

## Staffing and Administration



### New Appointments

#### Director

Professor Rob Vertessy  
CSIRO Land and Water

(Appointed Centre Director by Governing Board and succeeding Professor Russell Mein, Monash University, from July 2002)

#### Program Leaders

Dr Francis Chiew

(The University of Melbourne)

Program Leader

Program 5: Climate Variability

(Succeeding Prof Tom McMahon from April 2002)

Dr Tim Fletcher

(Monash University)

Program Leader

Program 4: Urban Stormwater Quality

(Succeeding Assoc Prof Tony Wong from April 2002)

Dr Alan Seed

(Bureau of Meteorology)

Project Leader, Project 5.1

(Succeeding Prof Tom McMahon from April 2002)

Dr (Sri) R Srikanthan

(Bureau of Meteorology)

Project Leader, Project 5.2

(succeeding Dr Francis Chiew from April 2002)

### Specified Research Personnel

Professor Russell Mein

Department of Civil Engineering

Monash University (Centre Director)

(succeeded as Director by Professor Rob Vertessy, CSIRO Land and Water, from July 2002)

Professor Tom McMahon

Department of Civil and Environmental Engineering, The University of Melbourne

(Centre Deputy Director,

Program 5 Leader – Climate Variability)

(succeeded as Program 5 Leader by Dr Francis Chiew from April 2002)

Dr John Tisdell

Faculty of Environmental Sciences,

Griffith University (Centre Deputy Director,

Program Leader 3 Leader – Sustainable Water Allocation)

Professor Rob Vertessy

CSIRO Land and Water

(Centre Deputy Director, Program 1

Leader – Predicting Catchment Behaviour)

(succeeded as Deputy Director by Mr Erwin Weinmann, Monash University, from July 2002; and succeeded as Program 1 Leader by Mr Geoff Podger, Department of Land and Water Conservation, NSW, from August 2002)

Dr Peter Hairsine

CSIRO Land and Water

(Program 2 Leader – Land-use Impacts on Rivers)

Associate Professor Ian Rutherford  
School of Anthropology, Geography and Environmental Studies,

The University of Melbourne

(Program 6 Leader – River Restoration)

(succeeded as Program 6 Leader by Dr Mike Stewardson, The University of Melbourne, from September 2002)

Associate Professor Tony Wong

Department of Civil Engineering

Monash University

(Program 4 Leader – Urban Stormwater Quality)

(succeeded as Program 4 Leader by Dr Tim Fletcher, Monash University, from April 2002)

Professor John Fien

Faculty of Engineering Sciences

Griffith University

(Program 8 Leader – Education & Training)

(succeeded as Program 8 Leader by Mr Tim Smith, Griffith University, from August 2002)

Researcher	Percentage Time	
	Actual	Agreement
Professor Russell Mein	100	100
Professor Tom McMahon	70	70
Dr John Tisdell	100	70
Professor Rob Vertessy	100	100
Dr Peter Hairsine	85	75
Assoc. Professor Ian Rutherford	53	55
Assoc. Professor Tony Wong	69	45
Professor John Fien	30	30



*Facing Page  
Far Left John Molloy, Business  
Manager*

*This Page  
Above (L to R) Andrew Ryan and  
Justin Lewis, among staff engaged  
for short-term contracts.*

*Right Tanya Jacobson, Office  
Manager, Canberra node.*

### **Staff on Contract**

Staff on short-term contracts during 2001–2002 included: Justin Lewis, Peter Poelsma, Andrew Ryan – Monash University, Robert Pipunic – The University of Melbourne and Tim Ellis – CSIRO Land and Water.

### **Postgraduates**

During 2001–2002 there were 42 postgraduates involved in research on CRC core programs or projects.

A further three were engaged in research on associated research projects. (Details are outlined in the Education and Training section).

### **Research Facilities**

The principal research facilities for the CRC are located at CSIRO Land and Water – Canberra; Griffith University – Nathan Campus; Monash University – Clayton; Natural Resources and Mines, Qld- Indooroopilly, and The University of Melbourne – Parkville.

Access to research infrastructure including laboratories, technical equipment, computer resources and libraries has been provided at the principal locations.

Significant research facilities are made available by other CRC Parties, in addition to the principal sites mentioned above.

### **Other**

Focus Catchments at Brisbane, Fitzroy, Goulburn Broken, Murrumbidgee and Yarra Rivers represent substantial components in the research sites and facilities available to the CRC.

Important and substantial resources for the CRC research include the datasets provided by CRC Parties including Brisbane City Council, Bureau of Meteorology; Department of Land and Water Conservation, NSW; Department of Natural Resources and Environment, Vic; Goulburn-Murray Water; Melbourne Water and Natural Resources and Mines, Qld.

## Public Presentations, Public Relations and Communication



### Communication activities

Following its successful independent Communications Review in May, 2001, the CRC built on its communication efforts to inform and involve key stakeholders including CRC Parties, Associates and land and water managers throughout the Focus Catchments and Australia-wide.

Public interest in catchment hydrology issues – such as urban stormwater management, the impact of reforestation on water yields, and water trading and allocation – remained high during 2001-02. The CRC contributed to the public debate by providing information based on relevant, practical, leading-edge research, through tailored communication activities such as its popular industry and technical seminar series (accompanied by reports and videos), *Catchword* newsletter, workshops and field days, industry manuals, fact sheets, best practice guidelines and protocols and its website,

<http://www.catchment.crc.org.au>.

### Website

In September, 2001, a new feature was introduced to the Website: a publications database at [www.catchment.crc.org.au/publications](http://www.catchment.crc.org.au/publications). As a result, visitors to the website can identify useful CRC publications and download and print many of them. Many CRC reports are available as Adobe Acrobat files (PDFs) and stored in a database that can be interrogated in a number of ways. The simplest search of the database uses the research program names. Users can also search by the report type, for example, technical or industry report, working document, video or other, such as maps or conference proceedings. More advanced searches using authors, keywords and titles, are also available.

All current CRC technical and working reports (over 35 at June 2002) and many of the initial CRC's reports are available from the website. Electronic formats of existing publications from the initial CRC (1992-1999) are regularly added to the website.

Another major update involved the site's search engine, which now searches all website pages including pdf files. This allows users to search on key words throughout the website including the events calendar, the *Catchword* newsletter, news items and technical, industry and working documents.

Continued data logging (which started in 2001) showed that, between July 1 2001 and June 30, 2002, over 24,000 visitors logged on to the Website and downloaded more than 89,000 documents

The website received an average of 3000 visitors each month with a third of visitors returning to the site more than once. Data logs recorded visitors to our website from the US, Russian Federation, Japan, Netherlands, Germany, Singapore, Spain, Italy, Canada, South Africa, New Zealand, Saudi Arabia and Malaysia.

### Catchment Modelling Toolkit

The CRC website for the Catchment Modelling Toolkit is being constructed as part of the CRC's website in four stages over two years. Stage 1, started in January 2002, is a basic site that includes a description of the Toolkit and its functions, contact details for staff developing the Toolkit, and the background and philosophy behind it. Member registration, user feedback and an E-mail subscription list will be added soon.

More than 120 people have registered their interest on-line in receiving updates about the Toolkit's development and associated models.

Recently with the release of the MUSIC software, a preliminary page for MUSIC has been added, which provides contact details for technical assistance, background papers related to MUSIC and order forms.



*Facing Page*

*Far Left* Speakers at the Russell Mein Seminar, Monash, June 2002

*Centre* Urban stormwater modelling users' forum on 'MUSIC' software, Melb, Oct 2001

*Right* Participants at Fitzroy catchment stakeholders' forum, Rockhampton, Oct 2001

*This Page*

*Above* Participants at Fitzroy catchment stakeholders' forum, Rockhampton, Oct 2001

*Above Right* Participants at joint IEAust/ CRC/River Basin Management Society workshop on Environmental Flows, Melbourne, Nov 2001



**Public Presentations**

The CRC continued its industry and technical seminar series throughout the year, attracting big audiences from land and water management agencies, local councils, community groups, Catchment Management Authorities, and research and funding organisations.

CRC researchers were invited to present their findings at Australian and international workshops, conferences and field days. Highlights included:

- The Third Annual Stream Management Conference in Brisbane, August 2001 (see Program 7)
- Environmental Flows – Theory, Practice and Management, a seminar in Melbourne attracting more than 200 professionals and jointly sponsored by the River Basin Management Society, the Institution of Engineers, Australia and the CRC, in November 2001
- International Congress on Modelling and Simulation (ModSim 2001) in Canberra, on “Integrating Models for Natural Resources Management across Disciplines, Issues and Scales”, in December 2001. CRC staff were involved in seven papers.
- 27th Hydrology and Water Resources Symposium, “The Water Challenge – Balancing the Risks”, in Melbourne, May 2002.

**Book Launches**

CRC participants have been significantly involved in the publication of two books in the last year, both in an editorial role and as contributors of chapters.

“Trees, water and salt: An Australian guide to using trees for healthy catchments and productive farms” is the culmination of a four year collaboration between The Rural Industries Research and Development Corporation and CSIRO Land and Water scientists, Edited by Richard Storzaker, Rob Vertessy and Alastair Sarre, this state-of-the-art guide is the first in the Joint Venture Agroforestry Program's (JVAP) Agroforestry Design Guidelines series. A manual for practitioners, this book draws on new and existing research to show how trees can be used to successfully to combat salinity while also providing farmers with income.

The book was launched in Canberra on 7 March 2002 by the Minister for Agriculture, Fisheries and Forestry, Hon Warren Truss.

“Spatial Patterns in Catchment Hydrology: Observations and Modelling”, edited by Rodger Grayson and Günter Blöschl, was also published in 2002. This book brings together a number of recent field exercises in research catchments, that illustrate how the understanding and modelling capability of spatial processes can be improved by the use of observed hydrological response. In addition, the introductory chapters review the nature of hydrological variability and introduce basic concepts related to measuring and modelling spatial hydrologic processes.

**Public Relations**

The CRC maintains a specialist media distribution list including natural resource-related journals and magazines, and radio and television outlets.

The CRC distributes news releases, liaises with media and provides expert commentary on its research, to promote its research outcomes and significant achievements to the wider community.

During the year, media coverage was obtained in a range of print and electronic media including The Weekend Australian, regional newspapers and radio.

A list of media references is provided in this report.

The CRC mounted displays promoting its activities at:

- CRC Industry Seminars on MUSIC in Melbourne, Canberra, Sydney, Brisbane and Adelaide
- CRC Technical Seminars in Melbourne, Canberra and Brisbane

The Brisbane and Melbourne nodes have a professional CRC display promoting the CRC and its research. The displays are used regularly for events where the CRC is involved.

# Public Presentations, Public Relations and Communication

## Public Presentations 2001-2002

Date	Speaker(s)	Topic	Venue
10 July 2001	Dr Tim Fletcher	Wetland Design Principles	Urban Stormwater Forum, North Central CMA, Victoria
10 July 2001	Dr Tim Fletcher	Water Sensitive Urban Design	Urban Stormwater Forum, North Central CMA, Victoria
17 August 2001	Dr Rebecca Bartley	Giant slugs attack Australian Streams – Research to the Rescue	CSIRO Davies Laboratory Townsville
23 August 2001	Assoc Prof Tony Wong	Demonstration of the Application of MUSIC	United Engineering Foundation Conference, Snowmass, Colorado, USA
12 September 2001	Assoc Prof Tony Wong	Stormwater Treatment Train	Stormwater Quality in the Urban Environment Seminar, Melbourne, Vic
12 September 2001	Assoc Prof Tony Wong	Developing a Planning Model for	Association of Bayside Municipalities Symposium, Melbourne, Vic Implementing Water Sensitive Urban Design
18 September 2001	Dr Richard Silberstein	Using Modelling to Study Catchment Hydrology and Vegetation Management	Research Institute for Tropical Forestry, Guangzhou, China
18 September 2001	Assoc Prof Tony Wong	Water Sensitive Urban Design	Rainwater Tanks in the Urban Water Cycle Forum, Sydney, NSW
21 September 2001	Assoc Prof Tony Wong Chris Chesterfield	Briefing to Project Officers and Ministerial Advisors on Water Sensitive Urban Design and Institutional Framework	Environment Australia, Canberra, ACT
25 September 2001	David Perry Jenni Metcalfe	The evaluation of science-based organisations' communication programs	National Conference of the Australian Science Communicators, Sydney, NSW
27 September 2001	Dr Jim Morris	Predicting tree plantation growth and water use from climate and site conditions using the 3PG growth model	Chinese Academy of Forestry, Beijing, China
5 October 2001	Prof Russell Mein	The CRC for Catchment Hydrology – Linking researchers and users	Department of Civil Engineering, Monash University
12 October 2001	Prof Russell Mein	Invited Conference Summary	Second Victorian Floodplain Management Conference, Traralgon, Vic
24 October 2001	Dr Tim Fletcher	MUSIC Users Forum	Monash University, Vic
25 October 2001	Assoc Prof Tony Wong	Invited speaker to launch the Moreland City Council Stormwater Management Plan	Moreland City Council, Vic
30 October 2001	Dr Bofu Yu	Recent developments in regional erosion risk assessment	Regional Workshop on Soil Erosion Prediction Methodology, Kuala Lumpur, Malaysia
7 November 2001	Dr Peter Hairsine	Keynote Speaker, River Symposium	Qld Hydrological Society, Brisbane, Qld
7 November 2001	Dr Rob Vertessy	Keynote Speaker, River Symposium	Qld Hydrological Society, Brisbane, Qld
19 November 2001	Durga D Kandel	Application of GPS (Geographic Positioning System) for Soil and Road/Trail Mapping	International Center for Integrated Mountain Development (ICIMOD), Kathmandu Nepal
29 November 2001	James Whelan	Best Practice Case Study: We All Use Water	Delft-IHE, The Netherlands
30 November 2001	Assoc Prof Tony Wong	Water Sensitive Urban Design	Melbourne Water, Melbourne, Vic
13 December 2001	Sara Lloyd	WSUD: A Stormwater Management Perspective	Water Services Association of Australia, Sydney, NSW
14 December 2001	Sara Lloyd	Lynbrook Estate – Project Strengths, Challenges, Negotiations and Experimental Results	Environment Australia, Melbourne, Vic
20 January 2002	Dr John Tisdell	Water Market Experimentation	Goulburn Murray Water, Tatura, Vic
29 January 2002	Dr John Tisdell	Water Market Experimentation	Department of Land and Water Conservation, Sydney, NSW
30 January	Dr Rob Vertessy (CSIRO)	Introducing the EMSS Water Quality Model for South East Queensland	CSIRO Davies Laboratory, Townsville, Qld
31 January 2002	Dr John Tisdell	Water Market Experimentation	Department of Land and Water Conservation, Wagga Wagga, NSW
23 February 2002	Dr Tim Fletcher	Opportunities for Water Sensitive Urban Design	Maribyrnong City Council and Melbourne Water, Vic
27 February 2002	Dr Ian Prosser	Using Sediment and Nutrient Budgets in Regional Planning	DLWC Regional Knowledge Managers, Bridge St Sydney
1 March 2002	Dr Ian Prosser	SEDNET: A Model of Sediment and Nutrient Budgets for Use in Regional Catchment Management Planning	QDNRM Catchment assessment tools workshop, Indooroopilly, Brisbane
19-20 March 2002	Assoc Prof Tony Wong	Invited Speaker	RMIT-UCLA Water Environment Research Forum
21 March 2002	Dr Rob Vertessy	Introducing the EMSS Water Quality Model for South East Queensland	CSIRO Land and Water, Perth, WA

## Public Presentations 2001-2002

Date	Speaker(s)	Topic	Venue
April 2002	James Whelan Jo Ferreira	Value-Adding to the Quality of Postgraduate Research Through the CRCs	Adelaide, SA
18 April 2002	Dr Andrew Western	Soil Moisture Research at the University of Melbourne	The University of Salerno, Italy
14 May 2002	Dr Rob Vertessy	CRC's Catchment Modelling Toolkit and the Environmental Management Support System (EMSS)	Environmental Engineering Department, Pusan University, South Korea
15 May 2002	Dr Rob Vertessy	CRC's Catchment Modelling Toolkit and the Environmental Management Support System (EMSS)	Environmental Engineering Department, Pusan University, South Korea
16 May 2002	Assoc Prof Tony Wong	Water Sensitive Urban Design and Ecologically Sustainable Development	Institution of Engineers Australia's National Infrastructure Forum in Brisbane
23 May 2002	Dr Mike Stewardson	Program 6 CRC for Catchment Hydrology Research	CEMAGREF, Lyon, France
11 June 2002	Teri Etchells	Allocating and Managing Water for a Sustainable Future: Lessons from Around the World	Natural Resources Law Center 23rd Summer Conference, University of Colorado, USA

## CRC Seminars

Date	Speaker (s)	Topic	Venue
5 July 2001	Dr Francis Chiew (Uni Melb)	New Evapotranspiration Maps for Australia	Institution of Engineers, Melbourne, Vic
30 July 2001	Prof Lawrence Band (Uni N.C., Chapel Hill)	Linking Nitrogen Cycling and Export with Variable Source Area Dynamics in Forested and Urbanising Catchments.	CSIRO Land and Water, Canberra, ACT
13 August 2001	Mark Hocking (DNRE)	Progress on Catchment Water Yield Work	Department of Natural Resources and Environment, Tatura, Vic
23 August 2001	Prof Tom McMahon (Uni Melb)	What Insight does Stochastic Data bring to Understanding the Risks in Water Resources Management?	Brisbane, Qld
23 August 2001	Prof Tom McMahon (Uni Melb)	Climate Variability Research and Application in Catchment Hydrology	Brisbane, Qld
24 August 2001	Dave Heller (United States Forest Service)	Restoring the Streams of Oregon and Washington: An Assessment after six years of a major catchment-scale program	The University of Melbourne, Parkville, Vic
31 August 2001	Dr Ralf Denzer (Saarlandes State Uni for App Sci)	Environmental Data Management in Europe – Good News and Bad News	The University of Melbourne, Parkville, Vic
14 September 2001	Assoc Prof Ian Rutherford (Uni Melb)	Weird Construction and Certain Destruction: A Discussion of How Whacky Australian Floodplains are Formed and Destroyed	The University of Melbourne, Parkville, Vic
18 September 2001	Dr Lu Zhang (CSIRO)	Murrumbidgee: to tree or not to tree?	Wagga Wagga, NSW
18 September 2001	Dr Peter Hairsine (CSIRO)	Land Use Impacts on Water Quantity and Quality	Wagga Wagga, NSW
25 September 2001	Prof Tom McMahon (Uni Melb)	What Insight does Stochastic Data bring to Understanding the Risks in Water Resources Management?	CSIRO Land and Water, Canberra, ACT
19 October 2001	Dr Peter Hairsine (CSIRO)	Overview of Program 2	Department of Land and Water Conservation, Parramatta, NSW
22 October 2001	Dr Rob Vertessy (CSIRO)	Predicting Pollutant Movement from Source to Sea: A New Regional Water Quality Model Tailored to South-East Queensland	CSIRO Land and Water, Canberra, ACT
23 October 2001	Dr Rob Vertessy (CSIRO)	Predicting Pollutant Movement from Source to Sea: A New Regional Water Quality Model Tailored to South-East Queensland	Sinclair Knight Merz, Melbourne, Vic
19 November 2001	Prof Bill Mitsch (Visitor- USA)	A Whole-Ecosystem, Long-Term Wetland Experiment: The Effects of Macrophyte Planting and Community Diversity on Ecosystem Functions	Griffith University, Brisbane, Qld
5 December 2001	Dr Dennis Flanagan (USDA – Agricultural Research Service)	The Water Erosion Prediction Project (WEPP) Development, Application and Status	Griffith University, Brisbane, Qld
6 December 2001	Albert van Dijk (Free Uni, Amsterdam)	Modelling Runoff and Soil Loss from Bench Terraced Hillslopes in the Volcanic Uplands of West Java, Indonesia	CSIRO Land and Water, Canberra, ACT
7 December 2001	Dr Ian Prosser (CSIRO)	Sediment and Nutrient Budgets for Australian River Basins	Department of Land and Water Conservation, Parramatta, NSW

