaps and the impact of their research. As part of its ongoing commitment to providing continuing professional education for its participants, the CRC began negotiations to develop short courses including one on stream restoration, in collaboration with the Rivers Consortium.

A list of field tours, demonstrations and short courses undertaken in 2000-2001 is provided later in this report.

FEATURE ARTICLES IN INDUSTRY AND TRADE PUBLICATIONS

In 2000-2001, the CRC contributed feature articles to industry and trade journals and newsletters including *Irrigation Australia* (journal of the Irrigation Association of Australia), *The Source* (Melbourne Water's magazine) and *Water* (the journal of the Australian Water Association). A list is included under the Public Presentations, Public Relations and Communication chapter.

ADVOCACY

Influencing the national agenda for land and water management is a major objective for CRC communication.

With the level of public and political interest in catchment issues at an all-time high, the CRC considers it important to contribute its knowledge to the debate, to assist managers in making policy decisions.

In 2000-2001, the CRC Board and Executive continued to play an advocacy role with national, state, and regional peak bodies involved in land and water management.

A highlight was the release of the Program 3 report, *Irrigator and Community Attitudes to Water Allocation and Trading in the Goulburn Broken Catchment*, in April 2001. The report will make a significant contribution to the social, economic, hydrological and ecological policies being developed for the region, which is undergoing rapid change brought about by water reform.

CONTRACT RESEARCH AND CONSULTANCIES

CRC research outcomes are being delivered through contract research. The CRC actively targets research contracts that will strategically support the adoption of key research outcomes.

Total external agency funding for 2000-2001 was some \$800,000 as indicated in the table opposite. Contracts included work with SEQRWQMS, Land & Water Australia (LWRRDC) and MDBC.

CONTRACT RESEARCH ACTIVITY

CRC ASSOCIATED/ADDITIONAL PROJECTS EXTERNAL FUNDING

8

CRC Project Number	Project Title / Project Leader	Related CRC Focus Catchment(s)	Total Project Resources (\$000s)	Total Funding Agency Resources Input (\$000s)	CRC Research Income (\$000s)	CRC Shared as to Other Projects	Funding Agency Input for 2002/2003 (\$000s)	Funding Agency Input for 2003/2004 (\$000s)	December Funding Agency Input to June 2004 (\$000s)	Project Start / Finish Date	CRC Parties Involved	Principal Funding Agency
1.3	Development of an environmental management support system (EMSS) for catchments in south east Queensland/ Dr Rob Vertessy	Brisbane catchment	263	151	112	43	0	110	110	May 00/Aug 01	CSIRO, Univ. Melb, Monash, BCC	South East Queensland Regional Water Quality Management Committee (SEQRWQMC)
1.4	Modelling and estimating sediment and nutrient loads in south east Queensland catchments – Phase 1/ Dr Francis Chiew	Brisbane catchment	72	54	18	25	0	54	54	May 00/Jan 01	CSIRO, Univ. Melb, Monash, BCC	South East Queensland Regional Water Quality Management Committee (SEQRWQMC)
2.6	Predicting the combined environmental impact of catchment management regimes on dryland salinity / Dr Lu Zhang	Goulburn Broken catchment, Murrumbidgee catchment	812	150	500	62	0	71	71	Jul 00/Jun 02	CSIRO, DNRE, DLWC-NSW, Corporation (LWRRDC)	Land and Water Resources Research and Development Corporation (LWRRDC)
2.7	Eucalypts and water: Managing forest plantations in China and Australia for sustained productivity and environmental benefits / Dr Jim Morris	Goulburn Broken Catchment	1,621	821	300	19	223	205	428	Jul 99/Jun 03	Centre for Forest Tree Technology DNRE, Univ. Melb Dept of Forestry, CSIRO	Australian Centre for International Agricultural Research (ACIAR)
2.10	SEQRWQMS, Stage 3, Project SS:Sediment and Nutrient Sourcing / Dr Jon Olley	Brisbane River catchment	397	277	120	30	223	54	277	Aug 99/Jun 01	CSIRO, DNRMQ	South East Queensland Regional Water Quality Management Committee (SEQRWQMC)
2.13	Basin-wide mapping of sediment and nutrient exports in dryland regions / Dr Chris Moran	Goulburn-Murray; Murrumbidgee are addressed by this study. The methodologies are of value to the other focus catchments .	1500	492	0	0	24	109	133	Mar 00/Mar 03	CSIRO, Univ. Melb, Monash Univ., MDBC	Murray-Darling Basin Commission (MDBC) Strategic Investigations and Education Program
2.15	Integrated assessment of the effects of land-use changes on water yield and salt loads / Dr Lu Zhang	Part of work in Murrumbidgee and Goulburn Broken catchments. Some work in catchments in WA	1295	753	542	42	0	0	0	Feb 01/Oct 03	NRE Vic, DLWC NSW, CSIRO	Murray-Darling Basin Commission (MDBC) Strategic Investigations and Education Program
3.4	Enhancement of the water market reform process: A socioeconomic analysis of guidelines and procedures for trading in mature water markets (Project No:[GRU25]) / Dr John Tisdell	Murrumbidgee catchment	833	208	625	75	0	60	60	Jul 00/May 03	Griffith Univ, DLWC-NSW, Monash Univ.	Land and Water Australia (LWRRDC)
6.8	Research to improve the effectiveness of Australian fishway design / Assoc Prof Bob Keller	Applies generally to Murray-Darling Basin	672	362	310	46	18	134	152	May 00/Jun 02	Monash Univ, Univ. Melb	Natural Heritage Trust, Dept of Agriculture, Fisheries and Forestry - Aust.(AFFA)
Resource Totals (\$000s)			7,465	3,268	2527							
Associate/Additional Projects External Funding Agency Input [as above] total (\$000s)				488	797	1285						
CRC Direct Contract Research/Consulting Income [Budget Table 2(b)] total (\$000s)				32	152	184						
Total Contract Research/Consulting total (\$000s)				520	949	1469						
Commonwealth Agreement Contract Research [Schedule 4, Table 2] totals (\$000s)				300	700	1000						

