CATCHMENT MODELLING TOOLKIT

The Cooperative Research Centre for Catchment Hydrology is developing the know-how to manage catchments in a totally new way. A key part of our plan is to produce a new generation of catchment models and modelling support tools, integrated within a system of software known as the Catchment Modelling Toolkit.

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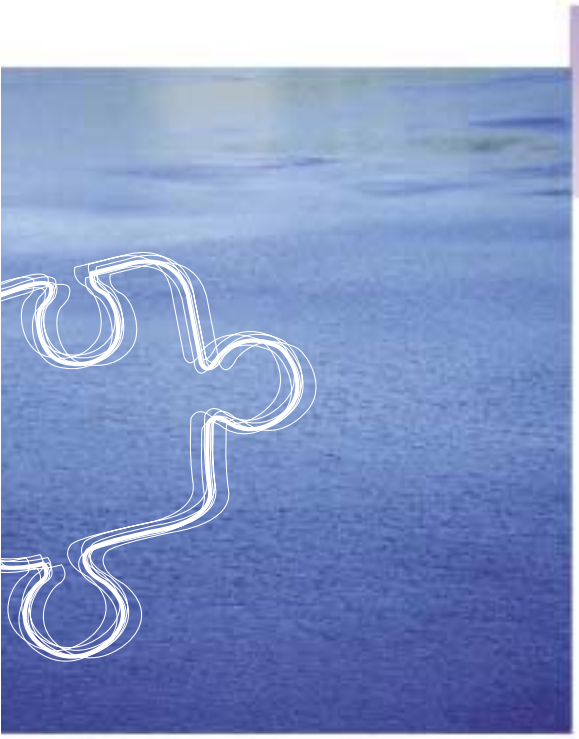
NOVEMBER 2001

A GROUND SWELL OF AUSTRALIAN CATCHMENT MANAGERS, MODEL USERS AND MODEL DEVELOPERS ARE SUPPORTING THE DEVELOPMENT OF AN INTEGRATED MODELLING TOOLKIT FOR CATCHMENT PREDICTION



PURPOSE OF THE TOOLKIT

The Catchment Modelling Toolkit is a system of software intended to improve the standard and efficiency of catchment modelling. The system includes:

- A library of models that can be applied to various catchment management problems (at a variety of time and space scales).
- A library of modules that can be linked together to form models.
- A development environment for programmers to write modules and models (and associated documentation) to a specified standard.
- A suite of data generation and manipulation tools to support catchment modelling.
- A set of standards for storing data used in catchment modelling.

These products will be supported within a software framework that permits easy selection and linkage of catchment modelling tools. Other relevant features of the Toolkit include:

- The adoption of professional software engineering standards.
- An integrated 'look and feel' to the various software products.
- Guidance on matching software tools to particular modelling problems.
- Public-domain licensing arrangements for most of the software.
- Ready access to the software via an advanced web site.
- A program of education and training for end-users.

IMAGINE IF YOU COULD LINK A RANGE OF MODELS TOGETHER TO PREDICT CATCHMENT BEHAVIOUR

PROGRESS SO FAR

The idea of developing a Toolkit grew out of major consultation exercises with the key land and water management and research groups around Australia, each of which progressively added technical detail to the idea.

The Toolkit project has been underway for just under two years. In 2000, the emphasis was on assessing end-user needs and reviewing national and international developments in modelling toolkits for natural resources management. On the basis of our review, we selected several frameworks to review.

Over the last year we have evaluated these candidate frameworks against end-user's catchment modelling requirements. After extensive testing we have chosen two frameworks known as Tarsier and ICMS. These will be described in the next Toolkit Bulletin.

The Toolkit project is an initiative of the CRC for Catchment Hydrology, made up of the following parties:

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

OUR GOAL IS TO HAVE A PILOT TOOLKIT DEVELOPED BY THE END OF 2002

IMAGINE IF WE WERE ALL WORKING TOWARDS DEVELOPING MODELS THAT WERE COMPATIBLE

CURRENT PRACTICE IS HOLDING US BACK

To manage catchments better we need improved modelling technology. A recent survey of Australian catchment managers, model users and model developers reveals the following things about the state of catchment modelling in the late 1990's:

- There are almost as many models as there are modellers, and there is significant duplication of effort in model building.
- The standard of computer code employed in these models, and their supporting documentation is generally poor.
- User interfaces are generally poor and inconsistent in their design and function.
- There are no agreed standards on how to code, document and deliver the models to end-users.
- Virtually no holistic modelling is being undertaken at large spatial scales, partly due to the lack of a suitable paradigm for linking models.
- Access to many catchment models is restricted.

The Catchment Modelling Toolkit is being designed to overcome these problems. It will help the land and water industry to manage catchments better.

TOOLKIT USERS

We envisage three different kinds of users of the Toolkit:

MODULE CODERS – people who write code that form parts of models.
MODEL BUILDERS – people who build models by piecing together modules.
MODEL USERS – people who apply configured models to problems.

Different software products in the Toolkit will be tailored to meet the various needs of these user groups.

SHARED BENEFITS

There are several expected benefits of a Catchment Modelling Toolkit:

- It will reduce duplication of effort in catchment modelling.
- It will improve the quality and currency of model code.
- It will make catchment models much easier to build, access, understand and use.
- It will lead to greater consistency of modelling for particular problems and scales.
- It will enhance response and delivery times in catchment modelling projects.

Most importantly, the Toolkit will improve our ability to integrate models that emphasise different aspects of catchment function. This will enable a more holistic approach to catchment modelling and management.

THE TOOLKIT PROJECT TEAM

The team is led by Robert Argent from Melbourne University and includes Rob Vertessy, Susan Cuddy, Joel Rahman, Shane Seaton, Frances Marston, Fred Watson, Daniel Figucio and John Coleman (CSIRO Land and Water), Roger Braddock (Griffith University), John Ruffini (NRM, QLD), Alex Lau and Christian Maul (NRE, VIC), Mark Littleboy and Geoff Podger (DLWC, NSW) and Roger Hadgraft from Monash University.

GETTING INVOLVED

This bulletin represents our first step in creating further awareness and support for the Toolkit concept. Please pass this on to colleagues who may be interested. More bulletins are available by contacting David Perry on 03 9905 9600.

You can register your interest on-line at www.catchment.crc.org.au/toolkit. You will then be sent regular updates on the progress of the Toolkit project.

Alternatively, you can contact:

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COOPERATIVE RESEARCH CENTRE FOR
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