# Public Presentations, Public Relations and Communication

## CRC Seminars

Date	Speaker (s)	Topic	Venue
6 March 2002	Dr Lu Zhang (CSIRO)	Predicting the Effects of Land Use changes on Catchment Water Yield and Stream Salinity - Outcomes to Date	Golburn-Murray Water, Tatura, Vic
8 March 2002	David Newton (Griffith)	The Use of Porous Pavement in Urban Stormwater Management	Brisbane City Council, Brisbane, Qld
15 March 2002	Andrew Barton (Monash)	Hydraulics of Vertical Slot Fishways	Melbourne, Vic
4 April 2002	Dr Walter Boughton (Honorary Senior Fellow, Griffith)	Modelling Rainfall-runoff Processes of Catchment Areas	CSIRO Land and Water, Canberra, ACT
8 May 2002	Assoc Prof Tony Wong (Monash) Dr Tim Fletcher (Monash) Hugh Duncan (Monash) Chris Chesterfield (Melb Water)	Urban Stormwater Quality Modelling	Canberra, ACT
9 May 2002	Assoc Prof Tony Wong (Monash) Dr Tim Fletcher (Monash) Hugh Duncan (Monash) Tony Weber (BCC)	Urban Stormwater Quality Modelling	Sydney, NSW
10 May 2002	Assoc Prof Tony Wong (Monash) Dr Tim Fletcher (Monash) Hugh Duncan (Monash) Tony Weber (BCC) Dr Graham Jenkins (Griffith)	Urban Stormwater Quality Modelling	Brisbane, Qld
13 May 2002	Assoc Prof Tony Wong (Monash) Dr Tim Fletcher (Monash) Hugh Duncan (Monash) Chris Chesterfield (Melb Water) Dr Graham Jenkins (Griffith)	Urban Stormwater Quality Modelling	Melbourne, Vic
14 May 2002	Assoc Prof Tony Wong (Monash) Dr Tim Fletcher (Monash) Hugh Duncan (Monash) Chris Chesterfield (Melb Water) Dr Graham Jenkins (Griffith)	Urban Stormwater Quality Modelling	Adelaide, SA
15 May 2002	Dr Andre Zerger (Uni Melb)	Decision support for flood emergency manager	CSIRO Land and Water, Canberra, ACT
17 May 2002	Assoc Prof Tony Wong (Monash) Tony Weber (BCC)	Urban Stormwater Management	Rockhampton, Qld
5 June 2002	Rebecca Letcher (ANU)	An Integrated Approach to Water Allocation	CSIRO Land and Water, Canberra, ACT

## Other Seminars

Date	Speaker (s)	Topic	Venue
17 August 2001	Assoc Prof Tony Wong (Monash)	Research Activities of Program 4	Prince George's County, Maryland, USA
31 August 2001	Erwin Weinmann (Monash) Janice Green (Monash)	Dams and Hydrologic Risk Assessment	Institution of Engineers Australia, Melbourne, Vic
2 September 2001	James Whelan (Griffith)	Collaborative Action Research with the Environment Movement	Griffith University, Nathan, Qld
6 September 2001	Assoc Prof Tony Wong (Monash)	Water Sensitive Urban Design	Victorian Stormwater Action Committee, Melbourne, Vic
10 September 2001	Dr Tony Ladson (Uni Melb)	Adaptive management of Environmental Flows	The University of Melbourne, Parkville, Vic
18 September 2001	Dr Lu Zhang (CSIRO)	Impact of Afforestation on Water Yield in the Murrumbidgee Catchment	Wagga Wagga, NSW
17 October 2001	Prof Russell Mein (Monsah)	An Overview of the CRC for Catchment Hydrology and Its Relevance to the Fitzroy Catchment – A Discussion Forum	Rockhampton, Qld
17 October 2001	Prof Rob Vertessy (CSIRO)	Overview of CRC for Catchment Hydrology Predicting Catchment Behaviour Program	Rockhampton, Qld
17 October 2001	Dr Peter Hairsine (CSIRO)	Overview of CRC for Catchment Hydrology Land-Use Impacts on Rivers Program	Rockhampton, Qld

## Other Seminars

Date	Speaker (s)	Topic	Venue
17 October 2001	Dr John Tisdell (Griffith)	Overview of CRC for Catchment Hydrology Sustainable Water Allocation Program	Rockhampton, Qld
17 October 2001	Assoc Prof Tony Wong (Monash)	Overview of CRC for Catchment Hydrology Urban Stormwater Quality Program	Rockhampton, Qld
17 October 2001	Prof Tom McMahon (Uni Melb)	Overview of CRC for Catchment Hydrology Climate Variability Program	Rockhampton, Qld
17 October 2001	Assoc Prof Ian Rutherford (Uni Melb)	Overview of CRC for Catchment Hydrology River Restoration Program	Rockhampton, Qld
17 October 2001	David Perry (Monash)	Overview of CRC for Catchment Hydrology Communication and Adoption Program	Rockhampton, Qld
17 October 2001	Prof John Fien (Griffith)	Overview of CRC for Catchment Hydrology Education and Training Program	Rockhampton, Qld
19 October 2001	Dr Peter Hairsine (CSIRO)	Overview of CRC for Catchment Hydrology Land-Use Impacts on Rivers program	Department of Land and Water Conservation, Parramatta, NSW
1 November 2001	Dr Tim Fletcher (Monash)	The Basis and Application of MUSIC	IEAust
19 November 2001	Dr Mike Stewardson (Uni Melb)	A Demonstration of the Flow Events Method: Environmental Flow Requirements of the Broken River	(CRC for Catchment Hydrology, IEAust and RBMS) Melbourne Zoo, Vic
2 April, 2002	Dr David Rassam (NRM)	Hydrology of a Riparian Buffer Zone: A Study in South East Queensland, Australia	National Institute of Water and Atmospheric Research (NIWA), Hamilton, New Zealand
2 May 2002	Durga D Kandel (Uni Melb)	Temporal Scaling Issues in Process Based Surface Runoff and Erosion Modelling	The University of Melbourne, Parkville, Vic
19 June 2002	Dr Peter Hairsine (CSIRO)	Overview of CRC for Catchment Hydrology Land Use Impacts on Rivers program	Department of Natural Resources and Environment, Tatura, Vic

## CRC Workshops/Field Trips 2001-2002

Date	Speaker (s)	Topic	Venue
14-15 August 2001	Dr Robert Argent (Uni Melb) Chris Carroll (NRM, Qld) Susan Cuddy (CSIRO) John Coleman (CSIRO) Assoc Prof Rodger Grayson (Uni Melb) Dr Peter Hairsine (CSIRO)	Fitzroy AEAM – Building the Shell for the Following AEAM Process	Melbourne, Vic
23 August 2001	Professor Tom McMahon (Uni Melb)	What Insight does Stochastic Data bring to Understanding the Risks in Water Resources Management?	Brisbane, Qld
10-13 September 2001	Dr Robert Argent (Uni Melb) Chris Carroll (NRM, Qld) Susan Cuddy (CSIRO) John Coleman (CSIRO) Dr Tim Ellis (CSIRO) Dr Peter Hairsine (CSIRO) Leo Lymburner (CSIRO)	Fitzroy AEAM Workshop – Building a System Understanding of the Fitzroy Catchment	CRC for Catchment Hydrology and CRC for Coastal Zone, Brisbane, Qld
24-25 September 2001	Prof Russell Mein (Monash) Assoc Prof Ian Rutherford (Uni Melb) Erwin Weinmann (Monash)	Design Flood Flow Estimation For Floodplain Management	Griffith University, Nathan, Qld
11 October 2001	Hugh Duncan, Dr Tim Fletcher and Assoc Prof Tony Wong (Monash)	Application of MUSIC	Melbourne Water, Melbourne, Vic
19-20 October 2001	Course Director – Prof Rob Vertessy (CSIRO)	EMSS Training Workshop	Brisbane, Qld
21 October 2001	Course Director – Susan Cuddy (CSIRO)	ICMS Training Workshop	Brisbane, Qld
24 October 2001	Course Director – Prof Tom McMahon (Uni Melb)	Climate Variability Research Seminar Forum	Tatura, Vic



## Public Presentations, Public Relations and Communication

### CRC Workshops/Field Trips 2001-2002

Date	Speaker (s)	Topic	Venue
24 October 2001	Assoc Prof Tony Wong (Monash) Dr Tim Fletcher (Monash) Hugh Duncan (Monash) Dr Graham Jenkins (Griffith)	Music User's Forum	Melbourne, Vic
20-21 November 2001	Dr Robert Argent (Uni Melb)	Modelling Toolkit Concepts and Activities	Lancefield, Vic
30 January 2002	Dr John Tisdell (Griffith) Dr John Ward (Griffith)	Water Experiment Trials	Yanco Agricultural College, Yanco, NSW
5-6 February 2002	Susan Cuddy (CSIRO)	ICMS Workshop	CSIRO Land and Water, Canberra, ACT
19 February 2002	Dr John Tisdell (Griffith) Dr John Ward (Griffith)	Water Experiment Trials	Goulburn-Murray Water, Tatura, Vic
21-22 February 2002	James Whelan (Griffith) Pat Feehan (GM Water)	We All Use Water Community Education Workshop	Shepparton, Vic (CRC with AWA)
13 March 2002	Nick Marsh (Griffith)	Field Investigation for Design of Rehabilitation Work for Mary River Catchment Coordinating Committee	Obi Obi Ck, Amry River, Qld
13 March 2002	Nick Marsh (Griffith)	Field Demonstration of Stream Rehabilitation Work	6.4 Field site – Echidna Creek, Qld
14-15 March 2002	James Whelan (Griffith) Clare Porter (AWA)	We All Use Water Community Education Workshop	Sydney, NSW (CRC with AWA)
14-16 April 2002	James Whelan (Griffith) Adam Le Good (Consultant)	Project Management for Postgraduates	Ballarat, Vic
1-2 May 2002	James Whelan (Griffith) Ainslee Hempseed (DNRM)	We All Use Water Community Education Workshop	CRC for Catchment Hydrology, Australian Water Association and Department of Natural Resources and Mines, Emerald, Qld
14-15 May 2002	Dr Robert Argent (Uni Melb) Chris Carroll (NRM, Qld) Dr Peter Hairsine (CSIRO)	Fitzroy AEAM Stakeholder Workshop	CRC for Catchment Hydrology and CRC for Coastal Zone, Rockhampton, Qld
18 June 2002	Dr Tim Fletcher (Monash)	Water Sensitive Urban Design Field Tour	Melbourne, Vic

### Other Workshops/Field Trips 2001-2002

Date	Speaker (s)	Topic	Venue
11 July 2001	James Whelan (Griffith)	Community Engagement Through Catchment Education	Catchment Educators' Network, Sunshine Coast, Qld
12 July 2001	Dr Tim Fletcher (Monash)	MUSIC Workshop - Case-Study for Application of MUSIC	Melbourne Water, Melbourne, Vic
30 July 2001	Dr Tim Fletcher (Monash)	Field Trip Examining Stormwater Quality Improvement Devices	Brisbane City Council, Brisbane, Qld
31 July – 1 August 2001	Assoc Prof. Tony Wong (Monash) Dr Peter Breen (Monash)	Planning and Design of Stormwater Management Measures	Institution of Engineers, Australia – Queensland Division, Brisbane, Qld
19 September 2001	Dr Tim Fletcher (Monash)	MUSIC - Application of MUSIC to Drainage Scheme Policy Development	Melbourne Water, Melbourne, Vic
4-5 October 2001	Dr Tim Fletcher (Monash)	Stormwater Quality and SQIDS Monitoring Workshop	Brisbane City Council
20 November 2001	Dr Sergei Schreider (Monash)	Modelling Integration for Sustainable Water Allocation Stakeholder Consultation	Goulburn Murray Water, Tatura, Vic
25 January 2002	Dr Sergei Schreider (Monash)	Modelling Integration for Sustainable Water Allocation Stakeholder Consultation	Goulburn Murray Water, Tatura, Vic
27 February 2002	Assoc Prof. Tony Wong (Monash)	Water Sensitive Urban Design	Goulburn Murray Water, Shepparton, Victoria
26 March 2002	Assoc Prof Margaret Greenway (Griffith) David Newton (Griffith)	Grass Swale Experiment.	Griffith University, Nathan, Qld
23 April 2002	Dr Sergei Schreider (Monash)	Modelling Integration for Sustainable Water Allocation Stakeholder Consultation	Department of Land and Water Conservation, Wagga-Wagga, NSW
30 April 2002	Dr Sergei Schreider (Monash)	Modelling Integration for Sustainable Water Allocation Stakeholder Consultation	NSW Agriculture, Dubbo, NSW
10 May 2002	Dr Christy Fellows (Griffith)	Land Use, Ground Water Quality, Processes in the Riparian Zone – Issues, Implications and Solutions	Australian Society of Soil Science Incorporated, Queensland Branch, "Mountains to Mangroves" Field Trip

## Other Workshops/Field Trips 2001-2002

Date	Speaker (s)	Topic	Venue
20 May 2002	Erwin Weinmann (Monash)	Extreme Flood Estimation: Issues in the Application of Book VI of Australian Rainfall and Runoff	27th Hydrology and Water Resources Symposium, Hilton on the Park, Melbourne, Vic
20 May 2002	Assoc Prof. Tony Wong (Monash)	Design, Operation and Maintenance of Urban Stormwater Treatment Measures	27th Hydrology and Water Resources Symposium, Melbourne Hilton on the Park, Melbourne, Vic
4 June 2002	Dr Sergei Schreider (Monash)	Modelling Integration for Sustainable Water Allocation Stakeholder Consultation	Goulburn-Murray Water, Tatura, Vic
12 June 2002	Dr Sergei Schreider (Monash)	Modelling Integration for Sustainable Water Allocation Stakeholder Consultation	Department of Land and Water Conservation, Wagga-Wagga, NSW

## CRC Media References 2001-2002

Medium	Publisher	Issue/Date (Page)	Title of Article/Item
Today's Life Science	Vertical Markets Operations Pty Ltd	Vol.13, No.4, July/August 2001 (44-46)	The CRC Association Conference - Technology Transfer Awards - Inaugural Student Awards
Waste Management and Environment (WME)	Ross May	Volume 12, No. 7 August 2001 (30-31)	The future of Melbourne's Water
The Source	Melbourne Water	Issue 15 August 2001 (12-13)	Q&A : Why farmers should be offered a dignified exit ( Prof Russell Mein)
The Source	Melbourne Water	Issue 15 August 2001 (8-9)	Leading the way (The Water Forum Cooperative Research Centres)
Shepparton Adviser	The Victorian Country Press Association	29 August 2001 (15)	Tackling 'sand slugs' in the Granite Creeks
Uni.News	The University of Melbourne	Vol. 10, No. 34, 24 September 2001 (1, 3)	CRC's water catchment research plays key role in managing Australia's future
Country News – Shepparton	McPherson Media	5 November 2001	Radar Helps to Plan (CRC Presented Seminar Covering Radar Forecasting and Weather Prediction Models)
The Weekend Australian Resources Section (Careers)	The Australian	8 December 2001 (18)	Sediment for Soil Erosion is Choking Rivers (By Asa Wahlquist – featuring discussions with CRC for Catchment Hydrology Researchers)
Australian Landcare Australian Farm Journal Supported by the Natural Heritage Trust	Agricultural Publishers Pty Ltd	December 2001 (6-10)	Australia is on the move – down the creek! (By Rebecca Bartley)
AWA News	Australian Water Association	6 January 2002	The CRC for Catchment Hydrology in conjunction with AWA is utilising the "We all use water" education resources to present 6 workshops across the east coast throughout 2002
CRC Association Media Release	Cooperative Research Centres Association Inc	13 January 2002	'Clean beaches and "cool" summer days CRC researchers work to keep our beaches clean and climate cool
Radio Interview 4BU Gladstone	News Mail Bundaberg	15 January 2002	'Application of Water Sensitive Urban Design' (Tony Wong interviewed by Michelle Price)
InfoCom – Newsletter of the CRC Program	AusIndustry	Issue 4, February 2002	Clean Beaches and 'cool' summer days
Prime News	Prime Television	7 March 2002	'Trees, Water and Salt' book launched by the Minister for Agriculture, Fisheries and Forestry, Hon Warren Truss
ABC Regional Goulburn-Murray Co – FM News Radio	ABC	12 March 2002	Lu Zhang CSIRO interview 'A new study has found water inflows to Lake Eildon and the Goulburn Broken catchment could be reduced by 14 per cent with the expansion of blue gum plantations'.
WME – Waste Management and Environment	Ross May	Volume 13, Number 2, March 2002 (25-27)	Water and Wastewater 'Changing course' (Water Sensitive Urban Design article by Sara Lloyd)
AWA Water News	Australian Water Association	Week ending 31 March 2002	The CRC for Catchment Hydrology is running a series of one-day workshops on "Urban Stormwater Quality Modelling", presenting the results of research they have undertaken including development of the "MUSIC" model.