COMMERCIALISATION AND INTELLECTUAL PROPERTY MANAGEMENT

With mainly public sector investment and an emphasis on adoption of its research findings for the broader economic and public good, commercialisation for direct financial return has not been a major priority for the CRC. However, some research outputs and products may present a unique opportunity to earn income, and these are assessed in turn.

As part of its management of intellectual property, the CRC has identified and documented the existing (background) intellectual brought into the Centre by its Parties. Intellectual property created in the initial CRC also has been brought in as background intellectual property to the new CRC.

When a new product or component of centre intellectual property is developed, it is assessed on a case-by-case basis. The process typically involves the relevant Program and Project Leader (s), and Centre Executive in the first instance.

The potential financial return is assessed, a process which may require external specialist advice, and initial recommendations are made regarding the product's possible continued development or distribution – either within the CRC or in conjunction with an external party.



During 2000–2001 two software models with identified intellectual property value were protected by agreement, and marketed on a public good basis. These were *Aquacycle* (a daily urban water balance model) and the *CRCForge-extract* program (a database and program for estimating rare design rainfalls for Victoria). They were released on CD-ROM and users were required to sign an agreement protecting CRC and other contributors' intellectual property rights.

The Centre also sought legal advice about possible liabilities associated with these products and that advice was incorporated into the products, their packaging and the user agreement.

The CRC has sold 29 copies of *Aquacycle* and seven copies of the *CRCForge-extract* CD-ROMs.

RELATIONSHIPS WITH SMALL TO MEDIUM-SIZE ENTERPRISES (SMES)

The CRC continued to develop a flexible and dynamic relationship with SMEs during the year. Links with SMEs were progressively strengthened, mainly through the uptake of graduates and staff by leading environmental consultancies.

STAFFING

The Program formally welcomed Ms Maeve O'Leary, to work on technical reports and regularly update the Website. She joined C&A Program Leader David Perry (Monash), Daniel Figucio (Website and graphic design, CSIRO) and Tanya Jacobson (technical seminars, workshop support and *CatchUP*, CSIRO).



Below Left Communication and Adoption Program group, Cobram-Barooga April 2001

Left Hampton Park Wetland – guided by CRC research and procedures

Below Urban stormwater quality Program group developing decision support system 'MUSIC'



PROGRAM 7 MILESTONES

MILESTONES

Years 1 and 2

All project agreements have a Communication and Adoption (C&A) strategy that details the needs of end-users and a strategy for adoption of research outcomes.

