



# E2 Catchment Modelling Framework

Issued June 2007

*EPA 704/07: This information sheet is part of a series (703 and 705). It explains the E2 catchment-modelling framework which has been used by the Environment Protection Authority's Watershed Protection Office to develop the Mount Lofty Ranges E2 Model which will monitor and analyse water quality in the Mount Lofty Ranges Watershed.*

## Introduction

E2 is a suite of software tools that analyses specific aspects of catchment management. It is a decision support tool that, when used in conjunction with on-ground monitoring and local knowledge, is a valuable resource.

E2 is the catchment-modelling framework used for the development of the Mount Lofty Ranges E2 Model. The framework underpinning E2 is part of an Australia-wide modelling framework. This national framework is supported with comprehensive documentation and resources to ensure its ongoing success well into the future.

E2 has the modelling capacity to undertake whole-of-catchment analyses, covering a wide range of water and land management issues. It can be applied in estimating present runoff and pollutant loads, and in evaluating the effectiveness of the actions being implemented to improve water quality at a whole-of-catchment or sub-catchment level.

E2 is designed for application in a range of catchment sizes, from backyards to areas covering thousands of square kilometres.

E2 provides capacity to model such scenarios as:

- changes in land use
- changes in land management
- modification of riparian zones
- construction of wetlands, dams, etc
- modification of flow regimes or water management
- climate change and variability.

It can simulate the effects of the above scenarios on outputs, such as fluxes and yields of both water and constituents, for example, Total Nitrogen.

E2 was designed to allow modellers and researchers to construct models by selecting and linking component models from a range of available choices. It enables a flexible modelling approach, allowing the attributes and detail of the model to vary in accordance with modelling objectives. This is in contrast to many catchment models, which are 'hard-wired' with algorithms that may not be appropriate for another catchment, or do not allow for the reuse of prior modelling knowledge.

E2 was developed between 2000 and 2005 by the Co-operative Research Centre for Catchment Hydrology (CRCCH) for resource managers to assess the hydrologic impact of a variety of land uses and to make water management decisions on a whole-of-catchment scale.

## Spatial representation

- **Sub-catchments** are the basic spatial unit in E2. They can be divided into 'functional units' based on a common response or behaviour (for example, land use, soil type, etc)
- **Nodes** represent sub-catchment outlets, stream confluences, or other places of interest (for example, stream gauges, sampling sites)
- **Links** connect nodes and may represent river reaches or reservoirs.

## Data requirements

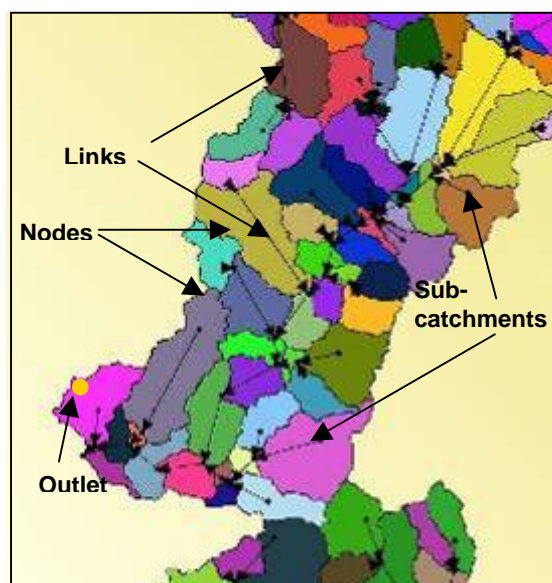
Input data are specific to the selected component models and typically consists of climate, topography, land use and land management practices.

## Target user group

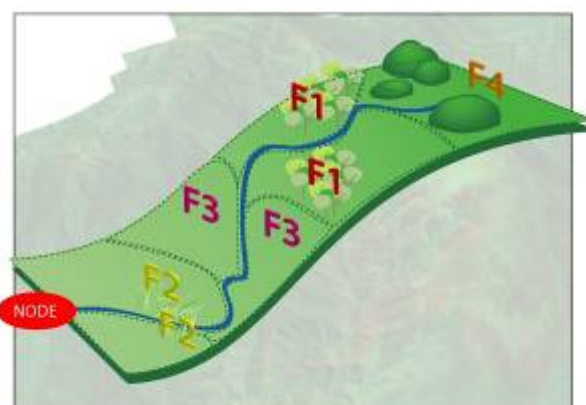
E2 is designed for researchers, modellers and consultants who are constructing tailored models for particular catchment management problems.

## Limitations

E2 does not have the functional capabilities to undertake regional groundwater, ecological or sophisticated economic modelling or complex water management for regulated systems.



E2 Model output representation of 'Sub-catchments', 'Links' and 'Nodes'



'Functional units' (F1, F2, etc) in a 'sub-catchment'. The watercourse represents the 'link' leading to a 'node'.



Staff at the EPA's WPO working with the MLR E2 Model.

## eWater

The South Australian Environment Protection Authority (EPA) through its Watershed Protection Office is a member of eWater CRC or Cooperative Research Centre. Concentrating on the WATERCAST product area, EPA is aiding the development and improved functionality of E2, including constituent transportation, in stream transformation and stormwater/groundwater interactions.

## Related readings

South Australian Environment Protection Authority 2007, [EPA Information Sheet—Mount Lofty Ranges E2 Model](#), EPA, Adelaide, viewed 5 June 2007, <[www.epa.sa.gov.au](http://www.epa.sa.gov.au)>.

—2007, [EPA Information Sheet— Frequently asked questions about the Mount Lofty Ranges E2 Model](#), EPA, Adelaide, viewed 5 June 2007, <[www.epa.sa.gov.au](http://www.epa.sa.gov.au)>T.

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## FURTHER INFORMATION

For further information go to <[www.toolkit.net.au/e2](http://www.toolkit.net.au/e2)> or <[www.epa.sa.gov.au/watershed](http://www.epa.sa.gov.au/watershed)>.

You can also contact:

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