## Grants and Awards

---



### Awards

#### Ataur Rahman, Erwin Weinmann, and Russell Mein

Dr Ataur Rahman, Mr Erwin Weinmann, and Professor Russell Mein have been awarded the 2002 G N Alexander Medal by the Institution of Engineers, Australia. The award was announced at the 2002 Hydrology and Water Resources Symposium in Melbourne, and is for the best paper in an Institution publication over the period from and including the previous Symposium.

The award was for the paper "The probabilistic nature of initial losses and its impact on design flood estimates" (Rahman, Weinmann, and Mein), published in the Hydro2000 Conference in Perth. The work was undertaken as part of the Flood Program of the initial CRC.

(Dr Ataur Rahman is now with the School of Engineering and Industrial Design, University of Western Sydney; Mr Erwin Weinman and Prof Russell Mein are with the Department of Civil Engineering, Monash University and the current CRC.)

#### Teri Etchells

Australian Postgraduate Award

Award for Best Presentation (Student or Recent Graduate) at the 27th Hydrology and Water Resources Symposium Melbourne 20 – 23 May 2002

#### Lucy McKergow

Meridian Energy and New Zealand Hydrological Society Student Research Prize (PhD).

"Just Add Water" Joint Conference of the New Zealand Hydrological Society and New Zealand Limnological Society. Massey University, Palmerston North, New Zealand. 20-23 November 2001.

Department of Conservation and New Zealand Limnological Society, PhD Student Presentation 2nd Prize. "Just Add Water" Joint Conference of the New Zealand Hydrological Society and New Zealand Limnological Society. Massey University, Palmerston North, New Zealand. 20-23 November 2001.

#### Joel Rahman and Shane Seaton

CSIRO Reward Review Committee  
– One-off Cash Reward of \$1500.

This reward recognises exceptional achievement in the development and delivery of the Environmental Management Support System.

#### Stuart Bunn

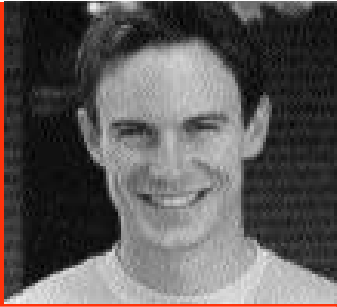
Healthy Waterways Science Award, 2001  
(for research on southeast Qld's waterways)

(Professor Bunn is also a researcher with the CRC for Freshwater Ecology)

#### Rob Vertessy

Appointed Reader to the Australian Research Council to review research proposals in the field of hydrology.

Appointed Honorary Professorial Fellow, Monash University



*Facing Page*  
Joel Rahman, CSIRO – award for exceptional achievement



*This Page*  
Above Shane Seaton, CSIRO – award for exceptional achievement

*Above Right* Sara Lloyd – scholarship for CRC Leadership and Development Course

## Grants

### Dana Thomsen

Dana Thomsen, CRC postgraduate at Griffith University, was awarded an international conference grant from Griffith University.

Dana used the grant to attend the 9th International Symposium on Society and Resource Management, 2-5 June 2002 at the Indiana University, USA.

### Sergei Schreider

Sergei Schreider (Program 3) has received a 2002 Fellowship with the Organisation for Economic Cooperation and Development (OECD) Cooperative Research Program, 'Biological Resource Management for Sustainable Agricultural Systems'. The fellowship included a five-week travel grant for research work in an OECD country university. He will be working in the Laboratory of Water Resources, Helsinki University of Technology, on hydrological modelling and inter-disciplinary modelling interaction .

### Sara Lloyd

Business/Higher Education Round Table and AusIndustry Scholarship (August 2001; CRC Leadership and Career Development Course)

### Durga D Kandel

Postgraduate Overseas Research Experience Scholarship (PORES) in 2001 for field visits and to work with the People and Resources Dynamics Project (PARDYP),

### Andrew Western

European Space Agency. ALFS – Applications of Low Frequency SAR. Consortium including Chalmers University of Technology, Sweden (lead group), Fokker Space B.V., Max Planck Institute for Biogeochemistry, Saab Ericsson Space, The University of Melbourne. \$50,000 (University of Melbourne share)

### Francis Chiew

Establishing and testing a methodology for determining the exceedance probability of water levels and fluxes in complex estuarine systems (Rodger Grayson, Francis Chiew and Tom McMahon), July 2001 to December 2002, ARC SPIRT, \$190,000.

### Rodger Grayson

University Collaborative Research Program Grants for:

- Joint research program \$7000
- Visiting Scholars (for 2000,2001) \$12,000
- Visiting Scholars (for 2002) \$8,000

DRDC (2001-2003) Collaboration with Deakin University \$60,000 to University of Melbourne.

ARC SPIRT (with Francis Chiew and Tom McMahon (for mid 2001-2003) approx \$500,000 total funding

ARC Linkage (for 2002-4) – \$148,000 over 3 years plus partner in kind.

### Stuart Bunn

2001-2004  
Riparian Lands Phase 2  
Land and Water Australia (with UWA, NIWA)  
\$228,500.00

### Rob Vertessy

Principal Investigator for SE QLD Regional Water Quality Management Strategy grant: \$136,000 over 15 months to develop a spatially-explicit water quality model for the North Pine catchment.

Sub-contractor with WBM Oceanics on SE QLD Regional Water Quality Management Strategy grant: \$48,000 over five months to contribute to a broad-scale evaluation of sediment and nutrient source data in the SE QLD region.

## Publications

### Books and Book Chapters:

- Bartley, R. and Rutherford, I. (2001) Ringarooma River. In: T. Marutani, G. Brierley, N. Trustrum and M. Page (eds), *Source-to-Sink Sedimentary Cascades in Pacific Rim Geo-systems*. Nippon Alps Sabo Center, Ministry of Land, Infrastructure and Transport, Tokyo. pp.132-139.
- Bartley, R., Rutherford, I., Davis, J. and Finlayson, B. (2001) Creightons Creek. In: T. Marutani, G. Brierley, N. Trustrum and M. Page (eds), *Source-to-Sink Sedimentary Cascades in Pacific Rim Geo-systems*. Nippon Alps Sabo Center, Ministry of Land, Infrastructure and Transport, Tokyo. pp.140-147.
- Bradford, A. and Zhang, L. (2002) Application of a Mean Annual Water Balance Model to the Murray--Darling Basin: Past, Present and Future. In: T.R. McVicar, L. Rui, J. Walker, R.W. Fitzpatrick and C. Liu (eds), *Regional Water and Soil Assessment for Managing Sustainable Agriculture in China and Australia*. ACIAR Monograph No.84. pp.277-290.
- Chiew, F.H.S., Duncan, H.P., Wong, T.H.F. and McMahon, T.A. (2002) Urban stormwater pollution. In: *Urban Drainage in Specific Climates –Urban Drainage in Arid and Semi Arid Climates*. C. Maksimovic and M. Nouh (eds), UNESCO Monograph, IHP-V Technical Document in Hydrology, Number 40, Volume 3, UNESCO, Paris. pp. 75-87.
- Connolly, R.D., Silburn, D.M. and Freebairn, D.M. (In press) Transport of sediment and pesticides in surface water. In: R. Kookana, R. Sadler, N. Sethunathan and R. Naidu (eds) *2002 Environmental Protection and Risk Assessment of Organic*. Science Publishers, Inc., Enfield, New Hampshire. pp.143-167.
- Fien, J. (2001) Educating for a Sustainable Future. Chapter 8 In: W.J. Campbell (ed.), *Creating Our Common Future, Educating for Unity in Diversity*. Berghahn Books, WEF and UNESCO Publishing, Paris. pp.122-142. †
- Fien, J. and Skoien, P. (2001) Towards Sustainable Consumption in Australia: Influences on Young Adults. Chapter 2 In: C. Milani et al (eds), *Youth and Sustainable Consumption*. United Nations Environment Programme and UNESCO MOST Programme. †
- Hatton, T., Dawes, W. and Harper, R. (2002) Woodlots in rotation with agriculture. Chapter 4 In: R.A. Vertessy, R.J. Stirzaker, and A. Sarre (eds), *Trees, Water and Salt – An Australian guide to using trees for productive farms and healthy catchments*. Rural Industries Research and Development Corporation, Canberra. pp.43-56.
- Kang, S.Z., Zhang, L., Liang, Y.L. and Cai, H.J. (2002) Effects of Limited Irrigation on Yield and Water Use Efficiency of Winter Wheat in the Loess Plateau of China. In: T.R. McVicar, L. Rui, J. Walker, R.W. Fitzpatrick and C. Liu (eds), *Regional Water and Soil Assessment for Managing Sustainable Agriculture in China and Australia*. ACIAR Monograph No.84. pp.105-116.
- Kang, S.Z., Zhang, L., Liang, Y.L. and Dawes, W.R. (2002) Simulation of Winter Wheat Yield and Water Use Efficiency in the Loess Plateau of China Using WAVES. In: T.R. McVicar, L. Rui, J. Walker, R.W. Fitzpatrick and C. Liu (eds), *Regional Water and Soil Assessment for Managing Sustainable Agriculture in China and Australia*. ACIAR Monograph No.84. pp.95-104.
- McMahon, T.A., Chiew, F.H.S., Wong, T.H.F. and Duncan, H.P. (2002) Storm hydrology of urban drainage. In: *Urban Drainage in Specific Climates – Urban Drainage in Arid and Semi Arid Climates*. C. Maksimovic and M. Nouh (eds), UNESCO Monograph, IHP-V Technical Document in Hydrology, Number 40, Volume 3, UNESCO, Paris. pp.58-74.
- McVicar, T.R., Zhang, G., Bradford, A.S., Wang, H., Dawes, W.R., Zhang, L. and Lingtao, L. (2002) Monitoring Regional Water Use Efficiency Indicators on the North China Plain. In: T.R. McVicar, L. Rui, J. Walker, R.W. Fitzpatrick and C. Liu (eds), *Regional Water and Soil Assessment for Managing Sustainable Agriculture in China and Australia*. ACIAR Monograph No.84. pp.231-257.
- Raper, G. P., Guppy, L. M., Argent, R. M. and George, R. J. (2001) Innovative use of water balance models in farm and catchment planning in Western Australia. In: Conacher, A. J., (ed.), *Land Degradation: The GeoJournal Library*. Kluwer Academic, Dordrecht. pp. 319-331.
- Rutherford, I. (2001) Glenelg River. In: T. Marutani, G. Brierley, N. Trustrum and M. Page (eds), *Source-to-Sink Sedimentary Cascades in Pacific Rim Geo-systems*. Nippon Alps Sabo Center, Ministry of Land, Infrastructure and Transport, Tokyo. pp.148-153.
- Shao, M.A., Huang, M.B., Zhang, L. and Li, Y.S. (2002) Simulation of Field-Scale Water Balance in the Loess Plateau Using the WAVES model. In: T.R. McVicar, L. Rui, J. Walker, R.W. Fitzpatrick and C. Liu (eds), *Regional Water and Soil Assessment for Managing Sustainable Agriculture in China and Australia*. ACIAR Monograph No.84. pp.48-56.
- Silberstein, R.P., Vertessy, R.A. and Stirzaker, R.J. (2002) The basics of hillslope hydrology. Chapter 2 In: R.J. Stirzaker, R.A. Vertessy and A. Sarre (eds), *Trees, Water and Salt – An Australian guide to using trees for productive farms and healthy catchments*. Rural Industries Research and Development Corporation, Canberra. pp.11-26.
- Silberstein, R.P., Vertessy, R.A., McJannet, D. and Hatton, T.J. (2002) Tree belts on hillslopes. Chapter 5 In: R.A. Vertessy, R.J. Stirzaker, and A. Sarre (eds), *Trees, Water and Salt – An Australian guide to using trees for productive farms and healthy catchments*. Rural Industries Research and Development Corporation, Canberra. pp.57-76.
- Stirzaker, R. and Vertessy, R. (2002) Balancing productivity and catchment health. Chapter 9 In: R.A. Vertessy, R.J. Stirzaker, and A. Sarre (eds), *Trees, Water and Salt – An Australian guide to using trees for productive farms and healthy catchments*. Rural Industries Research and Development Corporation, Canberra. pp.135-144.
- Stirzaker, R.J., Vertessy, R.A. and Sarre, A. (2002) The purpose of this book. Chapter 1 In: R.A. Vertessy, R.J. Stirzaker, and A. Sarre (eds), *Trees, Water and Salt – An Australian guide to using trees for productive farms and healthy catchments*. Rural Industries Research and Development Corporation, Canberra. pp.1-10.

### Books and Book Chapters:

Stirzaker, R.J., Vertessy, R.A. and Sarre, A. (2002) *Trees, Water and Salt - An Australian guide to using trees for productive farms and healthy catchments*. Rural Industries Research and Development Corporation, Canberra. 159pp.

Walker, G.R., and Zhang, L. (In press) Plot-scale models and their application to recharge studies. In: *Studies in Catchment Hydrology - The Basics of Recharge and Discharge*. CSIRO Publishing.

Western, A.W., Grayson, R.B., Blöschl, G. and Wilson, D.J. (In press) Spatial variability of soil moisture and its implications for scaling. In: *Scaling Methods in Soil Physics*. Soil Science Society of America.

Wong, T.H.F., Chiew, F.H.S., McMahon, T.A. and Duncan, H.P. (2002) Urban drainage maintenance and management issues in arid and semi-arid regions. In: *Urban Drainage in Specific Climates - Urban Drainage in Arid and Semi Arid Climates*. C. Maksimovic and M. Nouh (eds), UNESCO Monograph, IHP-V Technical Document in Hydrology, Number 40, Volume 3, UNESCO, Paris. pp.121-131.

Woods, R.A., Grayson, R.B., Western, A.W., Duncan, M., Wilson, D.J., Young, R.I., Ibbitt, R., Henderson, R. and McMahon, T.A. (2001) Experimental design and initial results from the Mahurangi River Variability Experiment: MARVEX. In: V. Lakshmi, J.D. Albertson and J. Schaake (eds), *Observations and Modelling of the Land Surface Hydrological Processes*. Water Science and Application Volume 3. American Geophysical Union. pp.201-213.

Zhang, L., Walker, G.R. and Dawes, W.R. (2002) Water Balance Modelling: Concepts and Applications. In: T.R. McVicar, L. Rui, J. Walker, R.W. Fitzpatrick and C. Liu (eds), *Regional Water and Soil Assessment for Managing Sustainable Agriculture in China and Australia*. ACIAR Monograph No.84. pp.31-47.

Zhang, L., Walker, G.R. and Fleming, M.P. (In press) Water balance methods for determination of deep drainage. In: *Studies in Catchment Hydrology - The Basics of Recharge and Discharge*. CSIRO Publishing.

### Reports

Best, A., Zhang, L., McMahon, T., Western, A. and Vertessy, R. (In press) A critical review of paired catchment studies with reference to seasonal flows and climatic variability. Murray-Darling Basin Commission, Canberra.

Bradford, A., Zhang, L. and Hairsine, P.B. (2001) Implementation of a mean annual water balance model within a GIS framework and application to the Murray-Darling Basin. Cooperative Research Centre for Catchment Hydrology Technical Report, Report 01/8, 31pp.

Brooks A., Erskine W. and Finlayson B. (2001) Report of the Genoa Expert Panel. East Gippsland Catchment Management Authority, Bairnsdale.

Bunn, S.E. (2002) *Healthy River Ecosystems: vision or reality?* Griffith University Professorial Lecture Series, February 2002, 22pp. \*‡

Caitcheon, G., Prosser, I., Douglas, G., Wallbrink, P., Olley, J., Hancock, G., Hughes, A., Scott, A. and Stevenson, J. (2001) Sources of sediment in Southeast Queensland. Report on Project SS, Phase 3 to the Southeast Queensland Regional Water Quality Management Strategy. CSIRO Land and Water, Canberra, 67pp.

Chiew, F.H.S. and Scanlon, P.J. (2002) Estimation of pollutant concentrations for EMSS modelling of the South-East Queensland region. Cooperative Research Centre for Catchment Hydrology Technical Report, Report 02/02, 108pp.

Chiew, F.H.S., Scanlon, P.J., Vertessy, R.A. and Watson, F.G.R. (2002) Catchment scale modelling of runoff, sediment and nutrient loads for the South-East Queensland EMSS. Cooperative Research Centre for Catchment Hydrology Technical Report, Report 02/01, 50pp.

Cottingham, P., Barton, J., Finlayson, B., Hart, B., Quinn, G., Raadik, T. and Stewardson, M. (2001) Development of a rehabilitation plan for the lower Thomson and Macalister Rivers: A Scoping Study. Report to the Department of Natural Resources and Environment and the West Gippsland Catchment Management Authority and the Cooperative Research Centre for Freshwater Ecology, Melbourne, 44pp.

Cottingham, P., Hannan, G., Hillman, T., Humphries, P., Metzeling, L., Roberts, J. and Stewardson, M. 2001 Report of the Broken Scientific Panel on the environmental condition and flows of the Broken River and Broken Creek, Draft Technical Report, Cooperative Research Centre for Freshwater Ecology, Canberra University, Canberra. ‡

Cottingham P., Howell G., Bennett P., Boehm J., Doolan J., Hannan G., Harris J., Hart B., Koehn J., Metzeling L., Quinn G., Shirley M., Stewardson M. and Thoms M. (2002) Perspectives on the Scientific Panel approach to determining environmental flows for southeastern Australian rivers. Proceedings of a workshop held at the Department of Natural Resources and Environment, Melbourne, 3rd December 2001, CRC Freshwater Ecology Technical Report /2002. ‡

CRCFE and SKM,(2001) Recommendations for Defining the Sustainable Diversion Limit over the Winterfill Period in Victorian Catchments, Final Report on Sustainable Diversion Limit Project to Department of Natural Resources and Environment by Cooperative Research Centre for Freshwater Ecology and Sinclair Knight Merz. ‡

Fenton, J.D. and Keller, R.J. (2001) The calculation of streamflow from measurements of stage. Cooperative Research Centre for Catchment Hydrology Technical Report, Report 01/6, 77pp.

Finlayson B.L. (2001) The impact of land use change on catchment hydrology in large catchments: The case of the Comet River, Central Queensland, Report to the Department of Natural Resources, Queensland.

Gilfedder, M., Smitt, C., Dawes, W.R., Petheram, C., Stauffacher M. and Walker, G.R. (In press) Impact of increased recharge on groundwater discharge: Development of a simplified function using catchment parameters. Murray-Darling Basin Commission, Canberra.