Existing Centre Communication and Adoption activities reviewed in conjunction with existing and new Parties to determine requirements and further improve the Communication and Adoption strategies during Years 1 and 2.

Development of a communication strategy to engage the interest and collaboration of a wide range of stakeholders in preparation for the delivery of the Centre's research outcomes.

Communication and Adoption activities benchmarked by independent consultants through review after Year 1.

Further improvement of the CRC's Website to increase access to research outcomes and products.

Establish strategy for communication within CRC Parties and between Focus Catchments to ensure their integration with Communication and Adoption research program objectives.

Level of commitment to contract research is on target set in Strategic Plan.

PROGRESS

The Communication and Adoption (C&A) Program trialled the C&A framework in conjunction with Program 4 during late 2000. Program 4 strategy completed and implementation begun. Program Leaders from Programs 1, 2, 3, 5 and 6 have begun the C&A planning process and Programs are being developed.

External communication review by Econnect completed in May 2001 and included an assessment of existing communication vehicles and recommendations to improve product range. Assessing the value of each product for target groups is part of the C&A Program's Planning Framework undertaken in each Program.

C&A planning framework completed in November 2000. External communication review included recommendations for improvements to developed strategies. Strategy implementation begun.

Econnect successfully tendered for the communications review and completed it by May 2001. Key communicators from other similar organisations (10), key CRC investors (25), and internal (73) and external stakeholders (175) surveyed to benchmark CRC's communication performance.

Stage 1 of the CRC Website redesign completed and includes improved navigation, research model downloads, technical report summaries, project information, events calendar, new pages, *Catchword* subscription, events notification, publications lists. Stage 2 begun.

Initial strategy comprises FCCs as communication links via: email newsletters to target audience in catchment; scoping of AEAM project in Fitzroy; involvement of FCCs in developing C&A plans; regular FCC meetings in person and via phone. Completed in December 2000 and implementation is ongoing.

External projects for endorsement represent 146% of the target to June: South East Queensland Regional Water Quality Management Strategy Projects 1.3, 1.4, 2.10; Land & Water Australia Projects 2.6, 3.4; Natural Heritage Trust/Agriculture, Fisheries and Forestry – Australia Project 6.8; Murray-Darling Basin Commission Projects 2.13, 2.15; ACAIR Project 2.7.

Education and training for PhD, Masters and other postgraduate students, as well as CRC stakeholders, are central to CRC activities. The CRC's whole-of-catchment approach requires novel and flexible training strategies and involves researchers and stakeholders in developing training modules to deliver its research outcomes.

This Program is developing knowledge and a skills base in land and water management throughout Australia. It offers educational products developed in collaboration with other CRCs, with an emphasis on holistic catchment management.

During the year, the CRC continued to build on its outstanding reputation for producing high-calibre postgraduate students, keenly sought-after by industry.

EDUCATION, TRAINING AND CAPACITY BUILDING PROJECT 8.1

PROJECT LEADER: ASSOCIATE PROFESSOR JOHN FIEN

Key areas of this project include:

- Postgraduate research
- Undergraduate courses
- Postgraduate courses, short courses and seminars
- Train the trainer
- Community education

ACHIEVEMENTS 2000-2001

- Postgraduate student Rebecca Bartley won the CRC Young Water Scientist Of The Year award and the Showcasing CRC Postgraduate Students award after being invited as one of four postgraduate students to present at the CRC Association annual conference in Perth in May 2001. Her research into work sediment slugs (large pulses of coarse sediment) in rivers investigates a river's ability to recover and forms part of the Land-use Impacts on Rivers and River Restoration Programs. Both awards recognise postgraduate students with outstanding research ability, good communication skills and an understanding of industry needs. Her achievement is the third time in four years the CRC has won the Young Water Scientist of the Year award, which is chosen from outstanding candidates in the five Water Forum CRCs.
- Six PhD theses were submitted; the students successfully graduated and were taken into a range of industry and agency positions.
- Dr Philip Jordan won an award for best postgraduate paper at the Hydro 2000 conference in November 2000.



