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Predicting Catchment Behaviour

Project 1.1: Development of a Catchment Modelling Toolkit

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Introduction

The Catchment Modelling Toolkit (www.toolkit.net.au) is a new and innovative direction in the arena of modelling to predict catchment behaviour. It represents a significant step forward over existing alternatives and, as it develops further over coming years, will provide an expanding set of flexible tools to support the sustainable management of Australia's land and water resources. The tools and information available from the Toolkit web site represent the accumulated advances of years of work commencing in 1999 and continuing beyond the CRC for Catchment Hydrology research activities of 2003-2006.

The application of the Toolkit concept and products to catchment management provides a flexible approach to catchment modelling. Models are created by fitting together model parts (modules) so that modelling solutions are tailored to management problems. Additionally, commonly grouped modules are developed and deployed as specific applications to meet particular industry needs. As an example of this process, a prototype whole-of-catchment modelling system, called the EMSS (Environmental Management Support System) was applied to the five Focus Catchments, primarily through the land and water management agencies who are parties to the CRC for Catchment Hydrology. Dealing with the limitations of the EMSS – such as fixed model formulations and structures – provided valuable information for the CRC in developing a suite of more flexible management tools and modelling methods.

Research focus

The Catchment Modelling Toolkit was born from extensive review and research. Over the period 2000-2002 a substantial research effort was undertaken in this project to investigate:

- the feasibility of such a concept,
- the toolkit-type approaches that existed at that time in research and application fields,
- the modelling needs of the land and water industry, and
- the kinds of software science required to make the Toolkit a success.

Traditionally, models related to the prediction of catchment behaviour have been developed to deal with specific research problems or locations, and were developed in times when modern software engineering practice was in its infancy. This resulted in a legacy of models with a high diversity of operational features (eg data formatting, time stepping, spatial structure, and parameter input), despite often strong similarities in problem focus, data requirements and output interpretation. Further, models were often developed and used without relevant protocols for

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