## Publications

### Reports

- Gippel, C. Anderson, B. and Marsh, N. (2001) Trial of Snowy River Rehabilitation Concept Plan: Scoping study to Review Structural Rehabilitation Options. Fluvial Systems Pty Ltd. Report to East Gippsland Catchment Management Authority.
- Hancock, G.J., Olley, J.M. and Wallbrink, P.J. (2001) Sediment Transport and Accumulation in Western Port: Report on Phase 1 of a Study Determining the Sources of Sediment to Western Port. CSIRO Technical Report 47/01, Melbourne Water, Canberra.
- Hume I.H., McVicar T.R and Roderick, M.L. (2002) Optical properties of leaves in the near-infrared under beam and diffuse radiance. Cooperative Research Centre for Catchment Hydrology, Technical Report, Report 02/3, 57pp.
- Kandel, D. (2001) Mapping soil moisture, soil texture, road/trail network and landslides integrating GPS and GIS in the Jhikhu Khola catchment in Nepal. Report submitted to the People and Resource Dynamics Project (PARDYP), International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal. Cooperative Research Centre for Catchment Hydrology, Department of Civil and Environmental Engineering, The University of Melbourne, Australia, 20pp.
- Knight, J.H., Gilfedder, M. and Walker, G.R. (2002) Impacts of irrigation and dryland development on groundwater discharge to rivers: A unit response approach to cumulative impacts analysis. CSIRO Land and Water Technical Report, Report 03/02, 20pp.
- Lewis, J. (2002) Effectiveness of Stormwater Litter Traps for Syringe and Litter Removal. Cooperative Research Centre for Catchment Hydrology. Melbourne Water Corporation, Melbourne, Australia.
- Lloyd, S.D. (2001) Water sensitive urban design in the Australian context. Conference Synthesis, Sustainable Drainage in Urban Areas. Cooperative Research Centre for Catchment Hydrology Technical Report, Report No. Report 01/7, 20pp.
- McKenzie, N., Gallant, J. and Gregory, L. (In press) Estimating water storage at catchment scales. Cooperative Research Centre for Catchment Hydrology Technical Report.
- Marston, F. (2001) Waterborne erosion - an Australian story. Content for the Australian Natural Resources Atlas storyboards. CSIRO Land and Water Technical Report, Report No. 17/01, Canberra. 45pp.
- Marston, F., Argent, R., Vertessy, R., Cuddy, S. and Rahman, J. (2002). The status of catchment modelling in Australia. Cooperative Research Centre for Catchment Hydrology Technical Report, Report No. 02/4, 39pp.
- Moran, C.J., Bormans, M. Cox, J., Hairsine, P., Oliver, R., Olley, J., Wallbrink, P. and Young, B. (2001) Sediment nutrient transport and budgetting. CSIRO Land and Water Technical Report, Report 20/01, 31pp.
- Olley, J., Caitcheon, G., Hancock, G. and Wallbrink, P. (2001) Tracing and dating techniques for sediment and associated substances. Report for the Sydney Catchment Authority. CSIRO Land and Water, Canberra, 44pp.
- Peel, M.C., Vertessy, R.A. and Watson, F.G.R. (2002) Generating water yield curves for forest stands in the Thomson catchment for inclusion in the Integrated Forest Planning System. Report prepared for the Victorian Department of Natural Resources and Environment, 33pp.
- Smitt, C., Gilfedder, M., Dawes, W.R., Petheram, C., Walker, G.R. (In press) Modelling the effectiveness of recharge reduction for salinity management. Murray-Darling Basin Commission, Canberra.
- Srikanthan, R., Kuczera, G., Thyer, M. and McMahon, T. (2002) Stochastic generation of annual rainfall data. Cooperative Research Centre for Catchment Hydrology Technical Report, Report 02/6, 53pp.
- Stewardson, M., Ladson, A.R. and Rutherford, I.D. (2001) Monitoring the pilot stream habitat improvement project on the Snowy River. East Gippsland Catchment Management Authority.
- Stewardson, M.J., Rutherford, I. and Cottingham, P. (2001) Evaluating the effectiveness of habitat reconstruction in the Murray-Darling Basin. Final Report to Murray Darling Basin Commission for MDBC Project R10008, Stage I, Melbourne Enterprises International.
- Summerell, G.K., Beale, G.B., Miller, M.L. and Dowling, T.I. (In press) Fuzzy Landscape Analysis GIS (FLAG) modelling in the Murray Darling Basin and the Hunter Region of NSW. Centre for Natural Resources, Department of Land and Water Conservation, Wagga Wagga, NSW, Report 01.
- Tisdell, J., Ward, J. and Grudzinski, T. (2002) The development of water reform in Australia. Cooperative Research Centre for Catchment Hydrology Technical Report, Report No.02/5, 109pp.
- Tisdell, J., Ward, J. and Grudzinski, T. (2001) Irrigator and community attitudes to water allocation and trading: a comparative study of the Goulburn Broken and Fitzroy catchments. Cooperative Research Centre for Catchment Hydrology Technical Report, Report No.01/5, 69pp.
- Walker, G.R., Gilfedder, M., Evans, W.R., Dyson, P. and Stauffacher M. (In press) A groundwater flow systems framework for salinity management. Murray-Darling Basin Commission, Canberra.
- Zhang, L., Dowling, T., Hocking, M., Morris, J., Adams, G., Hickel, K., Best, A. and Vertessy, R. (In press) Predicting the effects of Blue Gum plantations on water yield in the Goulburn-Broken Catchments. Cooperative Research Centre for Catchment Hydrology Technical Report.

## Manuals

MUSIC (Model for Urban Stormwater Improvement Conceptualisation) User Manual Version 1.0. (2002) Cooperative Research Centre for Catchment Hydrology, 134pp.

## Working Documents

Siriwardena, L. and Srikanthan, R. (2002) Generation of spatially averaged daily rainfalls for the Yarra Region. . Cooperative Research Centre for Catchment Hydrology, Working Document 02/1, 38pp.

Srikanthan, R., McMahon, T. A., Pegram, G.G.S., Kuczera, G.A. and Thyer, M.A (2002) Generation of annual rainfall data for Australian Stations. Cooperative Research Centre for Catchment Hydrology, Working Document 02/3, 76pp.

Srikanthan, R., McMahon, T. A., Thyer, M.A. and Kuczera, G.A. (2001) Modelling Victorian annual rainfall data. Cooperative Research Centre for Catchment Hydrology, Working Document 01/1, 117pp.

Srikanthan, R., Thyer, M.A., Kuczera, G.A. and McMahon, T. A., (2002) Application of Hidden State Markov Model to Australian rainfall data. Cooperative Research Centre for Catchment Hydrology, Working Document 02/4, 132pp.

## Conference Papers

Argent, R. M., George, R. J., Dawes, W. (2001) Flowtube: A groundwater calculator for salinity estimation. In: F. Ghassemi, P. Whetton, R. Little and M. Littleboy (eds), MODSIM 2001 International Congress on Modelling and Simulation, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.2, pp.621-626.

Argent, R. M., Vertessy, R. A., Rahman, J. and Seaton, S. (2001) From components to decisions: The role of software engineering and frameworks in catchment decision support. In: F. Ghassemi, D. White, S. Cuddy and T. Nakanishi (eds), MODSIM 2001 International Congress on Modelling and Simulation, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.4, pp.1589-1594.

Barlow, K., Nash, D., Grayson, R. B and Turrall, H. (2001) Phosphorus transformations down two farm drains. International Phosphorus transfer Workshop, Plymouth University, Plymouth, United Kingdom 28 August – 1 September 2001, pp.74.

Barlow, K., Nash, D., Turrall, H. and Grayson, R. (2001) Drain design and management – implications for phosphorus transfer from paddock to farm boundary. 9th Annual RACI Research and Development Topics Conference in Analytical Chemistry, Melbourne, Australia, 2-5 December 2001, pp.24.

Bartley, R. (2001) Predicting pre-disturbance pool depth: a tool for stream rehabilitation. In: L. Guifen (Ed.), Proceedings of the XXIX Congress of the International Association of Hydraulic Engineering and Research, Beijing, China, 16-21 September 2001, Vol.1, pp.166-177.

Bartley, R. and Rutherford, I. (2001) Statistics, snags and sand: measuring the geomorphic recovery of streams disturbed by sediment slugs. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.1, pp.15-21.

Bartley, R. and Rutherford, I. (2001) Quantifying the geomorphic recovery of streams disturbed by anthropogenically produced sediment slugs. Proceedings of the 5th International Conference on Geomorphology, Tokyo, Japan, August 2001.

Blöschl G, Grayson R.B. and Western, A.W. (In Press) Advances in distributed hydrological modelling. Proceedings of the International Workshop on Scaling Problems in Hydrology, Vienna, Austria, 7-8th June 2001. Austrian Academy of Sciences.

Braaten, R., Dowling, T., Walker, J. and Veitch, S. (2001) A Framework for Using Indicators and Environmental Software Systems for Analysis of Catchment Condition. In: D.A. Swayne, R. Denzer and G. Schimak (eds), Environmental Information and Indicators. Proceedings of the 4th International Symposium on Environmental Software Systems: 2001, Banff, Canada, 22-25 May 2001. Environmental Software Systems. Vol.4, pp.13-27.

Brown, B.G., Bally, J., Brooks, H.E., Casati, B., Ebert, E., Jaeneke, M., Nurmi, P., Stephenson, D., and Wilson, L. (2001) Forecast verification activities for the Sydney 2000 Forecast Demonstration Project. 30th International Conference on Radar Meteorology, Munich, Germany, 19-24 July 2001.

Browning, K. and Greenway, M. (2002) Suitability of four macrophyte species in subsurface flow constructed wetlands. Proceedings of 5th International IWA Specialist Group Conference on Waste Stabilisation Ponds, Auckland, New Zealand, 2-5 April 2002, pp.707-714.

Browning, K. and Greenway, M. (2001) Establishment and growth of four different species of aquatic macrophytes in a sub-surface flow constructed wetland receiving secondary treat effluent. Proceedings of 5th Annual Environmental Engineering Research Event, Noosa, Queensland, 20-23 November 2001, [CD-ROM].

Caitcheon, G., Prosser, I., Wallbrink, P.J., Douglas, G., Olley, J.M., Hughes, A., Hancock, G., Scott, A. (2001) Sediment delivery from Moreton Bay's main tributaries: a multifaceted approach to identifying sediment sources. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.1, pp.103-107.

Chiew, F.H.S., Peel, M.C. and Western, A.W. (2002) Extension of monthly unimpaired streamflow data for Australia. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].



## Publications

### Conference Papers

Chiew, F.H.S. and Scanlon, P.J. (2001) Estimation of pollutant concentrations for Environmental Management Support System (EMSS) modelling of the south-east Queensland region. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), *The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.1, pp. 141-147.*

Chiew, F., Wang, Q.J., McConachy, F., James, R., Wright, W. and deHoedt, G. (2002) Evapotranspiration maps for Australia. . *Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].*

Chirico, G.B., Grayson, R.B., Western, A.W., Woods, R. and Seed, A. (2001) Sensitivity of simulated catchment response to the spatial resolution of rainfall. In: F. Ghassemi, D. Post, M. Sivapalan and R. Vertessy (eds), *MODSIM 2001 International Congress on Modelling and Simulation, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.1, pp.377-382.*

Chirico, G.B., Grayson, R.B., Longobardi, A., Villani, P. and Western, A.W. (2001) Shallow landslide hazard mapping based on a quasi-dynamic wetness index. In: F. Ghassemi, P. Whetton, R. Little and M. Littleboy (eds), *MODSIM 2001 International Congress on Modelling and Simulation, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.2, pp. 931-936.*

Clarke, C. J., Bell, R. W., George, R. J., Argent, R. M. and Hatton, T. J. (2001) A simple groundwater computer program for dryland salinity management in Australia. In: K-P Seiler and S. Wohnlich (eds), *New Approaches Characterizing Groundwater Flow. Proceedings of the XXXI International Association of Hydrogeologists Congress, Munich, Germany, 10-14 September 2001, pp.279-282.*

Costelloe, J. F., Grayson, R. B., Argent, R. M., McMahon, T. A., 2001. Modelling flow routing and transmission loss processes in arid zone floodplain rivers. In: F. Ghassemi, D. Post, M. Sivapalan and R. Vertessy (eds), *MODSIM 2001 International Congress on Modelling and Simulation: Canberra, Modelling and Simulation Society of Australia and New Zealand Inc., Vol.1, pp. 95-100.*

Costelloe, J.F., Grayson, R.B., McMahon, T. A. and Argent, R.M. (2002) Modelling spatial and temporal variability of water salinity in an ephemeral, arid zone river, central Australia. *Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].*

Croke, J.C., Hairsine, P.B., Fogarty, P. and Brophy, J. (2001) Sediment delivery at the hillslope scale and the role of the delivery pathway. *COST 623 "Soil Erosion and Global Change" Workshop. The significance of soil surface characteristics in soil erosion. Strasbourg, France, 20-22 September 2001. (Abstract only)*

Cuddy, S.M., Rahman, J.M., Marston, F.M., Seaton, S.P. and Vertessy, R.A. (2001) An innovative approach to incorporating management options into water quality models. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), *The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.1, pp.169-174.*

Dale, P., Chapman, H. and Greenway, M. (2002) Treatment Constructed Wetlands for Sewage Effluent Treatment: Do They Encourage Mosquito Breeding? In: *Treatment Wetlands for Water Quality Improvement: Quebec 2000 Conference Proceedings, CH2M HILL Canada Ltd.*

Dawes, W., Gilfedder, M., Stauffacher, M. and Walker G. (2001) Salinity Case Studies of Australian Groundwater Flow Systems. *Proceedings of the 8th Murray Darling Basin Groundwater Workshop 2001, Victor Harbor, South Australia, 4-6 September 2001, Paper 6A.2.*

Dawes, W., Gilfedder, M., Walker, G.R. and Evans, W.R. (2001) Biophysical modelling of catchment scale surface and groundwater response to land-use change. In: F. Ghassemi, P. Whetton, R. Little and M. Littleboy (eds), *MODSIM 2001 International Congress on Modelling and Simulation, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.2, pp.535-540.*

Douglas, G., M. Palmer, M., and Caitcheon, G. (2002) The Provenance of Sediments in Moreton Bay, Australia: A Synthesis of Major, Trace Element and Sr-Nd-Pb Isotopic Geochemistry, and Modelling. *Proceedings of the 9th International Symposium on the Interactions between Sediments and Water, Banff, Canada, 5-10 May 2002. International Association for Sediment Water Science. (Abstract).*

Dowling, T.I., Summerell, G.K. and Walker, J. (2001) Soil Wetness as an Indicator of Dryland Salinity: A Fuzzy Landscape Analysis GIS. In: D.A. Swayne, R. Denzer and G. Schimak (eds), *Environmental Information and Indicators. Proceedings of the 4th International Symposium on Environmental Software Systems: 2001, Banff, Canada, 22-25 May 2001. Environmental Software Systems. Vol.4, pp.28-38.*

Dowling, T.I., Summerell, G.K. and Walker, J. (2001) Characterising catchment salinity using a landscape position index. *Proceedings of the 8th Murray Darling Basin Groundwater Workshop 2001, Victor Harbor, South Australia, 4-6 September 2001, Paper 8B.2.*

Ebert, E.E. (2002) A poor man's ensemble for predicting rainfall in the short range. *Proceedings of the 9th National Australian Meteorological and Oceanographic Society Conference, Melbourne, 18-20 February 2002.*

Ebert, E.E., Bally, J., Brown, B. and Wilson, L. (2002) Ability of radar-based nowcast algorithms to make useful rainfall predictions: Results from the Sydney 2000 Olympics Forecast Demonstration Project. *Proceedings of the 9th National Australian Meteorological and Oceanographic Society Conference, Melbourne, 18-20 February 2002.*

Eley, R.A. and Keller, R.J. (2001) Investigation of the Effect of Momentum Transfer on Water Level and Flow Distribution. In: L. Guifen (Ed.), *Proceedings of the XXIX Congress of the International Association of Hydraulic Engineering and Research, Beijing, China, 16-21 September, 2001, Vol.1, pp.76-82.*

## Conference Papers

- Etchells, T., Malano, H. and McMahon, T. A. (2002) Developing a methodology to calculate water trading exchange rates. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Finlayson B.L., Brizga S.O. and White K. (2001) Human Impacts on the Fitzroy River System, Central Queensland, Australia. The International Association of Geomorphologists, Fifth International Conference on Geomorphology, Tokyo, Japan, August 23-28, 2001. Transactions, Japanese Geomorphological Union, 22(4); C-69 (Abstract only).
- 
- Fitzpatrick, R.W., Powell, B., McKenzie, N., Maschmedt, D.J., Schoknecht, N. and Jacquier, D. (2001) Demands of Soil Classification in Australia. Invited oral presentation, Symposium on Soil Classification: Contributions to Advances in Pedology, Charlotte, North Carolina, 21-23 October 2001. American Society of Agronomy (Agronomy Abstracts).
- 
- Flanagan, D.C., Meyer, C.R., Yu, B. and Scheele, D.L. (2001) Evaluation and Enhancement of the CLIGEN Weather Generator. Proceedings of Soil Erosion Research for the 21st Century, Honolulu, Hawaii, U.S.A., 3-5 January 2001. American Society of Agricultural Engineers, pp.107-110.
- 
- Fleming, N., Nathan, R., Chiew, F., McMahon, T. and Hughes, R. (2002) Forecasting streamflow and water demand to improve the efficiency of water supply in South Australia. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Fletcher, T. D. and Bren, L. J. (2001) The role of land tenure in determining the condition of riparian zones. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.1, pp.225-230.
- 
- Fletcher, T. D., Wong, T. H. F., Duncan, H. P., Coleman, J. R., and Jenkins, G. A. (2001) Managing the impacts of urbanisation on receiving waters: a decision-making framework. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.1, pp.217-224.
- 
- Gilfedder, M., Smitt, C., Zhang, L. and Walker, G.R. (2001) Impact of increased recharge on groundwater discharge: Development and application of a simplified function using catchment parameters. Proceedings of the 8th Murray Darling Basin Groundwater Workshop 2001, Victor Harbor, South Australia, 4-6 September 2001, Paper 6A.3.
- 
- Gilfedder, M., Stauffacher, M., Walker, G.R. and Coram J. (2002) Characterising groundwater flow systems using a dimensionless similarity parameter. Proceedings of the International Groundwater Conference, Darwin, Northern Territory, 12-17 May 2002. International Association of Hydrogeologists, [CD-ROM].
- 
- Green, J.A.H., Weinmann, P.E., Laurenson, E.M., Nathan, R.J. and Kuczera, G. (2002) Estimation of storm arrival probabilities in the GSAM Inland Zone. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Greene, R.S.B. and Hairsine, P.B. (2001) Elementary Processes and Thresholds in Soil Surface Dynamics. Sediment delivery at the hillslope scale and the role of the delivery pathway. COST 623, Soil Erosion and Global Change Workshop: The significance of soil surface characteristics in soil erosion. Strasbourg, France, 20-22 September 2001. (Abstract only)
- 
- Greenway, M. (2001) Constructed wetlands for water pollution control – a review of processes, applications and performance. Proceedings of the International Conference on Industrial Pollution and Control Technologies, Hyderabad, India, 7-10 December 2001.
- 
- Greenway, M. (2001) Developing the Community Role in Research. Proceedings of the Second National Wetlands Conference on Repairing our Wetlands: Learning by Doing, Couran Cove Resort, Queensland, 14-16 November 2001.
- 
- Greenway, M. (2002) Suitability of macrophytes for nutrient removal from surface flow constructed wetlands receiving secondary sewage effluent in Qld, Australia. Proceedings of the 5th International IWA Specialist Group Conference on Waste Stabilisation Ponds. Auckland, New Zealand, 2-5 April 2002, pp.707-714.
- 
- Greenway, M. (2002) Stormwater treatment devices – how effective are they in improving water quality – a case study, Golden Pond, Calamvale, Brisbane. 4th Qld Environmental Conference on Environmental Solutions Meeting the Challenge in 2002. Brisbane, Queensland, 30-31 May 2002.
- 
- Greenway, M. and Bolton, K. (2002) Role of Constructed Melaleuca Wetlands in Water Pollution Control in Australia. In: Treatment Wetlands for Water Quality Improvement: Quebec 2000 Conference Proceedings, CH2M HILL Canada Ltd.
- 
- Greenway, M., Polson, C. and Proctor H. (2001) A comparison of aquatic biota and water quality in two tributaries of Native Dog Creek with different land-use activities. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.1, pp.245-252.
- 
- Hairsine, P.B., Bormann, K. and Brophy, J. (2001) Stock tracks and the delivery of pollutants to streams by overland flow. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.1, pp.253-258.
- 
- Hatton, T.J., Silberstein, R.P. and Salama, R.B. (2002) Catchment salt balances and the future of river salinisation in Australia. Proceedings of the International Groundwater Conference, Darwin, Northern Territory, 12-17 May 2002. International Association of Hydrogeologists, [CD-ROM].
-