- Twelve new students were recruited, bringing the total number of postgraduates working across the CRC Programs to 40. All contributed to a training needs analysis and are participating in professional development activities including conferences, industry placement, field trips and training courses in areas as diverse as GIS, project management, thesis writing, multivariate statistics, media and oral presentation skills. A major training opportunity was provided just before the CRC Annual Workshop at Cobram-Barooga. The postgraduate workshop was tailored for scholars in the first half of their candidature and included sessions on oral and written communication and community participation in catchment management.
- An effective e-group for postgraduates was established and is operating well.
- Strong cooperation was demonstrated between the CRC for Catchment Hydrology training postgraduate support programs and similar programs in the Coastal Zone and Sustainable Tourism CRCs, including joint workshop activities and teaching by staff across CRCs.



Below Left Program, Project Leader
Assoc Prof John Fien – Projects 8.1, 8.2

Far Left Monash University PhDs
included (Left to Right) Betty Richards,
David McJannet, Paul Feikema,
Sharon O'Sullivan

Centre Rebecca Bartley, Young Water
Scientist of the Year

Below Postgraduate skills workshop,
Cobram-Barooga, conducted by
James Whelan



- An Education and Training capability statement was developed, focusing on providing workshop design, facilitation and evaluation support to Research Program/Project leaders and Focus Catchment Coordinators.
- The CRC vacation studentship scheme providing stipends to third and fourth-year students to gain 8-10 weeks' professional experience with CRC research programs continued. A survey of participating students affirmed the scheme's value in attracting potential future scholars and adding value to research.
- The CRC is working with the Australian Water Association (AWA) to develop a resource package on catchment management training workshops, called *We All Use Water*, in all Focus Catchments, in partnership with the Coordinators.
- Mr James Whelan was invited to facilitate a series of workshops in catchment management in Tokyo, Japan in March 2001.
- Associate Professor John Fien was invited to a United Nations Environment Program planning meeting in Nairobi, Africa, in February 2001 to help develop an environmental education program.
- Associate Professor John Fien spent a three-month sabbatical at UNESCO in Paris, EEC, from August-November 2000 finalising a 100-hour multimedia (CD and WWW) teacher education program to promote student understanding of sustainable development.

**PUBLIC PARTICIPATION AND
COMMUNITY CHANGE PROJECT 8.2
PROJECT LEADER: ASSOCIATE PROFESSOR
JOHN FIEN**

This research project on public participation and community change complements the Education and Training activities. It identifies the needs of stakeholders in natural resource management and provides an understanding of the social, economic and political influences on stakeholder participation and the wide range of strategies being developed to encourage informed and appropriate participation in research, planning, policy development and decision-making.

CRC for Catchment Hydrology researchers are collaborating with the CRC for Coastal Zone, Estuary and Waterway Management, which has a similar range of interests. The project is developing a Public Participation Toolbox – an on-line resource for agency, industry and community groups to develop understanding and expertise in innovative strategies for public participation in natural resource management.

ACHIEVEMENTS 2000-2001

- A review of the participatory capacity of stakeholders in the Upper Fitzroy catchment was scoped. The Coastal Zone CRC completed similar research in the Lower Fitzroy. The reviews will lead to shared understandings and cooperation between both ends of the catchment.
- An annotated bibliography of resources for public participation in natural resource management containing more than 500 items was prepared by postgraduate student Dana Thomsen.

- Three PhD students completed all requirements for confirmation of their candidature and were accepted as Affiliated Students in the Coastal Zone CRC.
- Associate Professor John Fien was invited to present the keynote address on Building Civil Society through Public Participation in Environmental Decision-Making at the UNEP conference, Bangkok, Thailand, in May 2001.
- Vacation studentships were awarded to twenty scholars at the following CRC nodes:
 - **CSIRO Land and Water, Canberra**
Kathryn Bormann, Heinz de Chelard, Gabriel Anderson, Louisa Roberts, Amanda Windeyer
 - **Griffith University**
Nicole Le Muth, David Knights
 - **Monash University**
Jane Catford, Andrew Barton, Andrew Pinner, Justin Lewis, Anna Wilson
 - **The University of Melbourne**
Sam Bayley, Phillip Birtles, Nada Dashlouty, Michelle Ezzy, Anna Galloway, Elisa Howes, James Lander and Lauren Sheather

