About Source

What is Source?

Welcome to Source - an application that can be used for both catchment and river modelling. Source provides a flexible structure that allows you to select a level of model complexity appropriate to the problem at hand and within any constraints imposed by your available data and knowledge. You can construct models by selecting and linking component models from a range of available options.

Source is designed to:

- Support the construction and operation of river models that mimic river behaviour. Water resource systems can be analysed for periods that range from days to many years; and
- Allow you to construct and interrogate water and contaminant transport models to assess the impact of future change, on parameters of interest.

You can build various kinds of scenarios, including:

- Basin planning scenarios,
- River Operator scenarios, which are intended to support day-to-day operations; and
- Catchment scenarios, which are intended to model water quality constituents (eg. salinity).

Note: There are two versions of Source versions available - a version that allows unrestricted access to all parts of Source, and **Source (public version)**, that provides limited access. Refer to Source versions for more information on what is available in both.

Target audience

Source is designed for managers, researchers, modellers and consultants to develop computer simulation models of rivers and catchments so as to firstly, understand and explore important aspects of their behaviour and secondly, guide decision making.

To use Source, you should have a good working knowledge of catchment hydrology, integrated catchment modelling, river systems and river system modelling and, preferably, the support of experienced users. This reference manual assumes you have a basic knowledge of mathematics, physics and chemistry equivalent to completing high school or introductory tertiary courses.

Information produced by Source may be useful for a broader audience of people, including:

- Management and government representatives who want to understand how and where model results were obtained;
- Clients, such as resource managers (of catchments or water), water planners and operators, who rely on a model's results but are not necessarily interested in the detail of the model development process. They are often, however, interested in understanding general configuration and application issues;
- People affected by decisions supported by model results or who have a general interest in water use in a river system (eg irrigators or environmental groups); and
- People with an interest in water science, who may use model results and want to understand the model's behaviour.

History of Source

Since its original implementation as the E2 Modelling Framework, Source has transformed over the years to incorporate the management of catchments and rivers. The framework was originally a basic set of model selection, analysis and scenario tools. Later on, it was split into catchments (under the name WaterCAST) and rivers (Source Rivers). WaterCAST extended the original E2 modelling framework with new models and scientific functionality. WaterCAST was renamed Source Catchments in its first public release, in July 2010.

Source Rivers incorporated River Manager and River Operator, and together, they dealt with the management of river systems. Source Rivers was combined with Source Catchments to create Source in 2011.

Appropriate applications

Source can be used to:

- Construct river system simulation models that trace water movement through a river system over time;
- Track the ownership of water volumes as they move through a system;
- Understand the generation, transport, transformation, and fate of nutrients and other pollutants; and
- Develop, test and refine management interventions to improve water quality in rivers and reduce pollutant loads to receiving waters.

Generally, Source models are run over periods of the order of years (eg. 100 year simulations) and on either monthly or daily time-steps. Other simulation period lengths and time-steps can be used as are appropriate for the issues being investigated.

As a Source user, you should be familiar with modelling issues such as:

- Detail/resolution requirements and capabilities;
- Choice and application of suitable rainfall runoff, constituent generation and filtering models;
- Choice and application of suitable models for runoff routing and in-channel processing;
- Implications of linking component models together; and
- Uncertainty in data and parameters, and the propagation of uncertainty through to results.

In the case of river operations, you should also know about:

- The daily operation of a river system including flows, dams, weirs, and power plants; and
- The likely response of the river system to operational changes.

It is strongly recommended that you attend Source training to become familiar with how it operates, along with its capabilities and limitations.

Source limitations

Source embodies a new approach to catchment modelling that encourages not only a new way of thinking about constructing models, but also about managing catchment management problems. As with all models, however, there are limitations:

- Source adopts a particular conceptual framework, which may not be appropriate for all problems;
- Source models are built from components. Users need to choose components to build a model to simulate those aspects of river and catchment behaviour that are of interest. Useful models can only be constructed where components are available and where the appropriate components are selected;
- Reliable models also require data that can be used for validation, calibration and checking; and
- Source is not suitable for detailed hydraulic or ecological modelling.