# Publications

## Conference Papers

- Haupt, L.J. and Keller, R.J. (2001) The Influence of Rock Ramp Fishways on the Hydraulic Characteristics of Weirs. Proceedings of the 3rd Australian Technical Workshop on Fishways, Sunshine Coast, Queensland, 30 August - 1 September 2001, pp.106-115.
- 
- Howes, E. and Stewardson, M.J. (In press) An evaluation of the representative reach concept for stream hydraulic surveys. Proceedings of the 4th Ecohydraulics Symposium, Cape Town, South Africa, March 2002.
- 
- Hunter, H. and PB. Hairsine (In press) Riparian and wetland buffers for aquatic ecosystem protection. Proceedings of the Second National Conference on Sustaining Aquatic Environments, Townsville, Queensland, 20-23 November 2001. Australian Water Association. †
- 
- Jenkins, G.A. and Greenway, M. (2001) The Hydraulic Characteristics of Vegetation in Artificial Wetlands. Proceedings of the 6th Conference on Hydraulics in Civil Engineering, Hobart, Australia, 27-30 November 2001, pp.437.
- 
- Jenkins, G.A. and Greenway, M. (2001) Predicting Hydraulic Retention Time Distribution in Surface Water Wetlands. Proceedings of the 3rd International Symposium on Environmental Hydraulics, Tempe Arizona, 5-8 December 2001, [CD-ROM].
- 
- Kandel, D., Western, A., Grayson, R. and Turrall, H. (2002) Surface runoff modelling: Part 1. Testing at fine timescale and scaling-up to daily scale. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Kandel, D., Western, A., Grayson, R. and Turrall, H. (2002) Surface runoff modelling: Part 2. Parameterisation at process timescale using plot scale data from a mid-hill catchment of Nepal. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Kandel, D., Western, A., Grayson, R. and Turrall, H. (2001) Testing current generation soil erosion models at two minute and daily scales using plot scale data from a mid-hill catchment of Nepal. In: F. Ghassemi, D. Post, M. Sivapalan and R. Vertessy (eds), MODSIM 2001 International Congress on Modelling and Simulation, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.1, pp.365-370.
- 
- Karssies, L. and Prosser, I.P. (2001) Designing grass filter strips to trap sediment and attached nutrient. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.1, pp.349-353.
- 
- Karssies, L. and Prosser, I.P. (2001) Sediment trapping abilities of grass filter strips and their role in agricultural landscapes. Proceedings of the 9th Annual Conference on Soil and Water Management, Picton. International Erosion Control Association, pp.127-134.
- 
- Keller, R. and Peterken, C. (2001) Proceedings of the 3rd Australian Technical Workshop on Fishways, Sunshine Coast, Queensland, 30 August-1 September 2001.
- 
- Keller, R.J. and Winston, F.B. (2001) Experimental Analysis of Flap Gates in Sewer Emergency Relief Structures. Proceedings of the 6th Conference on Hydraulics in Civil Engineering, Hobart, Tasmania, 28-30 November 2001, pp.453-461.
- 
- Knight, J.H., Gilfedder, M. and Walker, G.R. (2002) Effect of a change in recharge on baseflow and salt loads to rivers - A unit response approach. Proceedings of the International Groundwater Conference, Darwin, Northern Territory, 12-17 May 2002. International Association of Hydrogeologists, [CD-ROM].
- 
- Ladson, A., Lander, J., Western, A., Grayson, R. and Zhang, L. (2002) Estimating extractable soil moisture content for Australian soils. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Ladson, A. R. (2002) Adaptive management of large rivers in North America: Lessons for the Murray-Darling Basin. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Ladson, A. R., Anderson, B. and Rutherford, I. D. (2002) An Australian handbook of stream roughness coefficients. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- McJannet, D.L., Silberstein, R.P. and Vertessy, R.A. (2001) Predicting the water use and growth of plantations on hillslopes: The impact of planting design. In: F. Ghassemi, D. Post, M. Sivapalan and R. Vertessy (eds), MODSIM 2001 International Congress on Modelling and Simulation, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.1, pp.455-460.
- 
- McKergow L., Weaver D., Prosser I., Grayson R. and Reed A. (2001) Before and after riparian management: Nutrient and sediment exports from a small agricultural catchment, Western Australia. In: The value of healthy streams. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.2, pp.427-435.
- 
- McKergow, L., Weaver, D., Prosser, I.P., Grayson, R. and Reed, A. (2001) Before and after riparian management: Sediment and nutrient exports from a small agricultural catchment, Western Australia. Just Add Water. Joint Conference of the New Zealand Hydrological Society and New Zealand Limnological Society. Massey University, Palmerston North, New Zealand. 20-23 November 2001.
- 
- McKergow, L., Weaver, D., Prosser, I.P., Grayson, R. and Reed, A. (2001) Before and after riparian management: Sediment and nutrient exports from a small agricultural catchment, Western Australia. Buffer zones for water pollution control summer school. Ghent University, Ghent, Belgium. 29 August - 8 September 2001.

## Conference Papers

- McMaster, M.J., Provis, D.G., Grayson, R.B. and McCowan, A.D. (2001) Modelling of Lakes Entrance. Proceedings of the Coasts and Ports Conference 2001. Surfers Paradise, Queensland, 25-28 September 2001, pp.545-550. \*
- 
- Marsh, N., Western, A., Grayson, R., Rutherford, I. and Finlayson, B. (2001) Enhancing instream habitat with large woody debris: A flume experiment. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), *The Value of Healthy Streams*. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.1, pp.397-402.
- 
- Menabde, M., Sivapalan, M. and Seed, A.W. (2001) Generalised scaling, extreme rainfall, and areal reduction factor. In: F. Ghassemi, D. Post, M. Sivapalan and R. Vertessy (eds), *MODSIM 2001 International Congress on Modelling and Simulation*, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.1, pp.335-340.
- 
- Morris, J. and Collopy, J. (2001) Validating plantation water use predictions from the 3PG forest growth model. In: F. Ghassemi, D. Post, M. Sivapalan and R. Vertessy (eds), *MODSIM 2001 International Congress on Modelling and Simulation*, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.1, pp.437-442.
- 
- Muthukumaran, M., Chiew, F. and Wong, T. (2002) Characterisation of Urban Street Surface Solids. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Ogden, R. and Young, W.J. (2001) Prediction of river bed sediment size as a function of stream power and channel confinement in the Murrumbidgee catchment above Wagga Wagga. In: Rutherford, I., F.Sheldon, G.Brierley and C.Kenyon (eds) Proceedings of the Third Australian Stream Management Conference, Brisbane, Australia. Vol.2, pp.477-482.
- 
- Rahman, A. and Weinmann, P.E. (2001) Application of Monte Carlo Simulation Technique to Estimate Design Floods in Tropical Australia. 13th Queensland Hydrology Symposium. The University of Queensland, Brisbane, 6-7 November 2001. The Institution of Engineers Australia (Abstract).
- 
- Rahman, A. and Weinmann, P.E. (2002) Flood estimation in Northern Australian catchments using Monte Carlo Simulation. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Rahman, A., Carroll, D. and Weinmann, P.E. (2002) Integration of Monte Carlo Simulation technique with URBS model for design flood estimation. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Rahman, J.M., Cuddy, S.M., and Watson, F.G.R. (2001) TARSIER and ICMS: Two Approaches to Framework Design. In: F. Ghassemi, D. White, S. Cuddy and T. Nakanishi (eds), *MODSIM 2001 International Congress on Modelling and Simulation*, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.4, pp.1625-1630.
- 
- Rahman, J.M., Seaton, S.P. and Cuddy, S.M. (2002) Making Frameworks More Useable: Using Model Introspection and Metadata to Develop Model Processing Tools. In: A. Rizzoli and Jakeman, A. (eds), *Integrated Assessment and Decision Support*. Proceedings of the 1st Biennial Meeting of the International Environmental Modelling and Software Society, Lugano, Switzerland, 24-27 June 2002, Vol.3, pp.277-282.
- 
- Rassam, D., Fellows, C., DeHayr, R., Hunter, H. and Bloesch, P. (2002) Hydrology of a riparian buffer zone. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM]. †
- 
- Richter, H., Mills, G.A. and Puri, K.K. (2002) The initialisation of soil moisture in the Limited Area Prediction System (LAPS). Proceedings of the 9th National Australian Meteorology and Oceanographic Society Conference, Melbourne, Australia, 18-20 February 2002. pp.47.
- 
- Rizzoli, A. E., Argent, R. M., Manglaviti, M. and Mutti, M. (2001) Encapsulating environmental models and data using Java and XML. In: F. Ghassemi, D. White, S. Cuddy and T. Nakanishi (eds), *MODSIM 2001 International Congress on Modelling and Simulation*, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.4, pp.1649-1654.
- 
- Roberts, S., Vertessy, R.A., Grayson, R.B., Bren, L. and P. Cornish, P. (2002) Water Yield in Eucalyptus Sieberi forests. Hydrology Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Rustomji, P. and Prosser, I. P. (2001) Rivers - Do they all have the same sensitivity to change? An assessment of the geomorphic stability of rivers in coastal south eastern Australia. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), *The Value of Healthy Streams*. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.2, pp.555-560.
- 
- Rutherford, I.D., Ladson, A.R., Stewardson, M.J. and Jerie, K. (2002) We don't have time for that!: Realistic approaches to evaluating stream restoration projects. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Schreider, S. Yu, Weinmann, P.E., Codner, G.P. and Malano, H.M. (2001) Integrated Modelling System for Sustainable Water Allocation Planning. In: F. Ghassemi, M. McAleer, L. Oxley and M. Scoccimarro (eds), *MODSIM 2001 International Congress on Modelling and Simulation*, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.3, pp.1207 - 1212.
- 
- Seed, A.W. (2001) A dynamic and spatial scaling approach to advection forecasting. Proceedings of the 30th International Conference of Radar Meteorology, Munich, 19-24 July 2001. American Meteorological Society, pp.492-494.

## Publications

### Conference Papers

- Seed, A.W. (2001) A dynamic and spatial scaling approach to advection forecasting. Proceedings of the 5th International Symposium on Hydrological Applications of Weather Radar, Kyoto, Japan, 19-22 November 2001, pp.311-316.
- 
- Seed, A.W. and Pegram, G.G.S. (2001) Using Kriging to infill gaps in radar data due to ground clutter in real-time. Proceedings of the 5th International Symposium on Hydrological Applications of Weather Radar, Kyoto, Japan, 19-22 November 2001, pp.73-78.
- 
- Seed, A.W. (2001) Theory and measurements of the distribution of rainfall in space and time. In: F. Ghassemi, D. Post, M. Sivapalan and R. Vertessy (eds), MODSIM 2001 International Congress on Modelling and Simulation, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.1, pp.323-328.
- 
- Shelton, D., Cork, S., Binning, C., Parry, R., Hairsine P.B., Vertessy, R. and Stauffacher, M. (2001) Application of an ecosystem services inventory approach to the Goulburn Broken Catchment. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.2, pp.571-576.
- 
- Silberstein, R.P., Vertessy, R.A. and Hatton, T.J. (2001) A simple method for hillslope agroforestry design. In: F. Ghassemi, D. White, S. Cuddy and T. Nakanishi (eds), MODSIM 2001 International Congress on Modelling and Simulation, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.4, pp.1883-888.
- 
- Silberstein, R.P., Vertessy, R.A. and McJannet, D.L. (2001) A Parameter Space and Simulation Response Surface for Agroforestry Design. In: F. Ghassemi, D. White, S. Cuddy and T. Nakanishi (eds), MODSIM 2001 International Congress on Modelling and Simulation, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.4, pp.1889-1894.
- 
- Smitt, C., Gilfedder, M., Dawes, W., Petheram, C., Stauffacher, M. and Walker, G. (2001) Modelling the Effectiveness of Recharge Reduction for Salinity Management: Preliminary Results for Sensitivity to Catchment Characteristics. Proceedings of the 8th Murray Darling Basin Groundwater Workshop 2001, Victor Harbor, South Australia, 4-6 September 2001, Paper 6A.4.
- 
- Srikanthan, R., Kuczera, G., Thyer, M. A. and McMahon, T. A. (2002) Generation of annual rainfall data for Australian stations. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Srikanthan, R., Thyer, M.A., Kuczera, G. and McMahon, T.A. (2002) Modelling annual rainfall using a hidden state Markov model. In: A. Rizzoli and Jakeman, A. (eds), Integrated Assessment and Decision Support. Proceedings of the 1st Biennial Meeting of the International Environmental Modelling and Software Society, Lugano, Switzerland, 24-27 June 2002, Vol.2, pp.360-365.
- 
- Stewardson, M. J. (2001) The flow events method for developing environmental flow regimes. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.2, pp.577-582.
- 
- Stewardson, M. J. (2001) Uncertainty in stream rehabilitation planning. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.2, pp.583-588.
- 
- Stewardson, M. J., Fenton, J. D. and Cottingham, P. (2001) Applying the flow events method in an environmental flow study of the Broken River. In: F. Ghassemi, P. Whetton, R. Little and M. Littleboy (eds), MODSIM 2001 International Congress on Modelling and Simulation, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.2, pp.881-886.
- 
- Stewardson, M.J. and Anderson, B. (2002) Variations in the flow resistance of natural channels with discharge. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Stewardson, M.J. and Howes, E. (2002) The Number of Channel Cross-Sections Required for Representing Longitudinal Hydraulic Variability of Stream Reaches. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Stewardson, M.J. and Gippel, C.J. (In press) Incorporating Flow Variability into Environmental Flow Regimes using the Flow Events Method. Proceedings of the 4th Ecohydraulics Symposium, Cape Town, South Africa, March 2002.
- 
- Takken I., Croke J., Hairsine P.B., Lane P., Mockler S. and Brophy J. (2002) Effects of landuse on patterns of sediment delivery at the catchment scale. Cost 623, Soil Erosion Patterns: Evolution, Spatio-temporal dynamics and connectivity Workshop. Muencheberg, Germany, October 2002. (Abstract only)
- 
- Tan, K.S., Grayson, R., Chiew, F., McMahon, T. and Western, A. (2002) Exploring cross-correlations of environmental forcings in a coastal lagoon. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].\*
- 
- Tan, K.S., Grayson, R.B., Provis, D.G., Candy, R.B., Western, A.W., Chiew, F.H.S. and McMahon, T.A. (2001) Establishing design water levels in the Gippsland Lakes - Proposed methodology and preliminary analysis. Proceedings of the 15th Australian Coastal and Ocean Engineering Conference and the 8th Australasian Port and Harbour Conference, Gold Coast, Queensland, pp.551-556.\*