TABLE A POSTGRADUATES – CRC CORE PROJECTS 2000–2001

Name	University	Type of postgraduate enrolment (PhD, MEngSc etc)	Supervisor and Associate Supervisors	Funding source(s) (ARC/CRC/Uni/etc)	Topic (Related CRC Program/Project)
Michele Akeroyd	Melbourne	PhD	G.R. Walker (CSIRO) G. Moore (UM)	MRS##, UMSPS†	An investigation into the isotopic composition of cellulose derived from tree rings to determine historical water sources of riparian vegetation (S3)
Brett Anderson	Melbourne	PhD	I.D. Rutherford (UM) A. Western (UM)	APA#	On the impact of riparian vegetation on catchment-scale flood characteristics (Program 6, 2.1)
Mark Bailey	Monash	PhD	L.D. Connell (University College London) R.J. Nathan (Sinclair Knight Merz) R.G. Mein (Monash)	Goulburn-Murray Water	Improved techniques for treatment of uncertainty in physically-based models of catchment water balance (A1)
Yinbang Bao	Melbourne	PhD	R. Argent (UM) A. Western (UM)	APA#	Scaling issues and hydrological modelling (1.1)
Rebecca Bartley	Monash (9)	PhD	I.D. Rutherford (UM) R.G. Mein (Monash)	MGS††, MDS*	The recovery of disturbed stream systems: a case study of sand slugs (W2, 2.1)
Alice Best	Melbourne (2)	PhD	L. Zhang (CSIRO) T.A. McMahon (UM) A. Western (UM)	MRS, CRC funded top up (CSIRO)	The impact of land-use change on seasonal water yield (2.3)
Dominic Blackham	Melbourne	PhD	I.D. Rutherford (UM) M. Stewardson (UM)	MIRSØ	Predicting horizontal surface development in alluvial river channels (6.7)
Kate Browning	Griffith	MPhil	M. Greenway (Griffith) I. Phillips (Griffith)	NHT Clean Seas Program (Brisbane City Council)	Effectiveness of Australian wetland native plant species in nutrient removal from a secondary treated effluent fed sub-surface flow constructed wetland(4)
Sharon Davis	Monash	PhD	R.G. Mein (Monash) R.A. Vertessy (CSIRO) D. Dunkerley (Monash)	MDS*	Measurement of forest soil hydraulic properties: implications for physically based catchment models (A2)
Rachel Eley	Monash	PhD	R.J. Keller (Monash) I.D. Rutherford (UM)	APA#, MDS*	Effects of channel and floodplain vegetation on flow rating of streams (FL3)
Teri Etchells	Melbourne	PhD	H. Malano (UM)	UMSPS†	Development of a methodology for calculating exchange rates (3.1)
Myriam Ghali	Melbourne	PhD	I.D. Rutherford (UM) S. Ewing (UM) R. Grayson (UM)	IPRSØØ, MIRSØ	Evaluating existing prioritisation procedures in the field of stream rehabilitation (Program 6)
Margaret Gooch	Griffith	PhD	J. Fien (Griffith) J. Warburton (UQ) R Rickson (Griffith)	GUPRA	Volunteers and sustainable catchment management (8.2)
Janice Green	Monash	PhD	PE. Weinmann (Monash) E.M. Laurenson (Monash) R. Nathan (Sinclair Knight Merz)	APAI	Estimation of extreme rainfall risk (D3)
Anthony Grudzinski	Griffith	PhD	J. Tisdell (Griffith)	GUPRA	An economic model of Australian water trading (3.2)
Tam Hoang	Monash	PhD	PE. Weinmann (Monash) E.M. Laurenson (Monash)	APA#, MDS*	A joint probability model to rainfall-based design flood estimation (FL1)
Phillip Jordan	Monash (4)	PhD	PE. Weinmann (Monash) A.W. Seed (Bureau of Met) J. Elliott (Bureau of Met)	APA#, MDS*	Effect of rainfall variability and radar rainfall measurement error on flood modelling (FL2)
Durga Kandel	Melbourne	PhD	R. Grayson (UM) A. Western (UM) H. Turrall (UM)	IPRSØØ, MIRSØ	Soil erosion modelling integrating with GIS (1.2)
Fay Lewis	Melbourne (7)	PhD	G.R. Walker (CSIRO) Q.J. Wang (UM/DNRE) R. Nulsen (Agriculture WA)	UMSPS†	Episodic recharge in the Western Australian wheatbelt (S3)
Kevin Linton	Melbourne (5)	MAppSc	H. Turrall (UM) M. Grace (Monash)	Goulburn-Murray Water	Transportation and cycling of phosphorus in the Deakin main drain (S1)
Sara Lloyd	Monash	PhD	T.H.F. Wong (Monash)	APA#, MDS*	Exploring impediments and opportunities of sustainable stormwater management schemes (4.2)

