

Restoration, planning and prioritisation product

P6

Project Leader: Dr Nick Marsh

The role of Project P6 is to develop tools that support natural resource management for rivers, through effective planning and design, in both conservation and restoration.

Project summary

Effective natural resource management requires consistent solutions communicated across several different user audiences. The suite of products from the Restoration, planning and prioritisation tools project (P6) is largely designed around providing a consistent strategy and message across a broad range of user audiences and scales (see diagram).

The **Catchment Planning Tool** provides the interface between the Ecological Response Modelling (ERM) framework (see Project R2) and the catchment modelling tool 'WaterCAST' (see Project P5). It will provide solutions for:

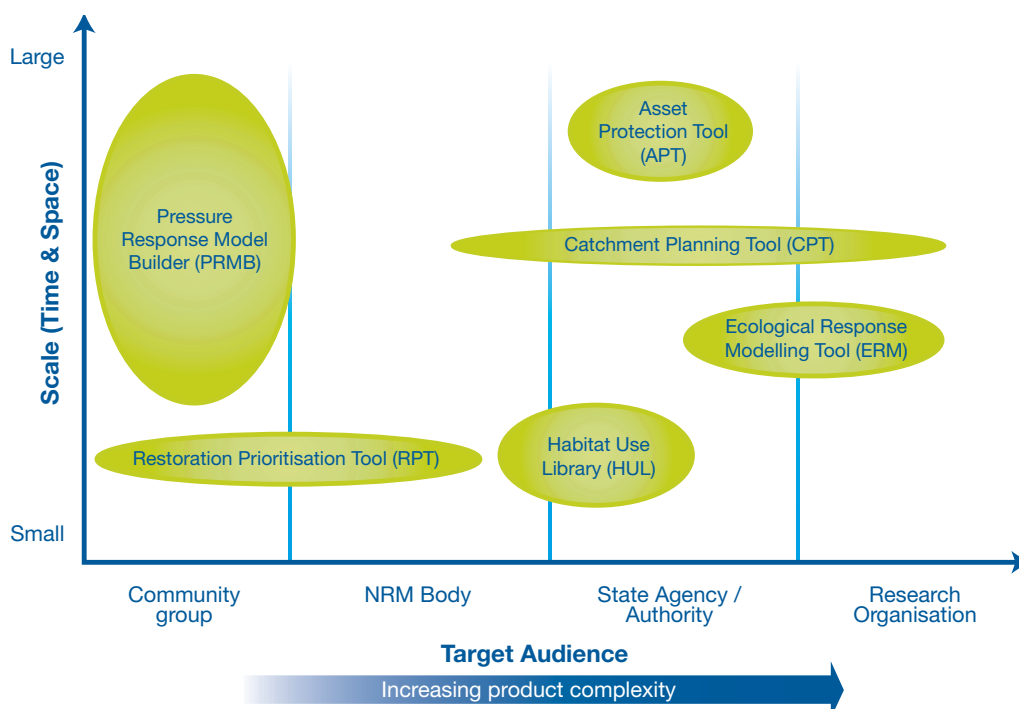
- making the best use of Environmental Water Allocations as part of overall strategies to restore flow regimes, within a broad water management context;
- predicting responses in aquatic ecosystems and water quality resulting from land use changes and water management activities;

- assessing the cumulative impacts of changes to the catchment, including restoration activities such as reforestation, and potential changes in climatic factors;
- assessing the relative roles of major ecosystem disturbances such as drought, floods, fire;
- devising water quality strategies and plans that consider the source and behaviour (spatial and temporal) of contaminants.

The **Asset Protection Tool** is for use to assess the value of ecological assets such as:

- identifying wetlands of high conservation value;
- determining priorities and 'best value' for protection and restoration activities at catchment scale and at more localised scales.

The **Restoration Prioritisation Tool (RPT)** provides guidance on implementing stream restoration activities at the reach scale. In developing the RPT, we recognise that there is a large and growing number of guidelines and manuals. The RPT will not be another one of these, but rather will allow users to find the relevant information from the vast pile that is already available. The RPT is 'Google for restoration', and would be used for:



- deciding on changes to infrastructure and in-stream barriers, to permit freer movement of aquatic biota;
- designing erosion control schemes, stabilising streams and reducing sediment loads that can damage the health of aquatic ecosystems;
- planning floodplain and wetland restoration, including structural works, water management and land management actions; and
- managing aquatic alien species and weeds.

The **Ecological Response Modelling (ERM) tool** is a stand-alone product that will allow the scientific community to publish quantitative models of ecological response, and NRM organisations to run those models. The ERM tool is essentially an interface on the ERM framework being developed in Project R2, giving users direct access without having to develop scenarios through the WaterCAST catchment modelling tool as is the case with the Catchment Planning Tool. For example, a scenario of considering climate change impacts on the distribution of Cane Toads may not require a catchment hydrological model. The ERMT is the general case; the specific implementation for catchment management is called the Catchment Planning Tool (see above).

The **Pressure Response Model Builder (PRMB)** is intended primarily as a communication tool. Users will be able to create and view dynamic (e.g. cartoon style) conceptual models to see the expected consequences of alternative management actions. It will be a way of visualising effects of management options on habitat, via flow or water quality, and the resulting impacts on species or ecosystem services.

The pressure response model builder provides a simplified generalised summary that is immediately usable. It is qualitative, compared to the quantitative ERM tool, and will be of use to technical officers as well as scientists, managers and regional CMA staff.

The Habitat Use Library (HUL) is a collection and collation of information about the habitats needed for the life-cycles of individual species. This information forms the basic underpinning of many quantitative ecological response models used in the ERM Tool and Catchment Planning Tool. Rather than simply collect and collate this information as numerical models, the HUL will present the basic information as a separate product, recognising that the observed habitat use criteria form a very sound basis for past stream management decisions and are likely to continue to do so in cases where quantitative modelling is not acceptable. The library builds on the wealth of information already available, making that knowledge more directly accessible to its users, who will include technical officers as well as scientists, managers and regional CMA staff.

Key achievements 2006

- Delivery of Version 1 of the Ecological Response Modelling Tool.
- Delivery of prototype Pressure Response Model Builder.

2007–2008 key deliverables

- Version 1 of the Asset Protection Tool.
- A revised version of the Ecological Response Modelling Tool
- Specifications for the Catchment Planning Tool.

The project team

Project leader Dr Nick Marsh is based at CSIRO Land and Water in Brisbane. Until recently, he was Chief Scientist for Freshwater and Marine Sciences with the Queensland EPA. Nick's focus in recent years has been to adapt existing research to develop operationally useful tools to support sound natural resource management. He has developed widely used tools for such activities as river analysis, allocating environmental flows and predicting ecological responses

Please contact him at <nick.marsh@csiro.au> for further details on Project P6.

The P6 team also comprises staff of: Griffith University, Monash University, University of Canberra, The University of Melbourne, SA Department of Water Land and Biodiversity Conservation, NSW Department of Natural Resources, Queensland Department of Natural Resources and Water, Environment ACT, CSIRO, EPA Victoria, Sinclair Knight Merz, Sydney Catchment Authority, Brisbane City Council, The University of Queensland, Murray-Darling Basin Commission, Goulburn-Broken CMA, Queensland EPA, Melbourne Water, Victorian Department of Sustainability and Environment, and regional bodies (Victorian Catchment Management Authorities, Queensland regional bodies, South Australian regional NRM boards).