## Conference Papers

- Udy, J., Bunn, S., Dennison, W. and Hunter, H. (2001) Nutrient cycling in SEQ waterways: nitrogen plays a key role. Fourth International Riversymposium, Brisbane, Queensland, 29-31 August 2001, (Abstract). †‡
- 
- Vertessy, R.A., Rahman, J.M., Watson, F.G.R., Argent, R.M., Cuddy, S.M. and Seaton, S.P. (submitted) A regional water quality model designed for a range of users and for retrofit and re-use. In: A. Rizzoli and Jakeman, A. (eds), *Integrated Assessment and Decision Support. Proceedings of the 1st Biennial Meeting of the International Environmental Modelling and Software Society*, Lugano, Switzerland, 24-27 June 2002, Vol.3, pp.312-317.
- 
- Vertessy, R.A., Watson, F.G.R., Rahman, J.M., Cuddy, S.M., Seaton, S.P., Chiew, F.H.S., Scanlon, P.J., Marston, F.M., Lymburner, L., Jeannelle, S. and Verbunt, M. (2001) New software to aid water quality management in the catchment and waterways of the south-east Queensland region. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), *The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference*, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.2, pp.611-616.
- 
- Wallbrink, P.J., Martin, C.E. and Wilson, C.J. (2001) An assessment of the delivery of sediment and P to channels in a mixed landuse tropical catchment – identifying opportunities for improved management. *Aquatic Symposium*, Townsville, Queensland, 11-15 November 2001.
- 
- Wallbrink, P.J., Martin, C.E. and Wilson, C.J. (2001) Contribution of sediment and sediment bound P from different landuses to two contrasting streams in temperate and tropical Australia. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), *The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference*, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.2, pp.617-623.
- 
- Walsh, C.J., Fletcher, T.D., Wong, T.H.F. and Breen, F.F. (2001) Developing predictive ecological capacity for a stormwater management decision-making framework. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), *The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference*, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.2, pp.625 - 630.
- 
- Watson, F.G.R., Grayson, R.B., Vertessy, R.A., Peel, M.C. and Pierce, L.L. (2001) Evolution of a Hillslope Hydrologic Model. In: F. Ghassemi, D. Post, M. Sivapalan and R. Vertessy (eds), *MODSIM 2001 International Congress on Modelling and Simulation*, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.1, pp.461-467.
- 
- Watson, F.G.R., Rahman, J.M., and Seaton, S.P. (2001) Deploying environmental software using the TARSIER modelling framework. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), *The Value of Healthy Streams. Proceedings of the Third Australian Stream Management Conference*, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.2, pp.631-637.
- 
- Wealands, S., Grayson, R. B., McMaster, M., Tan, K.S. and Provis, D.P. (2002) Representing terrain accurately for flood modelling in large coastal lagoons: a case study of the Gippsland Lakes. *Proceedings of the 27th Hydrology and Water Resources Symposium*, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM]. \*
- 
- Western, A.W., Duncan, M.J., Olszak, C., Thompson, J., Anderson, T., Grayson, R.B., Wilson, D. and Young, R. (2001) Calibration of CS615 and TDR instruments for MARVEX, Tarrawarra and Point Nepean soils. In: C.H. Dowding (ed.), *TDR 2001: The Second International Symposium and Workshop on Time Domain Reflectometry for Innovative Geotechnical Applications*. Infrastructure Technology Institute at Northwestern University, Evanston, Illinois, pp.95-108.
- 
- Western, A.W., Grayson, R.B. and Blöschl, G. (2001) Spatial scaling of soil moisture: A review and some recent results. In: F. Ghassemi, D. Post, M. Sivapalan and R. Vertessy (eds), *MODSIM 2001 International Congress on Modelling and Simulation*, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.1, pp.347-352.
- 
- Western, A., Richter, H. Chiew, F., Young, R., Mills, G., Grayson, R., Manton, M. and McMahon, T. (2002) Testing the Australian Bureau of Meteorology's land surface simulations using soil moisture observations for the Murrumbidgee Catchment. *Proceedings of the 27th Hydrology and Water Resources Symposium*, Melbourne, 20 - 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- 
- Western, A., Sadek, T., Wang, L., Grayson, R., Turrall, H. and Troch, P. (2001) Is SAR capable of mapping small-scale spatial patterns of soil moisture? *Proceedings of IGARSS 2001*, Sydney, Australia, 9-13 July 2001, Vol.1, pp.40-42.
- 
- Whelan, J. *Powerful Voices: Learning to Speak out for the Environment*, conference proceedings, 6th Biennial Conference on Communication and Environment, University of Cincinnati, Ohio, 27-30 July 2001 †
- 
- White, L.J., Henderson, S.M. and Keller, R.J. (2001) Diel patterns of fish entering and exiting Torrumbarry Fishway. *Proceedings of the 3rd Australian Technical Workshop on Fishways*, Sunshine Coast, Queensland, 30 August - 1 September 2001, pp.176-179.
- 
- White, L.J., Katopodis, C., Keller, R.J., Harris, J.H. and Rutherford, I.D. (2001) Findings of Australian and overseas surveys on fishways. *Proceedings of the 3rd Australian Technical Workshop on Fishways*, Sunshine Coast, Queensland, 30 August - 1 September 2001, pp.32-41.
- 
- White, L.J. and Keller, R.J. (2001) Response of fish to hydraulic stimuli within Yarrowonga Fishway. *Proceedings of the 3rd Australian Technical Workshop on Fishways*, Sunshine Coast, Queensland, 30 August - 1 September 2001, pp.127-136.
- 
- White, L.J. and Keller, R.J. (2001) Ascent time of Murray-Darling fish through a vertical slot fishway: Is it determined by swimming ability or behaviour? *Proceedings of the 3rd Australian Technical Workshop on Fishways*, Sunshine Coast, Queensland, 30 August - 1 September 2001, pp.184-187.

## Publications

### Conference Papers

- White, L.J., Keller, R.J. and Henderson, S.M. (2001) Utilisation of overnighing pools by Murray-Darling fishes in vertical slot fishways – A Field Study. Proceedings of the 3rd Australian Technical Workshop on Fishways, Sunshine Coast, Queensland, 30 August – 1 September 2001, pp.180-183.
- Wijedasa, H.A, Malano, H.M., McMahon, T.A., Turrall, H.N. and Smith, G.S. (2002) Water Security Aspirations of Permanent Water Traders. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 – 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- Wilkinson, S. N., Keller, R. J. and Rutherford, I. D. (2001) Environmental flow thresholds for maintenance of pool-riffle sequences. Proceedings of the 6th Conference on Hydraulics in Civil Engineering, Hobart, Tasmania, 28-30 November 2001. The Institution of Engineers Australia, pp.513-522.
- Wilkinson, S. N., Keller, R. J. and Rutherford, I. D. (2001) Rehabilitating pool and riffle sequences; the role of alternate bar dynamics and flow constriction. In: I. Rutherford, F. Sheldon, G. Brierley and C. Kenyon (eds), *The Value of Healthy Streams*. Proceedings of the Third Australian Stream Management Conference, Brisbane, 27-29 August 2001. Cooperative Research Centre for Catchment Hydrology, Vol.2, pp.681-687.
- Wilson, D.J., Western, A.W., Grayson, R.B., Shao, Y., Woods, R.A. and Munro, R.K. (2001) Application of ALSIS to the hydrological modelling of New Zealand's Mahurangi catchment; Comparisons of temporal distribution of soil moisture. In: F. Ghassemi, D. Post, M. Sivapalan and R. Vertessy (eds), *MODSIM 2001 International Congress on Modelling and Simulation*, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.1, pp.353-358.
- Wilson, D., Western, A., Grayson, R., Woods, R. and McMahon, T. (2002) Predicting the spatial distribution of soil moisture from measurements made at a limited number of point locations. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 – 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- Wong, T.H.F., Tim D. Fletcher, T.D., Duncan, H.P, Coleman, J.R. and Jenkins, G.A. (2002) A Model for Planning and Prioritisation of Urban Stormwater Improvement Measures. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 – 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- Wong, T. H. F., Fletcher, T. D., Duncan, H. P., Coleman, J. R. and Jenkins, G. A. (2002) A model for urban stormwater improvement conceptualisation. In: A. Rizzoli and Jakeman, A. (eds), *Integrated Assessment and Decision Support*. Proceedings of the 1st Biennial Meeting of the International Environmental Modelling and Software Society, Lugano, Switzerland, 24-27 June 2002, Vol.1, pp.48-53.
- Young, W.J., Ogden, R.W., Hughes, A.O. and Prosser, I.P (2002) Predicting channel type from catchment and hydrological variables. In: *The Structure, Function and Management Implications of Fluvial Sedimentary Systems*. Proceedings of an international symposium held at Alice Springs, Australia, September 2002. IAHS Publ. No. 276, pp.53-60.
- Young, W.J., Ogden, R., Prosser, I.P and Hughes, A.O. (2001) Predicting river channel type from flow and sediment regime attributes. In: F. Ghassemi, P. Whetton, R. Little and M. Littleboy (eds), *MODSIM 2001 International Congress on Modelling and Simulation*, Canberra, Australia, 10-13 December 2001. Modelling and Simulation Society of Australia and New Zealand Inc., Vol.2, pp.855-860.
- Zhou, S., Srikanthan, R., McMahon, T. A., Wang, Q. J. and Nathan, R. (2002) Stochastic modelling of daily rainfall. Proceedings of the 27th Hydrology and Water Resources Symposium, Melbourne, 20 – 23 May 2002. The Institution of Engineers Australia, [CD-ROM].
- Refereed Journals**
- Aryal, S.K., Mein, R.G, and O'Loughlin, E.M. (In press) The concept of effective length in hillslopes: Assessing the influence of climate and topography on the dynamic contributing areas and application to natural catchments. *Hydrologic Processes*.
- Aryal, S.K., O'Loughlin, E.M., and Mein, R.G. (In press) Similarity of landscape saturation in catchments. *Water Resources Research*.
- Ballantyne, R., Fien, J. and Packer, J. (2001) School Environmental Education Programme Impacts Upon Student and Family Learning: A Case Study Analysis. *Environmental Education Research*, 7(1):23-37. \*†
- Beuselinck L., Govers, G., Hairsine, P.B., Sander, G.C. and Breynaert, M. (2002) The influence of rainfall impact on sediment transport by overland flow over areas of net deposition. *Journal of Hydrology*, 257(1):145-163.
- Beuselinck L., Hairsine P.B. and Govers G. (In press) Evaluating single class net deposition equations across a range of conditions. *Water Resources Research*.
- Beuselinck, L., Hairsine P.B., Sander, G. and Govers, G. (In press) Evaluating a multi-class net deposition equation across a range of conditions. *Water Resources Research*.
- Cardwell, A.J., Hawker, D.W. and Greenway, M. (2002) Metal accumulation in aquatic macrophytes from southeast Queensland, Australia. *Chemosphere*, 48:653-663.
- Chiew, F.H.S. and McMahon, T.A. (In press) Global ENSO-streamflow teleconnection, streamflow forecasting and interannual variability. *Hydrological Sciences*.
- Chiew, F.H.S. and McMahon, T.A. (2002) Modelling the impacts of climate change on Australian streamflow. *Hydrological Processes*, 16:1235-1245.

## Refereed Journals

- Davis J., Finlayson B.L. and Hart B.T. (2001) Barriers to science informing community-based land and water management. *Australian Journal of Environmental Management*, 8:99-104. \*†
- 
- Fien, J., Kumar, P. and Ravindranath, M. (2001) The Action Research Network as a Strategy for Change: The Learning for a Sustainable Environment Project. *Journal of Educational Change*. \*†
- 
- Fien, J., Scott, W. and Tilbury, D. (2001) Education and Conservation: Lessons from an Evaluation. *Environmental Education Research*. \*†
- 
- Foley, J.L. and Silburn, D.M. (In press) Hydraulic properties of rain impact surface seals on three clay soils: Influence of raindrop impact frequency and rainfall intensity during steady state. *Australian Journal of Soil Research*
- 
- Geeves G.W., Hairsine, P.B. and Moore, I.D. (In press) Effects of rainfall intensity on surface seal development on a pre-wetted surface soil. *European Journal of Soil Science*.
- 
- Grayson, R.B., Blöschl, G., Western, A.W. and McMahon, T.A. (In press) Advances in the use of observed spatial patterns of catchment hydrological response. *Advances in Water Resources*.
- 
- Grayson, R.B. and Western, A.W. (2001) Terrain and the distribution of soil moisture. *Hydrological Processes*, 15(13):2689-2690.
- 
- Greenway, M. and Woolley, A. (2001) Changes in Plant Biomass and Nutrient Removal over 3 Years in a Constructed Free Water Surface Flow Wetland in Cairns, Australia. *Water Science and Technology*, 44:303-310.
- 
- Hairsine P.B., Croke, J.C., Mathews, H., Fogarty, P. and Mockler, S. P. (In press) Modelling plumes of overland flow from roads and logging tracks. *Hydrological Processes*.
- 
- Hairsine, P.B., Sander, G.C., Beuselink, L. (In press) Sediment transport through on area of net deposition. *Water Resources Research*.
- 
- Hatton, T.J., Bartle, G.A., Silberstein, R.P., Salama, R.B., Hodgson, G.A., Ward, P.R., Lambert, P., and Williamson, D.R. (2002) Predicting and controlling waterlogging and groundwater flow in sloping duplex soils in Western Australia. *Agricultural Water Management*, 53(1-3):57-81.
- 
- Hodgson, G.A., Bartle, G.A., Silberstein, R.P., Hatton, T.J. and Ward, B.H. (2002) Measuring and monitoring the effects of agroforestry and drainage on waterlogging in the 'Ucarro' sub-catchment: experiment description. *Agricultural Water Management*, 53(1-3):39-56.
- 
- Ladson, A.R. and Argent, R.M. (2002) Adaptive management of environmental flows: lessons for the Murray-Darling Basin from three large North American rivers. *Australian Journal of Water Resources*, 5 (1):89-101.
- 
- Ladson, A.R. and Finlayson, B.L. (In press) Rhetoric and reality in the allocation of water to the environment: A case study of the Goulburn River, Victoria, Australia. *River Research and Applications*, 18.
- 
- Lewis, M.F. and Walker, G.R. (2002) Assessing the potential for significant and episodic recharge in southwestern Australia using rainfall data. *Hydrogeology Journal*, 10:229-237.
- 
- Lloyd, S.D., Wong, T.H.F., Liebig, T. and Becker, M. (2002) Sediment Characteristics in Stormwater Pollution Control Ponds. *Australian Journal of Water Resources*, 5(2):137-146.
- 
- Lloyd, S.D., Wong, T.H.F. and Porter, B. (2002) The Planning and Construction of an Urban Stormwater Management Scheme. *Water, Science and Technology*, 45(7):1-10.
- 
- McVicar, T.R., Zhang, G., Bradford, A.S., Wang, H., Dawes, W.R., Zhang, L. and Lingtao, L. (2002) Monitoring Regional Agricultural Water Use Efficiency for Hebei Province on the North China Plain. *Australian Journal of Agricultural Research*, 53:55-76.
- 
- Mitchell, V.G., Mein, R.G. and McMahon, T.A. (2001) Modelling the urban water cycle, *Environmental Modelling and Software*, 16:615-629.
- 
- Mosisch, T.D., Bunn, S.E. and Davies, P.M. (2001) The relative importance of riparian shading and nutrients on algal production in subtropical streams. *Freshwater Biology*, 46:1269-78. ‡
- 
- Motha, J.A., Wallbrink, P.J., Hairsine, P.B. and Grayson, R.B. (2002) Tracer properties of eroded sediment and source soils. *Hydrological Processes*, 16:1983-2000.
- 
- Murray, A.S. and Olley, J.M. (In press) Precision and Accuracy in the Optically Stimulated Luminescence Dating of Sedimentary Quartz: A Status Review. *Geochronometria*
- 
- Olley, J.M. (In press) Organic carbon supply to a large lowland river and implications for aquatic ecosystems. IAHS publication.
- 
- Olley, J.M. and Wasson R.J. (In press) Changes in the flux of sediment in the Upper Murrumbidgee catchment, SE Australia, since European settlement. *Hydrological Processes*.
-



## Publications

### Refereed Journals

- Parker, P., Letcher, R., Jakeman, A., Beck, M. B., Harris, G., Argent, R. M., Hare, M., Pahl-Wostl, C., Voinov, A., Janssen, M., Sullivan, P., Scoccimarro, M., Friend, A., Sonnenschein, M., Barker, D., Matejicek, L., Odulaja, D., Deadman, P., Lim, K., Larocque, G., Tarikhi, P., Fletcher, C., Put, A., Maxwell, T., Charles, A., Breeze, H., Nakatani, N., Mudgal, S., Naito, W., Osidele, O., Eriksson, I., Kautsky, U., Kautsky, E., Naeslund, B., Kumblad, L., Park, R., Maltagliati, S., Girardin, P., Rizzoli, A., Mauriello, D., Hoch, R., Pelletier, D., Reilly, J., Olafsdottir, R., Bin, S., (2002) Progress in integrated assessment and modelling. *Environmental Modelling and Software*, 17(3):209-217.
- Peel, M.C., McMahon, T.A. and Finlayson, B.L. (2002) Variability of annual precipitation and its relationship to the El Niño- Southern Oscillation. *Journal of Climate*, 15(5):545-551.
- Peel, M.C., McMahon, T.A., Finlayson, B.L. and Watson, F.G.R. (2001) Identification and explanation of continental differences in the variability of annual runoff. *Journal of Hydrology*, 250:224-240.
- Peel, M.C., McMahon, T.A., Finlayson, B.L. and Watson, F.G.R. (In press) Implications of the relationship between catchment vegetation type and the variability of annual runoff. *Hydrological Processes*.
- Petheram, C., Walker, G., Grayson, R.B., Thierfelder, T. and Zhang, L. (In press) Towards a framework for predicting impacts of land-use on recharge: 1. A review of recharge studies in Australia. *Australian Journal of Soil Research*.
- Sander, G.C., Hairsine, P.B., Beuselink, L. and Govers, G. (In press) Sediment Transport through an Area of Net Deposition: Multi-size Class Solutions. *Water Resources Research*.
- Silberstein, R.P., Bartle, G.A., Salama, R.B., Hatton, T.J., Reggiani, P., Hodgson, G.A., Williamson, D.R. and Lambert, P. (2002) Mechanisms and control of waterlogging and groundwater flow in 'Ucarro' catchment - Western Australia. *Agricultural Water Management*, 53(1-3):227-257. \*
- Silburn, D.M. and Glanville, S.F. (2002) Management practices for control of runoff losses from cotton furrows under storm rainfall. I. Runoff and sediment on a black Vertosol. *Australian Journal of Soil Research*, 40(1):1-20. \*
- Silburn, D.M., Simpson, B.W. and Hargreaves, P.A. (2002) Management practices for control of runoff losses from cotton furrows under storm rainfall. II. Transport of pesticides in runoff. *Australian Journal of Soil Research*, 40(1):21-44. \*
- Stewardson, M.J., and Cottingham, P. (2002) A demonstration of the flow events method: Environmental flow requirements of the Broken River. *Australian Journal of Water Resources*, 5(1):33-48.
- Stewardson, M.J. and McMahon, T.A. (2002) A stochastic model of hydraulic variations in stream reaches. *Water Resources Research*, 38(1):14.
- Taylor, A.C. (2002) The Complete Arsenal of Stormwater Management. *Waste Management and Environment*, 13(1):28-29.
- Udy, J.W. and Bunn, S.E. (2001) Elevated d15N values of aquatic plants in cleared catchments: why? *Marine and Freshwater Research*, 52:347-351. ‡
- Vaze, J. and Chiew F.H.S. (In press) Experimental study of pollutant accumulation on an urban road surface. *Urban Water*.
- Walker, G.R., Zhang, L., Ellis, T.W., Hatton, T.J. and Petheram, C. (2002) Estimating impact of changed land-use on recharge. Review of modelling and other approaches as appropriate for dryland salinity management. *Hydrogeology Journal*, 10:68-90.
- Wallbrink, P.J. and Croke, J. (In press) A combined rainfall simulator and tracer approach to assess the role of Best Management practices in minimizing sediment redistribution and losses in forests after harvesting. *Forest Ecology and Management*.
- Wallbrink, P.J., Roddy, B.P. and Olley, J.M. (2001) A tracer budget quantifying soil redistribution on hillslopes after forest harvesting. *Catena*, 47:179-201.
- Wang, H.X., Liu, C.M. and Zhang, L. (2002) Water-saving agriculture in China: An overview. *Advances in Agronomy*, 75, 135-171. \*
- Western, A.W., Grayson, R.B. and Blöschl, G. (2002) Scaling of soil moisture: a hydrologic perspective. *Annual Review of Earth and Planetary Sciences*, 30:149-180.
- Whelan, J. (2002) Community Organising By the Book: A Critical Appraisal of the Midwest Academy Activist Training Program. *Applied Environmental Education and Communication*, 1(2). †
- Young, W.J., Olley, J.M., Prosser, I.P. and Warner, R.F. (2002) Relative changes in sediment supply and sediment transport capacity in a bedrock-controlled river. *Water Resource Research*, 37(12):3307-3320.
- Yu, B. and Rosewell, C.J. (2001) Validation of WEPP for runoff and soil loss prediction at Gunnedah, NSW, Australia. *Australian Journal of Soil Research*, 39(5):1131-1145.
- Yu, B., Hashim, G. M. and Eusof, Z. (2001) Estimating the R-factor using limited rainfall data: A case study from Peninsular Malaysia. *Journal of Soil and Water Conservation*, 56(2):101-105. \*
- Zhou, G., Morris, J. and Yan, J. (In press) Hydrological impacts of reforestation with eucalypts and indigenous species in southern China. *Forest Ecology and Management*, 167(1-3):209-222.