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TABLE A POSTGRADUATES – CRC CORE PROJECTS 2000–2001 (continued)

Name	University	Type of postgraduate enrolment (PhD, MEngSc etc)	Supervisor and Associate Supervisors	Funding source(s) (ARC/CRC/Uni/etc)	Topic (Related CRC Program/Project)
Leo Lyburner	Melbourne (2)	PhD	PB. Hairsine (CSIRO) J. Walker (UM)	UMSPS†	Riparian vegetation mapping using hyperspectral and high spatial resolution satellites (2.2)
Lucy McKergow	Melbourne (2)	PhD	I. Prosser (CSIRO) R. Grayson (UM)	MRS##, UMSPS†	Monitoring riparian lands for water quality improvement (W3)
John Marsh	Melbourne	PhD	T.A. McMahon (UM) R Argent (UM)	UMSPS†	Towards participatory information systems in environmental planning and management (U2)
Nicholas Marsh	Melbourne (8)	PhD	I.D. Rutherford (UM) R. Grayson (UM) B.L. Finlayson (UM) A. Western (UM)	MRS##, UMSPS†	The effect of large woody debris (LWD) on stream morphology (6.6)
Antony Motha	Melbourne (2)	PhD	PB. Hairsine (CSIRO) R. Grayson (UM) P. Wallbrink (CSIRO)	UMSPS†	Sediment redistribution in a catchment with multiple land-uses (W1)
Tanja Mueller	Griffith	PhD	M. Greenway (Griffith) I. Phillips (Griffith)	APA#	Role of biofilms in water quality improvement in stormwater quality improvement devices (4.2)
Muthukaruppan Muthukumaran	Melbourne	PhD	F.H.S. Chiew (UM) T.H.F. Wong (Monash) T. Weaver (UM)	MRS##, UMSPS†	Modelling quality and size distribution of contaminants in stormwater (4)
David Newton	Griffith	PhD	M. Greenway (Griffith) G.A. Jenkins (Griffith)	GUPRA	Sustainable management of constructed wetlands for urban stormwater quality improvement (Program 4)
Linh Nguyen	Melbourne	PhD	R. Grayson (UM) R.A. Vertessy (CSIRO)	MIRSØ	Elucidating catchment behaviours using multi-temporal, high resolution remote sensing data (1.2 and 2.3)
Cuan Petheram	Melbourne (2)	PhD	G.R. Walker (CSIRO) R. Grayson (UM) M. Stauffacher (CSIRO)	APA#, UMSPS†	A catchment classification approach to managing stream salinisation in the middle Murrumbidgee (S3)
Avijeet Ramchurn	Monash	MEngSc	PE.Weinmann (Monash) G. Codner (Monash)	IPRSØ, MGS	The modelled effects of anticipated on-farm storage yield on irrigator decisions (3.1)
Sandra Roberts	Melbourne	PhD	R.A. Vertessy (CSIRO) R. Grayson (UM) L. Bren (UM)	UMSPS†	Water yield and transpiration in Eucalyptus sieberi forests of different age (F02)
Renuka Sabaratnam	Monash	MEngSc	R.J. Keller (Monash) I.D. Rutherford (UM)	Part project support	Streambank undercuts: their distribution and morphology along the Acheron River, SE Australia (W2)
Vasanthi Siriwardhena	RMIT	PhD	N. Jayasuriya (RMIT) M. Moore (RMIT) D. Jayasuriya (Melbourne Water) PB. Hairsine (CSIRO)	RMIT scholarship supported by industry and CRC	Water pollution control in multiple land-use water supply catchments (B1)
Dana Thomsen	Griffith	PhD	J. Fien (Griffith) M. Greenway (Griffith)	GUPRA	Community-based research: a strategy for community empowerment and environmental quality (8.2)
John Tilleard	Melbourne	PhD	B.L. Finlayson (UM) I.C. O'Neill (UM) W.D. Erskine (UNSW)	APA#, UMSPS†	River channel adjustment to hydrologic change (B2)
Jai Vaze	Melbourne	PhD	F.H.S. Chiew (UM) I. O'Neill (UM) T.A. McMahon (UM)	MRS##, MIRSØ	Modelling storm event pollutant load in urban catchments (U2) (4.1)
Clayton White	Griffith	PhD	J. Fien (Griffith) R. Rickson (Griffith)	GUPRA	The role of communication in citizen participation in catchment management (8.2)
Lindsay White	Monash	PhD	R.J. Keller (Monash) I.D. Rutherford (UM) J.H. Harris (CRCFE)	APA#, MDS*	Hydraulic information to improve the effectiveness of fishways in Australia (6.5)
Scott Wilkinson	Monash	PhD	R.J. Keller (Monash) I.D. Rutherford (UM)	APA#, MDS*	Sediment transport processes that maintain pool riffle sequences in alluvial streams (2.1)
Juliette Woods	Adelaide (6)	PhD	K. Narayan (CSIRO) M. Teubner (U Adelaide) C. Simmons (Flinders Univ of SA)	APA#, CRC project support	Improving the accuracy of numerical simulations of density-dependent groundwater flow and transport (S2)

