DEPARTMENT OF
PRIMARY INDUSTRIES

# GROUNDWATER AND SURFACE WATER EXCHANGE IN LOWLAND RIVERS

FACT SHEET

An output of the Landscape Systems platform

Groundwater connection to rivers plays a major role in the health and function of riverine environments in groundwater dependent wetland ecosystems. It also plays a primary role in stream water quality through the delivery of salt and other constituents (e.g., nitrate) to streams. There is not enough information available to develop appropriate groundwater and surface water management strategies to protect these ecosystems in many Australian catchments.

Agriculture Development is funding DPI's contribution to a project that aims to understand and model the fluxes and interaction between groundwater and surface water in lowland streams and rivers. The funding is provided by the ADT program "Integrating Farming Systems into Landscapes"; eWater Cooperative Research Centre (CRC) is leading the project.

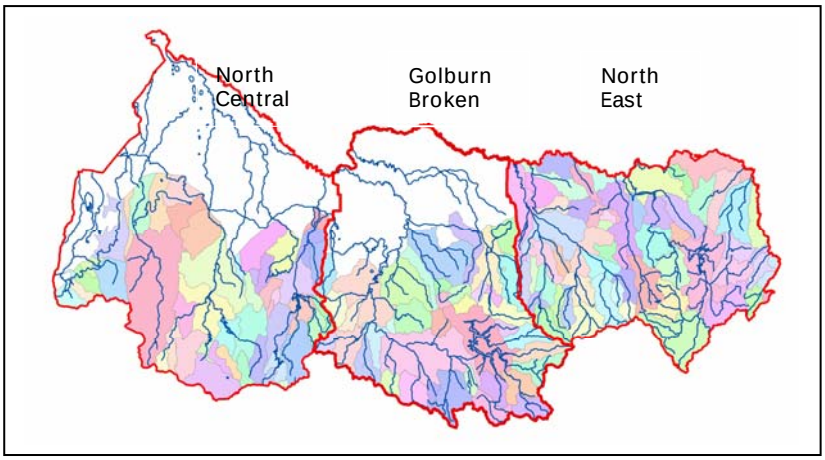


**Figure 1. Model 2CSalt is being applied to three Victorian Catchment Management Authority regions**

## What is the purpose?

This project will use the Catchment Analysis Tools (CAT) to improve our understanding of the near-river processes of groundwater and surface water exchange and model how the exchange fluxes respond to groundwater and surface water management. It will assist river managers to build their capacity to manage river flow while protecting the health of river habitat. The project will also continue the development of the 2CSalt model developed within the former CRC for Catchment Hydrology in conjunction with the Murray Darling Basin Commission (MDBC). The 2CSalt model is included in CAT and determines the impact of land-use and land-use change on water and salt generation from upland areas to streams.

CAT is an interconnected suite of models that operates at a catchment scale to specifically link point-scale land use changes to groundwater systems and stream flows. It was developed to assess the catchment scale impacts of current and new farming systems.

Victoria
The Place To Be

## What have we achieved?

- Stream flow and salinity data for various gauges in the catchments have been obtained and pre-processed for use in the 2CSalt model.
- Statistical measures of hydrological model performance have been incorporated in the calibration process
- The 2CSalt model has been calibrated for the North East and Goulburn Broken catchments
- A catalogue of conceptual models of groundwater-surface water interaction relevant to integrated water resource management has been developed (under peer review)

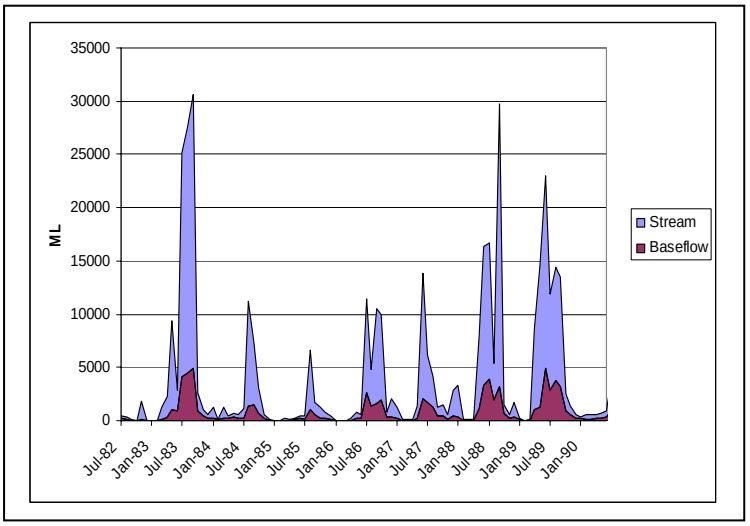


**Figure 2. An example of monthly averaged baseflow separated from stream flow data for Bet Bet catchment**

## Key outcomes:

- Enhanced understanding of near river processes.
- River management capacity building.
- Understanding of the impact of regional groundwater systems management on stream flow quantity and salinity.
- Further improvement of 2CSalt model.
- Improved understanding of hydrological aspects of riverine ecosystems.

## What are the next steps?

- Calibration and application of 2CSalt to continue for other Victorian catchments
- Accreditation of 2CSalt by MDBC for Goulburn Broken and North East CMA regions for salinity accounting planning as part of the salinity audit process.
- Spatial rollout of 2CSalt in collaboration with CSIRO and interstate partners in NSW and Queensland
- A new project beginning in July 2007 will use CAT to produce maps showing the impact of targeted afforestation on stream flow, stream salt load and other hydrological characteristics.

## Want to know more?

### Contact:

**Brendan Christy**
Research Scientist
Department of Primary Industries
RMB 1145, Rutherglen Vic 3685
Phone: (02) 6030 4537
Email: Brendan.Christy@dpi.vic.gov.au

Published by: Primary Industries Research Victoria, Department of Primary Industries
Rutherglen Centre, Chiltern Valley Road Rutherglen Victoria 3685
June 2007

© The State of Victoria, 2007. This publication is copyright. No part may be reproduced by any process except in accordance with the provisions of the *Copyright Act 1968*.

Authorised by: Victorian Government, 1 Treasury Place, Melbourne, Victoria, 3000 Australia
ISBN: 978-1-74199-339-4 (Print)
978-1-74199-340-0 (Online)

**Disclaimer**
This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.