### Papers, Articles in Industry Journals or Other Periodicals

Bartley, R., Rutherford, I.D. Hairsine, P.B. Prosser, I.P. Wallbrink, P. and Perry, D. (2001) Australia is on the move...down the creek! A brief insight into the impacts of increased sediment delivery for Australia's streams and rivers. *Australian Landcare Journal*, December 2001, pp.6-10.

Bunn, S., Abal, E., Dennison, B and Greenfield, P. (2001) Making the connection between healthy waterways and healthy catchments: synthesis and recommendations. p11. In: *Healthy Waterways - Healthy Catchments: Synthesis of scientific research of the SEQ Study*. Healthy Waterways Partnership, Brisbane. ‡

Chiew, F.H.S. and McMahon, T.A. (2001) Seasonal streamflow forecast and water resources management. *Water, Australian Water Association Journal*, 28(1):23-24.

Dale, P.E.R., Greenway, M. and Chapman, H.F. (2001) Constructed wetlands for wastewater treatment and mosquito borne diseases in Queensland, Australia. *Arbovirus Research in Australia*, 8:109-118.

Dennison, B., Abal, E., Bunn, S. and Greenfield, P. (2001) Setting the scene. p1. In: *Healthy Waterways - Healthy Catchments: Synthesis of scientific research of the SEQ Study*. Healthy Waterways Partnership, Brisbane. ‡

Ebert, E.E. (2001) Ability of a poor man's ensemble to predict the probability and distribution of precipitation. *Monthly Weather Review*, 129:2461-2480.

Finlayson, B. (2001) Report on the property of Mrs Anne Gschwendtner - effects of proposed forestry operations on water supply. *Upper Catchment Issues, Tasmania*, 1(1):36-46. \*

Prosser, I.P. and Karssies, L. (2001) Designing filter strips to trap sediment and attached nutrient. *Riparian Land Management Technical Guideline Update No. 1*, Land and Water Australia, Canberra.

Silberstein, R.P. (2002) Well designed tree plantings enhance water use. *Farming Ahead, Journal of the Kondinin Group, W.A.* May 2002.

Smith, M., Storey, A. and Bunn, S. (2001) Developing the tools for assessing the health of rivers and streams. p6. In: *Healthy Waterways - Healthy Catchments: Synthesis of scientific research of the SEQ Study*. Healthy Waterways Partnership, Brisbane. ‡

Udy, J., Bunn, S., Hunter, H. and Dennison, B. (2001) Nutrient cycling in SEQ waterways: nitrogen plays a key role. Pp 4-5. In: *Healthy Waterways - Healthy Catchments: Synthesis of scientific research of the SEQ Study*. Healthy Waterways Partnership, Brisbane. † ‡

\* Publication related to CRC activities and involving CRC participants but not directly arising from CRC Core or Associated/Additional Projects

† CRC personnel also involved in CRC for Coastal Zone, Waterway and Estuary Management and/or CRC for Sustainable Tourism

‡ CRC personnel also involved in CRC for Freshwater Ecology

# Glossary

<b>AEAM</b>	Adaptive Environmental Assessment Modelling
<b>AFFA</b>	Agriculture, Fisheries and Forestry – Australia (Commonwealth Department)
<b>BCC</b>	Brisbane City Council
<b>BC2C</b>	Biological capacity to change – software model for catchment land and water analysis
<b>BoM</b>	Bureau of Meteorology
<b>CCDSM</b>	Catchment Categorisation for Dryland Salinity Management project
<b>COAG</b>	Council of Australian Governments
<b>CRC</b>	Cooperative Research Centre
<b>CRC-Forge</b>	Computer software methodology for extreme rainfall analysis
<b>DLWC</b>	Department of Land and Water Conservation, NSW
<b>DNRE</b>	Department of Natural Resources and Environment, Vic
<b>DSS</b>	Decision Support System
<b>EMSS</b>	Environmental Management Support System
<b>ET</b>	Evapotranspiration
<b>FCC</b>	Focus Catchment Coordinator
<b>GEWEX</b>	Global Energy and Water Experiment (a component of the World Climate Research Program)
<b>ICMS</b>	Interactive Component Modelling System (formerly Integrated Catchment Management System); one of three frameworks for building and linking catchment hydrology models being used by the CRC Toolkit Project (see also TARSIER and TIME)
<b>IQQM</b>	Integrated Quantity and Quality Monitoring - water allocation software methodology and model
<b>L&amp;WA</b>	Land and Water Australia (formerly Land and Water Resources Research and Development Corporation) (Commonwealth R&D Corporation)
<b>LEMSS</b>	Local-Scale Environmental Management Support System
<b>Macaque</b>	Computer model for forest hydrology applications in large catchments
<b>MDBC</b>	Murray-Darling Basin Commission
<b>MUSIC</b>	Model for Urban Stormwater Improvement Conceptualisation – CRC computer software methodology
<b>MWater</b>	A water market experimental methodology to evaluate alternative water trading rules and procedures in mature water markets
<b>NHT</b>	Natural Heritage Trust (Commonwealth Government)
<b>NLWRA</b>	National Land and Water Resources Audit (Commonwealth Government, funded by NHT)
<b>NRM</b>	Natural Resources and Mines, Qld
<b>NWP</b>	Numerical Weather Prediction
<b>R&amp;D</b>	Research and development
<b>REALM</b>	Computer model for predicting catchment water balance
<b>SEQRWQMS</b>	South East Queensland Regional Water Quality Management Strategy
<b>S_PROG</b>	Model for nowcasting (forecasting rainfall one to two hours in advance)
<b>TAG</b>	Technical Advisory Group (expert panel for CRC projects)
<b>TARSIER</b>	A framework for building and linking catchment hydrology models; one of three being used by the CRC Catchment Modelling Toolkit Project (see also TIME and ICMS)
<b>TIME</b>	The Invisible Modelling Environment; one of three frameworks for building and linking catchment hydrology models being used by the CRC Catchment Modelling Toolkit Project (see also TARSIER and ICMS)
<b>TOPOG</b>	Computer model developed for forest hydrology applications in small or experimental catchments
<b>WSUD</b>	Water Sensitive Urban Design

# Performance Indicators



# Performance Indicators

## Objectives of the Centre

Nature of Indicator	Performance Indicator	Target over life of Centre	Measure – Leading	Measure – Real Time	Measure – Lagging	Report of Activities and Achievements for 1999/2000	Report of Activities and Achievements for 2000/2001	Report of Activities and Achievements for 2001/2002
<b>Outcome</b>	Economic benefit to Centre	Adding value to intellectual capital at least equal to CRC Commonwealth funding	Building Centre intellectual capital	Maximising value of intellectual capital good research	Demonstrated application Centre's public	11 major cooperative research projects underway. Further 3 in July 2000.	19 collaborative core research projects and 5 major contract research projects underway.	19 collaborative core research projects and 11 major contract research projects with two completed.
		Additional income (contract research) of \$10.1 m over life of Centre	Budget provision	Additional contract income in year	Cumulative income	Research Contracts with AFFA, LWRDRC, MDBC, SEQRWQMS. Contract income \$0.05m for 99/2000 of total \$0.92m in contracts to date. [Includes \$0.03m from direct CRC contract/consulting work]	Research Contracts with AFFA, LWRDRC, MDBC, SEQRWQMS. Contract income \$0.79m for 2000/01 of total \$1.47m in contracts to date. [Includes \$0.18m from direct CRC contract/consulting work]	Research Contracts with AFFA, LWA, SEQRWQMS, MDBC, EPA. Contract income \$1.70m for 2001/02 of total \$3.20m in contracts to date. [Includes \$0.21m from direct CRC contract/consulting work]
	Economic benefit to user core participants	Actual or future potential benefits more than 3 times total resources committed	Dissemination of Centre IP to Parties.  Potential economic benefit assessed	Access to Centre IP and know-how	Actual benefit achieved or achievable by core user participants	IP access: Communication and Adoption Program underway. Seminars and dissemination of reports, videos continuing,  Overall indicative economic benefits highlighted in Business Plan. Individual assessments of Party economic benefits to follow project completions.	IP access: Communication and Adoption Program underway. Seminars and dissemination of reports, videos continuing,  Overall indicative economic benefits highlighted in Business Plan. Individual assessments of Party economic benefits to follow project completions.	IP access: Communication and Adoption Program continuing. Seminars and dissemination of reports, videos continuing,  Overall indicative economic benefits highlighted in Business Plan. Individual assessments of Party economic benefits to follow project completions.
	Economic benefit to Australia	Actual or future potential benefits more than 5 times total resources committed	Potential economic benefit assessed	Completed economic benefit assessments for projects	Actual benefit achieved or achievable	Overall indicative economic benefits highlighted in Business Plan  Assessments of national economic benefits to follow project completions	Overall indicative economic benefits highlighted in Business Plan  Assessments of national economic benefits to follow project completions	Overall indicative economic benefits highlighted in Business Plan  Assessments of national economic benefits to follow project completions
	Economic benefit – other	Public benefit from positive environmental impact	Public good potential identified	Completed assessments of public good potential benefit for projects	Public good benefit achieved	Public good potential outlined in Business Plan  Assessments of public good and other economic benefits to follow project completions	Public good potential outlined in Business Plan  Assessments of public good and other economic benefits to follow project completions	Public good potential outlined in Business Plan  Assessments of public good and other economic benefits to follow project completions
<b>Input</b>	Total resources	\$67.7m total resources	Agreement	Actually committed	Cumulative resources	Parties/Grant Total Agreement commitment of \$57.6m.	Parties/Grant Total Agreement commitment of \$57.6m.	Parties/Grant Total Agreement commitment of \$57.6m.
		Total leverage > 4.1 vs Commonwealth cash				\$6.1 m committed to 30 June 2000.	\$11.8 m committed by Parties to 30 June 2001.	\$ 18.0m committed by Parties to 30 June 2002.
	Cash resources	\$33.6m cash resources Cash 49% of total resources	Agreement	Actually committed	Cumulative resources	Total Agreement cash budget of \$33.6m. \$3.3m cash committed to 30 June 2000.	Total Agreement cash budget of \$33.6m. \$3.6m Grant/Parties cash committed in year to 30 June 2001. Cumulative \$6.9m Grant/Parties.	Total Agreement cash budget of \$33.6m. \$3.6m Grant/Parties cash committed in year to 30 June 2002. Cumulative \$10.5m Grant/Parties.
<b>Process</b>	Program/Project Management	Project initiation, management, review and evaluation systems	Adoption of project management approach	Quarterly reports Regular project reviews	Projects completed on time and on budget	Monthly Project finance reporting continuing. Quarterly Project reporting continuing. Reporting format upgraded.	Monthly Project finance reporting continuing. Quarterly Project reporting continuing.	Monthly Project finance reporting continuing. Quarterly Project reporting continuing.

## Objectives of the Centre continued

Nature of Indicator	Performance Indicator	Target over life of Centre	Measure – Leading	Measure – Real Time	Measure – Lagging	Report of Activities and Achievements for 1999/2000	Report of Activities and Achievements for 2000/2001	Report of Activities and Achievements for 2001/2002
Outputs	Centre Publications transferring research outcomes and technology to industry	50 Centre reports	Number planned	Number in preparation	Number issued	3 Industry Reports [one 2nd Ed], 14 Technical Reports, 5 videos and 5 Working Documents published since July 99. Email notification and database established with 590 recipients. 11 issues of monthly newsletter issued (800 in hard copy, 200 emailed – includes Website posting).	12 Technical Reports and 2 videos published. Email notification and database established with 760 recipients. 11 issues of monthly newsletter issued (890 in hard copy, 360 emailed – includes Website posting). Approx 2000 visits to CRC website per month with over 700 visiting more than twice per month.	10 Technical Reports and 1 Manual published. Email notification and database established with 850 recipients. 11 issues of monthly newsletter issued (950 in hard copy, 450 emailed – includes Website posting). Approx 3000 visits to CRC website per month with over 900 visiting more than once.
	Industry Seminars	50 Seminars	Number planned	Number each year	Total number completed	5 Industry Seminars presented since July 99. 14 Technical Seminars	19 CRC Technical Seminars presented	31 CRC Technical Seminars presented
	Industry Workshops	20 Workshops	Number planned	Number each year	Total number completed	7 CRC workshops/field tours since July 99	14 CRC Workshops/field tours given	18 CRC Workshops/field tours given

## Quality and Relevance of the Research Program

Nature of Indicator	Performance Indicator	Target over life of Centre	Measure – Leading	Measure – Real Time	Measure – Lagging	Report of Activities and Achievements for 1999/2000	Report of Activities and Achievements for 2000/2001	Report of Activities and Achievements for 2001/2002
Outcome	Scientific status and user satisfaction	Demonstrated research quality	Scientific review of planned projects	Annual review for scientific status and user satisfaction	Cumulative results	Technical Advisory Groups involved in developing projects. Project review panels established for projects. Independent science review included in project review panel tasks.	Technical Advisory Groups involved in developing projects. 14 Project review panels held to June 2001 covering all projects. Independent science review included in project review panel tasks.	Technical Advisory Groups involved in developing projects. 11 Project review panels held in year to June 2002. Independent science review included in project review panel tasks.
		Demonstrated user satisfaction	User input to planned projects			Industry users represented in Technical Advisory Groups for Projects. for Projects. Participation also in Project Review panels	Industry users represented in Technical Advisory Groups. Participation also in Project Review panels	Industry users represented in Technical Advisory Groups for Projects. Participation also in Project Review panels
Input	Research program resources	\$46m total cash and in-kind resources on research program	Strategic plan	Actually committed	Cumulative resources	\$3.5m research expenditure (cash and in-kind) for 99/2000	\$5.2m research expenditure (cash and in-kind) for 2000/01 Cumulative total \$8.7m	\$5.8m research expenditure (cash and in-kind) for 2001/02 Cumulative total \$14.5m
Process	Advisory committees/groups	Technical Advisory Groups (TAGs) for iResearch Programs	Roles defined, meetings scheduled	Membership, meetings held	Extent of involvement and contribution to research directions and management	Technical Advisory Groups established and used in developing projects.	Technical Advisory Groups established and used in developing projects.	Technical Advisory Groups established and used in developing projects.
	Involvement of research users	User driven selection, review and termination of applied projects	Project selection	Consultation and project monitoring	Project reviews	Research users strongly represented in project formulation stages and Technical Advisory Groups. Project review panels established for projects. Independent science review included in project review panel tasks	Research users strongly represented in project formulation stages, Technical Advisory Groups and Communication and Adoption Plans. Project review panels held for all core projects. Independent science review included in project review panel tasks	Research users strongly represented in project formulation stages, Technical Advisory Groups and Communication and Adoption Plans. Project review panels held for core projects. Independent science review included in project review panel tasks
Outputs	External publications	100 publications in refereed journals	Number planned	Number of publications submitted	Total number published	Over 40 refereed papers in 99/2000.	69 refereed papers published/accepted in 2000/01.	33 refereed papers published/accepted in 2001/02.
		100 papers in international conferences				16 international conference papers in 99/2000	24 international conference papers accepted/published in 2000/01	35 international conference papers accepted/published in 2001/02
		100 papers in national conferences				41 Australian conference papers in 99/2000	37 Australian conference papers in 2000/01	96 Australian conference papers in 2001/02