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PROGRAM 8 EDUCATION AND TRAINING

TABLE B POSTGRADUATES – CRC ASSOCIATED/ADDITIONAL PROJECTS 2000–2001

Name	University	Type of postgraduate enrolment (PhD, MEngSc etc)	Supervisor and Associate Supervisors	Funding source(s) (ARC/CRC/Uni/etc)	Topic (Related CRC Program/Project)
Andrew Barton	Monash	MengSc	R.J. Keller (Monash) T.H.F. Wong (Monash)	MDS (AFFA funded)	Aspects of fishway design (6.8)
Wijedasa Hewa	Melbourne	PhD	H.M. Malano (UM) H.N. Turrall (UM) T.A. McMahon (UM) G. Smith (G-MW)	MRS##, MIRSØ	Implication of water trading on system management and environmental flow (3.6)
Peter Kolotelo	Monash	MSc	J. Baldwin (Monash) R.J. Keller (Monash)	MDS (AFFA funded)	Improving the effectiveness of Australian fishway design (6.8)
Kishor Panta	Melbourne	PhD	H. M. Malano (UM) T.A. McMahon (UM) H. Turrall (UM)	IPRSØØ	Operating policies for environmental regulation and optimal allocation of water resources with inflow forecasts using ENSO signals (3.5)
Mark Wood	Melbourne	PhD	H.M. Malano (UM) H. Turrall (UM)	LWRRDC Goulburn-Murray Water	Real-time monitoring and control of surface irrigation systems (E)

