

RiverManager product

P2

Project Leader: Alice Brown

The role of Project P2 is to develop a platform for eWater's development of the next generation of river planning, management and operation tools, and to develop a specific application, the RiverManager – a model, which river planners and managers can use improve the way they do their work.

Project summary

Several enterprise models have been developed that allow natural resource managers to plan and manage water resources in river valleys. The use of different models makes the management of water difficult at a whole-of-basin or cross-jurisdiction scale. As well, these models are being implemented in an increasingly complex environment, with the number of consumptive users rising, water-sharing becoming more complex, the environment entering the arena as a water user, and climate variation and change affecting risk assessment. This increasing complexity will, in the future, create challenges for the existing enterprise models. Project P2 is developing a new enterprise model that can be adapted to meet the needs of river planners and managers across Australia, which can be used to effectively manage a complex water sector, and which facilitates interactions with river operators.

Project P2 is carrying out two major streams of development, for:

- a river system model and associated platform architecture that will underpin the products of both Project P1 and Project P2, and
- the RiverManager, a model designed for use by river planners and managers.

Components are being developed or modified to create the river system model and its associated platform that represent:

- the routing of water and water quality through channels and multiple other flow paths and sources;
- weir operations, including head-driven processes;
- water demand: irrigation, urban, environmental, hydropower;
- catchment inflows to the river system;
- surface water and groundwater interactions;
- river and floodplain or wetland interactions.

Development for the RiverManager model will focus heavily on model customisation so that users can

assemble a physical model of a river network. They will be able to configure water management components describing resource assessment, resource allocation, river flow rules, water accounts, storage operation, etc. Advanced scenario management functionality will also be developed.

The first stage of the project will deliver the functions provided by existing enterprise models but in a new flexible and extensible platform. The second stage of the project will bring in other eWater product and research components to form the RiverManager model.

The product will allow users (who are likely to be staff of natural resource management agencies, CMAs, water authorities and river operators, and researchers) to:

- reproduce the functionality of existing models including IQQM, REALM, and MSM-BIGMOD; the RiverManager model is likely to use slightly different processing methods from some of these models and hence produce some variation in model outputs, which will be clearly explained in the model application;
- order water along multiple supply paths and from multiple storages;
- assign ownership to inflows in storages and share constraints on water availability; transfer ownership in storages and en route to users; and reassign ownership in storages and in stream;
- assess current and future water availability and quality;
- share 'surplus flows' (those entering the river system from the catchment downstream of storages);
- account for water use and movement; and
- investigate the influence of resource management decisions, in catchments and river systems, on river hydrology and ecology, as well as some economic impacts.

The most powerful feature of RiverManager will be its capacity to introduce and seamlessly link discrete models into one integrated model of a whole river system.

Separately, the discrete models may represent physical movement of water (tributary inflows, groundwater, floodplains), water management (water trade, water accounts) and the environment (ecological responses). Together, as part of the system-wide model, they will allow resource managers to analyse the impacts of changes in the discrete models on the overall system.

Managers will be able to consider the combined effects of multiple influences such as climate change, landscape change and economic change.

The product will deal with water movement under system flow conditions that are both regulated (under the control of a river operator) and unregulated (when system inputs exceed the system demands).

Key achievements 2006

- Scoping of product functions.
- Commenced development of the management functionality components (ownership) and aspects of the interface (graphical network builder).

2007–2008 key deliverables

RiverManager model components:

- ownership function and graphical network builder;
- resource assessment function and customisation of model;
- scenario management;
- unregulated and supplementary flow sharing;
- multi-supply path and reporting components.

The project team

Project leader Alice Brown is a river systems modeller working for CSIRO Land and Water. Alice has previously worked as a water resources engineer with SMEC Australia, and has been involved with a number of projects with NSW DNR. Alice's research interests include the impacts of vegetation changes on streamflow and hydrological modelling.

Please contact her at <alice.brown@csiro.au> for further details on Project P2.

The P2 project team also comprises staff of: Murray-Darling Basin Commission, Goulburn-Murray Water, Queensland Department of Natural Resources and Water, Victoria Department of Sustainability and Environment, NSW Department of Natural Resources, Environment ACT and CSIRO Land and Water.