# Performance Indicators

## Strategy for Utilisation and Application of Research Outputs

Nature of Indicator	Performance Indicator	Target over life of Centre	Measure – Leading	Measure – Real Time	Measure – Lagging	Report of Activities and Achievements for 1999/2000	Report of Activities and Achievements for 2000/2001	Report of Activities and Achievements for 2001/2002
<b>Outcome</b>	Development of approaches to improve land and water management and adoption by end-users	Demonstration of approaches to improve land and water management in Centre's 5 focus catchments	Communication and adoption activities planned	Communication and adoption activities completed	Demonstrated adoption of Centre research by end-users in focus catchments	Communication and Adoption planning framework developed for new Programs. Pilot undertaken with industry users for Urban Stormwater Quality Program.  Continuing activity with take-up of CRC products by users for Urban Hydrology, Predictive tools, Flood hydrology.	Communication and Adoption planning framework adopted for Programs.  Continuing activity with take-up of CRC products by users for all Programs.	Communication and Adoption planning framework adopted for Programs.  Continuing activity with take-up of CRC products by users for all Programs.
<b>Input</b>	Resources devoted to communication and adoption program	Minimum \$13m cash and in-kind on communication and adoption program	Strategic plan – Commercialisation and adoption strategy	Actually committed	Cumulative resources	Total \$1.5m cash and in-kind expenditure for 99/2000 on Communication and Adoption Program	Total \$2.2m cash and in-kind expenditure for 2000/01 on Communication and Adoption Program Cumulative total \$3.7m	Total \$3.1m cash and in-kind expenditure for 2001/02 on Communication and Adoption Program. Cumulative total \$6.8m
	User core participant resources	\$21m core user participant resources  Core user participant resources 32% of total resources	Agreement	Actually committed	Cumulative resources	Total \$21.8m committed by core user Parties in Agreement. Contributions of \$2.3 m 99/2000.  46% of total contributions by core users, 99/2000.	Total \$21.8m committed by core user Parties in Agreement. Contributions of \$3.2m 2000/01. Cumulative total \$5.5m 50% of total contributions by core users, 2000/01.	Total \$21.8m committed by core user Parties in Agreement. Contributions of \$3.8m in 2001/02. Cumulative total of \$7.0m. 56% of total contributions by core users, 2001/02.
<b>Process</b>	Communication and implementation of Centre research outcomes and technology	Integration of communication and adoption (technology transfer) principles into Programs/projects and focus catchments	Appointment of Program Leader – Communication and Adoption. Appointment of 5 site coordinators.	Number of meetings held by program leaders and site coordinators with stakeholders on communication and adoption	External independent review of Communication and Adoption Program at end of years 1, 3 & 5	Appointments completed for Program Leader and Focus Catchment Coordinators.  Meetings held Dec 99 and February 2000. Workshop early April 2000 for Program Leaders and Focus Catchment Coordinators.	Workshops held Oct 2000 and early April 2001 for Program Leaders and Focus Catchment Coordinators.	Workshops held October 2001, January 2002 and April 2002 for Program Leaders and Focus Catchment Coordinators.
<b>Outputs</b>	Centre products	Monthly newsletter to over 1400 industry end-users. 14 Major updates of Centre Web site. 20 Industry seminars 30 Technical seminars 15 Industry reports and videos 35 Technical reports 15 Field tours and demonstrations of Centre products. 20 Workshops 20 Targeted short courses. 4 Contributions to influential trade journals.	Number planned	Number each year	Total number completed	Monthly newsletter continuing: copies to 1000 subscribers (surveyed need) and available on CRC website. Since July 99, second major update of Website underway. 5 Industry Seminars presented since July 99. 14 technical seminars since July 99. 3 Industry Reports and 5 videos, 14 Technical Reports, and 5 Working Documents issued since July 99. 2 Field tours held since July 99, 5 workshops held since July 99, 4 day Stormwater Management short course planned for October 2000, 5 industry articles. CRC contribution/ features for AWA Journal 'Water' being prepared for Nov/Dec 2000 issue	Monthly newsletter continuing: copies to 1250 subscribers (surveyed need) and available on CRC website. Second major update of Website completed. 19 Technical seminars. 12 Technical Reports, 2 Videos issued, 1 Field Tour, 13 CRC workshops held, 15 industry articles. 9 CRC contributions/features in AWA Journal 'Water'. Cumulative totals: 2 Website upgrades 5 Industry Seminars 63 Technical Seminars 3 Industry Reports 36 Technical Reports 6 Field Tours 36 Workshops 26 Industry/trade articles.	Monthly newsletter continuing: copies to 1400 subscribers (surveyed need) and available on CRC website. 30 Technical seminars. 10 Technical Reports, 1 Manual, 3 Field Tours, 18 CRC workshops held, 6 industry articles.  Cumulative totals: 2 Website upgrades 5 Industry Seminars 63 Technical Seminars 3 Industry Reports 36 Technical Reports 6 Field Tours 36 Workshops 26 Industry/trade articles

## Collaborative Arrangements

Nature of Indicator	Performance Indicator	Target over life of Centre	Measure – Leading	Measure – Real Time	Measure – Lagging	Report of Activities and Achievements for 1999/2000	Report of Activities and Achievements for 2000/2001	Report of Activities and Achievements for 2001/2002
<b>Outcome</b>	Cooperation in research within Australian and overseas and more efficient use of resources	Twenty collaborative	Number planned arrangements	Number implemented	Total number completed	Nine collaborative arrangements being established with ANU; Coastal Zone CRC and Freshwater Ecology CRC; others being planned	Four collaborative arrangements being established with ICAM(ANU); NIWA(NZ); close collaboration with University of Texas and Univ Nth Carolina, USA.	New collaborative arrangements being established with UNSW; close collaboration with University of Natal Univ Nth Carolina, USA, Univ of Leuven, Belgium.
<b>Input</b>	Research providers contributed resources	\$19.5m total cash and in-kind	Agreement	Actually committed	Cumulative resources	\$2.6m committed by Research providers to 99/2000.	\$3.1m committed by Research providers in 2000/01. \$5.7m Cumulative	\$3.0m committed by Research providers in 2001/02. \$8.7m Cumulative
	Research providers FTEs in-kind	11.4 FTE in-kind	Agreement	Actually committed	Cumulative resources	10.6 FTE for 99/2000 Increased level expected for later years.	13.0 FTE for 2000/01 23.6 FTE Cumulative	12.7 FTE for 2001/02 36.3 FTE Cumulative
<b>Process</b>	Collaboration between researchers	All projects to involve two or more Parties	Average number of Parties proposed per agreement	Average number for projects initiated within year	Average cumulative number of Parties per project	Average of 5 Parties for 11 Agreements signed February 2000.	Average of 4.4 Parties for 21 Agreements signed to June 2001.	Average of 4.4 Parties for 21 Core Project Agreements signed to June 2002.
		Participants workshop each year	Workshop planned for year	Number attending	Total number of participant workshops held and cumulative attendance	Workshop held 4-6 April 2000 (Mt Buffalo) 68 attended	Workshop held 3-5 April 2001 (Cobram-Barooga) 93 attended 161 Cumulative Total	Workshop held 16-18 April 2002 (Ballarat) 96 attended
	Collaboration between researchers and research users	University and non-University supervisors for 75% of postgraduate students	Percentage planned	Percentage for students starting in year	Cumulative percentage of students with university and non-university supervisors	Currently over 50% of postgraduates have both university and non-university supervisors	Currently over 34% of postgraduates have both university and non-university supervisors	Currently 29% of postgraduates have both university and non-university supervisors
	International collaboration	Centre researchers involved in 3 international collaborations per year	Number planned for year	Number of collaborations in year	Cumulative number of international collaborations	Collaborative arrangements developed for projects including Projects 1.1(Univ Edinburgh), 4.1(Univ Essen), 5.1(WMO), 6.5 (Univ Alberta). Other collaborations occurred with Prog 1-IUFRO (Vertessy), Prog 2-NIWA,NZ(Seed) – 6 in total listed	Collaborative arrangements developed for projects including Projects 1.1(Univ of Texas, Univ of N.Carolina), 1.2 (Univ of Vienna, Univ of Uppsala), 2.2 (C. Univ of Leuven) 4.1/4.2 (Colorado State Univ), 5.1(Univ. Calif.)(WMO), 5.2 (Univ of Natal), 6.5 (Univ Alberta). Other collaborations occurred with Prog 1- Univ of Cincinatti (Vertessy); Prog 5-NIWA,NZ(Seed) – 12 in total listed	Collaborative arrangements developed for projects including Projects 1.1(HTW, Saarlandes, Germany; RIZA, Netherlands; California State Univ; Univ of Cincinatti; Univ of N.Carolina; Univ of Texas), 1.2 (Univ of Vienna), 2.2 (C. Univ of Leuven), 5.1(Univ Catalonia, Spain; Met Office UK), 5.2 (Univ of Natal), 6.7(CEMAGREF, France). 12 in total listed
	75% of postgraduate students to present at one international conference	Number planned for year	Number attended in year	Cumulative number	Presentations in 99/2000 by 5 postgraduates at Intl confs: Haupt, Hoang, Jordan, McJanet, Wilkinson.	Presentations in 2000/01 by 2 postgraduates at Intl confs: Lloyd, Wilkinson. Cumulative total 7.	Presentations in 2001/02 by 3 postgraduates at Intl confs: Bartley, Eley, McKergow,	
Associate membership program	5 Associates (by Year 4)	Number planned in year	Number joined in year	Total number	SA Water joined. State Forests of NSW renewed.	SA Water continuing involvement. State Forests of NSW renewed.	WA Water Corporation joined as Associate.	
Secondments of industry staff to research providers	12 secondments to research providers	Secondments planned in year	Number of secondments in year	Cumulative number of secondments	H Duncan (Melb Water) and J Green (DLWC) (part of year) at Monash Univ.	H Duncan (Melb Water) and (part of year) R O'Neill (DLWC), M Seker (Goulburn-Murray Water), B James (DNRE) at Monash Univ. Cumulative 6 (part) secondments.	H Duncan (Melb Water), J Green (DLWC) at Monash Univ.	
Secondments of research provider staff to industry	12 secondments to industry	Secondments planned in year	Number of secondments in year	Cumulative number of secondments	L Siriwardena located at Bureau of Met for part of year	S Lloyd and J Lewis located at Melbourne Water for part of year. Cumulative 3 (part) secondments.	Cumulative 3 (part) secondments.	



# Performance Indicators

## Collaborative Arrangements *continued*

Nature of Indicator	Performance Indicator	Target over life of Centre	Measure – Leading	Measure – Real Time	Measure – Lagging	Report of Activities and Achievements for 1999/2000	Report of Activities and Achievements for 2000/2001	Report of Activities and Achievements for 2001/2002
<b>Outputs</b>	Collaborative publications (Centre researchers from and authors other organisations)	100 collaborative publications	Number planned in year	Number published in year	Total number	10 refereed journal papers, 1 CRC Technical Report, and 13 conference papers – with external collaborators	14 refereed journal papers and 12 conference papers – all with external collaborators.	14 refereed journal papers and 23 conference papers – all with external collaborators

## Education and Training

Nature of Indicator	Performance Indicator	Target over life of Centre	Measure – Leading	Measure – Real Time	Measure – Lagging	Report of Activities and Achievements for 1999/2000	Report of Activities and Achievements for 2000/2001	Report of Activities and Achievements for 2001/2002
<b>Outcome</b>	Training and equipping postgraduate students as future leaders in research and management: Education benefit – postgraduate	All postgraduates employed  50% of postgraduate students employed in user or related industry	Students trained in job skills	Employment of graduating students	Number employed, % employed in user or related industry  % employed in user or related industry	Postgraduate skills training being planned. Further interaction with industry provided in Annual workshop.  Postgraduates*: Feikema, Haupt, Jordan, Richards, Siriwardhena, Somes with user industry. Davis, Herron, McJannet, Scanlon, and Stewardson with research providers *Submitted theses in 99/2000	Postgraduate skills workshop held April 2001. Further interaction with industry provided in Annual workshop  Postgraduates*: Hoang, Lewis, Sabaratnam, Tilleard with user industry. Roberts with research providers.  *Submitted theses in 2000/01	Postgraduate Project Management workshop held April 2002. Further interaction with industry provided in Annual workshop.  Postgraduates*: Akeroyd, Bailey, Linton, Vaze with user industry. Bartley, Marsh, Motha, Petheram, Thomas, Wilkinson with research providers.  *Submitted or passed theses in 2001/02
	Increase in knowledge and skill base available for land and water management in Australia: Education benefit – other	Short courses attended by 500 industry persons	Number planned	Number per year and number attending	Cumulative number of courses and attendees	208 attended courses/workshops on: Continuous simulation system for design flood estimation Nov 99 (15), Planning and design of stormwater management measures, Nov 99 (30); Setting priorities for stream restoration, Dec 99 (25); Hydrology and Hydraulics for Floodplain Managers May 2000 (33); Urban stormwater monitoring Protocol workshop May 2000 (25); Urban Stormwater Field workshop – examples of best practice (80)	Over 490 attended courses/workshops on: Hydrology and hydraulics for floodplain managers – Design flood flow estimation, July 2000 (45); Water sensitive urban design Field trip, July 2000 (90); Murrumbidgee 2000, July 2000 (85); Water sensitive urban design, Aug 2000 (40); Hydrology and hydraulics for floodplain managers – Flood level estimation, Oct 2000 (35); Regional hydrologic modelling, Oct 2000 (24); Planning and design of urban stormwater management measures, Oct 2000 (17); Hydrology and hydraulics for floodplain managers – Design of flood mitigation measures, Nov 2000 (31); Stochastic hydrology, Feb 2001 (25); Environmental management support system, March 2001 (25); MUSIC (Model for urban stormwater improvement conceptualisation), April 2001 (12); MUSIC (Model for urban stormwater improvement conceptualisation), May 2001 (14); Tarsier developers workshop, May 2001 (12); Future issues workshop, May 2001 (38). Cumulative total 698.	Over 440 attended courses/workshops on: Fitzroy AEAM, Building the shell for AEAM process, Aug 2001 (15); Stochastic data – risks in water resources management, Sept 2001 (23); Fitzroy AEAM, Understanding Fitzroy catchment, Sept 2001 (25); Design flood flow estimation, Sept 2001 (28); Application of MUSIC, Oct 2002 (5); EMSS Training, Oct 2001 (35); ICMS Training, Oct 2001 (12); Climate Variability Research, Oct 2001 (40); MUSIC users, Oct 2001 (12); Modelling Toolkit concepts and activities, Nov 2001 (23); Water experiment trials, Jan 2002 (12); ICMS, Feb 2002 (10); ; Water experiment trials, Feb 2002 (12); We all use water, Feb 2002 (15); Field investigation, river rehabilitation design, Mar 2002 (6); Field demonstration, stream restoration, Mar 2002 (50); We all use water, Mar 2002 (17); Project management, Apr 2002 (17); We all use water, May 2002 (15); Fitzroy AEAM stakeholders, May 2002 (30); WSUD field tour, June 2002 (40).

## Education and Training continued

Nature of Indicator	Performance Indicator	Target over life of Centre	Measure – Leading	Measure – Real Time	Measure – Lagging	Report of Activities and Achievements for 1999/2000	Report of Activities and Achievements for 2000/2001	Report of Activities and Achievements for 2001/2002
<b>Input</b>	Education and training Program resources	\$6.1m cash and in-kind resources	Strategic plan	Actually committed	Cumulative resources used	\$0.53m for 99/2000	\$1.05m for 2000/01 \$1.58m Cumulative	\$1.09m for 2001/02 \$2.67m Cumulative
<b>Process</b>	Industry training	All students to undergo industry induction	Planning of induction	Number of students inducted in year	Cumulative number inducted	Induction program to be planned	Industry placements program being developed (S.Lloyd with Melb. Water on specific project)	Industry placements program being developed
<b>Outputs</b>	PhD program	12 full scholarships 12 top-up scholarships	Number planned	Number in year	Cumulative number Awarded	Two rounds of scholarships advertised. Lloyd, Muthukumaran, Anderson, Ghali awarded scholarships and/or top-ups during 99/2000.	Five rounds of scholarships advertised [Aug., Sept., Oct., Nov. 2000; Mar/April 2001], Best, Etchells, Gooch, Grudzinski, Lymburner, Newton, Ramchurn, Thomsen White C. awarded scholarships and/or top-ups. 13 Cumulative total scholarships/top-ups.	One round of scholarships advertised [Oct 2001] Biggin, Griffith, Henderson, Johnson, Judd, Potter, Taylor, D. Woods awarded scholarships and/or top-ups.  21 Cumulative total scholarships/top-ups.

## Management Structure and Arrangements

Nature of Indicator	Performance Indicator	Target over life of Centre	Measure – Leading	Measure – Real Time	Measure – Lagging	Report of Activities and Achievements for 1999/2000	Report of Activities and Achievements for 2000/2001	Report of Activities and Achievements for 2001/2002
<b>Outcome</b>	Continuity of long term research effort	Satisfaction of Parties	Survey of Parties satisfaction	Annual Party survey results	Cumulative results	Survey to be planned.	Survey to be planned. (CRC Parties included in Communication survey in 2000/01)	Board reviewed its performance in 2001/02. Parties' further survey to be planned.
<b>Input</b>	Total cash and in-kind resources in general administration program	\$2m cash and in-kind	Strategic plan	Actually committed	Cumulative resources	\$0.54m total expenditure 99/2000.	\$0.35m total expenditure 2000/01. Cumulative total \$0.89m	\$0.41m total expenditure 2001/02. Cumulative total \$1.30m
<b>Process</b>	Governing Board	Representatives for each Party Majority of user and independent members on Governing Board	Chair and number of members	Number of meetings held in year	Performance review	Each Party* represented on Governing Board. Two independents appointed (in addition to independent Chair) Independents and users form majority on Board (3 independents, 8* users, 4 research providers) (*3 Rural Water Authorities share one Board representative)	Each Party* represented on Governing Board. Two independents appointed (in addition to independent Chair) Independents and users form majority on Board (3 independents, 8* users, 4 research providers) (*3 Rural Water Authorities share one Board representative)	Each Party* represented on Governing Board. Two independents appointed (in addition to independent Chair) Independents and users form majority on Board (3 independents, 8* users, 4 research providers) (*3 Rural Water Authorities share one Board representative)
	Occupational Health and Safety	Incident and accident free workplaces	OH&S training. Risk identification and assessment procedures	OH&S to be part of project meetings and reviews	OH&S incident/accident performance	First Aid courses attended by selected staff and postgrads.OH&S field policies from Parties used to aim at overall compliance for visiting researchers	First Aid courses attended by selected staff and postgrads. OH&S field policies from Parties used to aim at overall compliance for visiting researchers	First Aid courses attended by selected staff and postgrads. OH&S field policies from Parties used to aim at overall compliance for visiting researchers Project management course held for postgraduates, April 2002
	Project management skills	All program/project leaders to attend one course	Selection and planning of Project Management/ leadership training for Program/projects	Number of project leaders attending training courses in year	Cumulative number of program/project leaders who attended courses	New Program/Project leaders to be invited to attend training courses where appropriate.	Budget provided for Program/Project leaders to attend training courses where appropriate.	Budget provided for Program/Project leaders to attend training courses where appropriate.

# Performance Indicators

## Management Structure and Arrangements continued

Nature of Indicator	Performance Indicator	Target over life of Centre	Measure – Leading	Measure – Real Time	Measure – Lagging	Report of Activities and Achievements for 1999/2000	Report of Activities and Achievements for 2000/2001	Report of Activities and Achievements for 2001/2002
<b>Outputs</b>	Financial management	Programs and projects within budget	Program budgeting for year ahead and three years	Budget versus actual performance within year	Cumulative income and expenditure budget performance	<p>Program budgeting: Program budgeting for initial projects on three year basis. Program budget approved May 2000 Board (14 projects)</p> <p>Project Budget performance: All projects under budget for 99/2000.</p>	<p>Program budgeting: Program budgeting for initial projects on three year basis. Program budget approved May 2001 Board (21 projects)</p> <p>Project Budget performance: 17 projects under cash budget for 2000/01. Total cash 83% of budget.</p>	<p>Program budgeting: Program budgeting for initial projects on three year basis. Program budget approved May 2002 Board (22 projects)</p> <p>Project Budget performance: 12 projects under cash budget for 2001/02. Total cash 95% of budget.</p>
	Monthly, quarterly and Annual report on time	Completion by required dates each year	Preparation of reports	Timeliness within year	Cumulative performance	Parties provided monthly cash reporting Quarterly in-kind reports submitted in time.	Parties provided monthly cash reporting Quarterly in-kind reports submitted in time.	Parties provided monthly cash reporting Quarterly in-kind reports submitted in time.