TABLE C HIGHER DEGREES (RESEARCH) COMPLETED AND DESTINATION OF POSTGRADUATES

Name	Degree University	Supervisor(s)	Topic	Date Research Thesis Submitted	Destination
Sharon Davis	PhD, Monash	R.G. Mein (Monash) R.A. Vertessy (CSIRO) D. Dunkerley (Monash)	Measurement of forest soil hydraulic properties: implications for physically based catchment models (A2)	January 2000 (Passed November 2000)	Rural Industries Research Development Corporation (RIRDC) (Research Manager)
Tam Hoang	PhD, Monash	PE. Weinmann (Monash) E.M. Laurenson (Monash)	A joint probability model to rainfall-based design flood estimation (FL1)	May 2001	Bureau of Meteorology (Professional Officer)
Phillip Jordan	PhD, Monash	PE. Weinmann (Monash) A.W. Seed (Bureau of Met) J. Elliott (Bureau of Met)	Effect of rainfall variability and radar rainfall measurement error on flood modelling (FL2)	March 2000 (Passed October 2000)	SMEC Victoria (Water Resources Engineer) (and later) Bureau of Meteorology
Fay Lewis	PhD, UM	G.R. Walker (CSIRO) Q.J. Wang (UM/DNRE) R. Nulsen (Agric WA)	Episodic recharge in the Western Australian wheatbelt (S3)	December 2000 (Passed July 2001)	Consultant
John Marsh	PhD, UM	T.A. McMahon (UM) R Argent (UM)	Towards participatory information systems in environmental planning and management (U2)	February 2001	The Gambia, West Africa
Sandra Roberts	PhD, UM	R. Grayson (UM) L. Bren (UM) R.A. Vertessy (CSIRO)	Water yield and transpiration in eucalyptus sieberi forests of different age	April 2001	State Forests of NSW (Research Officer)
Renuka Sabaratnam	MEngSc, Monash	R.J. Keller (Monash) I.D. Rutherford (UM)	Streambank undercuts: their distribution and morphology along the Acheron River, SE Australia (W2)	November 2000	Goulburn-Murray Water (Natural Resources Management Support Officer)
Vasantha Siriwardhena	PhD, RMIT	N. Jayasuriya (RMIT) M. Moore (RMIT) D. Jayasuriya (Melbourne Water) PB. Hairsine (CSIRO)	Water pollution control in multiple land-use water supply catchments (B1)	April 2001	Sri Lanka (Consultant)
John Tilleard	PhD, UM	B.L. Finlayson (UM) I.C. O'Neill (UM) W.D. Erskine (UNSW)	River channel adjustment to hydrologic change (B2)	April 2001	Consultant

† University of Melbourne Special Postgraduate Studentship supported by CRC

†† Monash University Graduate Scholarship

* Monash University Department Scholarship supported by CRC

** Melbourne University Postgraduate Scholarship

Australian Postgraduate Award

Melbourne Research Scholarship

Ø Melbourne International Research Scholarship (fee remission)

ØØ International Postgraduate Research Scholarship

Australian Postgraduate Award Industry

Monash Graduate Scholarship

Griffith University Postgraduate Research Award (ENS Faculty)

(1) Also located at Monash University

(2) Also located at CSIRO, Canberra

(3) Also located at The University of Melbourne

(4) Also located at Bureau of Meteorology, Melbourne

(5) Also located at Goulburn-Murray Water, Tatura

(6) Also located at CSIRO, Adelaide

(7) Also located at Agriculture WA

(8) Also located at Griffith University

(9) Also located at CSIRO, Atherton



Left University of Melbourne
Program 6 Vacation scholars
in field

Below Education and Training
Program group



PROGRAM 8 MILESTONES

MILESTONES

Years 1 and 2

Package of courses and industry placements for PhD students in operation.

Framework for collaborative offering of courses developed.

Protocols for flexible delivery of courses in place.

Selected masters coursework subjects available for participating universities to share.

Training needs analysis for industry.

Action plan for community education, including schools, in catchment hydrology.

PROGRESS

Training needs analysis for postgraduates completed and integrated into a schedule of possible collaborative training activities with Sustainable Tourism and Coastal Zone CRCs.

Two-day workshop for postgraduate students on oral and written communication, presentation skills and community participation undertaken from April 1-3 2001 in collaboration with the CRC for Sustainable Tourism.

Industry placement program developing with strong student and industry input.

Active e-group operating for postgraduate students focusing on providing information on research support, possible supplementary training opportunities, CRC/CRCA news, discussing shared concerns, etc.

Appointment of a lecturer in Science Leadership, co-funded with the CRC for Coastal Zone, Estuary and Waterway Management.

Framework for a collaborative postgraduate support program across Coastal Hydrology and Coastal Zone, Estuary and Waterway Management CRCs in place.

Postgraduate education program integrated with that of the Sustainable Tourism and Coastal Zone CRCs.

Planning meetings with Education and Training coordinators of related CRCs to plan joint activities within the Water CRCs Forum.

Blackboard software evaluated and available for development of on-line courses and training.

Uncertainty over value of postgraduate coursework masters courses. A consultation/planning workshop has been scheduled for early 2001-2002 year to address this problem.

Industry training needs emerging through Communication and Adoption planning by each research program/project.

Three PhD students began their studies in the area of community learning through public participation.

Workshop facilitator's training manual nearing completion.

Regular professional support provided to catchment, Waterwatch and other agency educators.

Partnership developed with AWA to develop and deliver catchment training workshops in all Focus Catchments.