Water Dependant Ecosystem Risk Assessment Tool (Water-RAT)

Program Overview:

When setting priorities for allocating water resources, investing in on-ground works or protection of water dependant ecosystems, the Department of Water Land and Biodiversity Conservation is required to place these management decisions in a total catchment context.

The State NRM Plan (2006) states "Natural resources management will be most effective when using an *ecosystem approach* that recognises and integrates all the components and processes of ecosystems and their use; and manages these at the appropriate temporal and spatial scales."…" The use of our natural resources in response to social and economic pressures must work within *ecologically sustainable limits* to maintain their life supporting capacity."

EPBC Act (1999) is the main Commonwealth legislation for protecting the environment and conserving biodiversity.The aim of the act is to protect native species, identify processes that threaten all levels of biodiversity and implement plans to address these processes. The Fleurieu Peninsula Swamps and the Mount Lofty Ranges Southern Emu-wren are listed under this Act. Any *new or intensified activities* if they are likely to have a significant impact on these ecological communities requires approval at State level and may also require referral to the Commonwealth.

All management and allocation of water resources must therefore provide a process that places decisions about individual water resources development proposals in a total catchment context and take consideration of existing levels of development and the ecosystems that depend on the resource.

A GIS tool was identified as a means to provide baseline information that would identify significant water dependant ecosystems assets and could incorporate spatial distribution and connectivity issues and associated development threats and risks.

The water dependent ecosystem risk assessment tool (Water-RAT) was developed primarily as a risk assessment framework that integrates environmental condition and process data within a GIS platform to provide a standard approach that can integrate scientific data at varying scales and level of detail. This framework allows consequences to be evaluated prior to making decisions regarding resource allocations.

Data Use:
The data incorporated into Water-RAT was collected through multiple processes. Surface water information was obtained through the interpretation of aerial photography (farm dam mapping, wetland mapping) and aerial videography (watercourse attributes). Water licence approvals and irrigation application estimates were used to obtain values for groundwater use and on-ground site verifications identified significant assets such as critically endangered Southern Emu Wren habitat and the Fleurieu peninsula Swamps.

The following GIS covers are used to evaluate the connectivity between upstream and downstream areas and the potential threats to the ecosystem assets (see Fig.1).

Planning Information

- Stream cover / order (Strahler)
- Digital elevation model (DEM)
- Land parcels / titles (available from the Department for Administrative and Information Services)

Assets

- Permanent baseflow
- Permanent pools
- Fleurieu Peninsula Swamps, conditions: degraded, good, intact
- Southern Emu Wren habitat and location
- Macroinvertebrate river health data (AusRivAS)
- Permian Sands, high value groundwater resource

Threats

- Farm dam surface water capture, (spatial / intensity)
- Irrigation bore usage, (spatial / intensity of use)
- Instream structures, weirs, culverts, bridges, fords
- On-stream pumping stations
- On-stream dams (length)
- Forestry cover (spatial)

Management / Policy Application:
Water-RAT has been used to develop a GIS coverage to assist planning and policy witin the Mount Lofty Ranges. The coverage addresses water affecting activities, water resource use, and ecosystem assets such as the Fleurieu Peninsula Swamps and the Southern Emu-wren populations (listed under the EPBC Act 1999). This coverage will enable a preliminary assessment of the potential impact of a water affecting activity on a site and prescribe a level of

assessment required by the proponent to investigate and address any potentially negative impacts on water resources and significant ecosystems.

The Water Dependent Ecosystem Risk Assessment Tool (Water RAT) developed by DWLBC has defined three risk categories for water affecting activities and incorporates buffer zones that are used to provide boundaries around these ecological assets. The buffer width zones are supported by the findings of Davies, P.M. and Lane, J.A.K. (1995) *Guidelines for design of effective buffers for wetlands on the Swan Coastal Plain.* Report to: Australian Nature Conservation Agency Canberra.
The applications of the following three zones are used for categorising development risks (see Fig.2).

Zone 1, Low risk: GREEN AREA
Defined as area without a mapped wetland. Defined as area with less than 20% of modelled runoff potentially used by farm dams or where intensity of bore irrigation has not potentially exceeded or reached sustainable use limits (State NRM Plan, 2006).

Outcome for developer: A proposal that has negligible impacts provided that it complies with pre-set conditions or a code of practice.

Zone 2, Medium risk: ORANGE AREA
Defined as area where greater than 20% of the modelled run-off is captured by farm dams or where the intensity of bore irrigation has potentially reached or exceeded sustainable use limits (State NRM Plan, 2006).

Outcome for developer: Proposals that may present a risk to sustainable water use and require a hydrological assessment.

Zone 3, High risk: RED AREA
This zone has been defined as containing high value ecosystems and may include potential surface and groundwater stress.

Outcome for developer: Proposals that may present a high on-site or off-site impact and require a rigorous ecological assessment.

The Department of Water Land and Biodiversity Conservation initially developed Water-RAT for catchment management issues in the Mount Lofty Ranges area. This tool provides support information for prescription, policy and licence approvals within the Mount Lofty Ranges, as well as providing NRM boards and local Councils with planning information and guidelines.

Testimonial

"The Development Planning Group of DWLBC assists in the administration of the River Murray Act 2003 and the Natural Resources Act 2004. The WaterRAT CD is used regularly by our group as we assess development proposal that fall within the river Murray Tributaries area. The risk assessment tool allows us to do most, if not all of our work from the desktop. This alone is a significant savings of time and money for our small team.

WaterRAT clearly identifies the matters of concern. As a non-scientific group this is valuable as it is easy for us to not know what to look for in terms of concerns to the environment. WaterRAT clearly shows low, med and high risk areas plus proximity to high sensitive ecosystems (i.e. Emu Wren) which immediately identifies for us the need to dispatch a scientific officer for a complete assessment thus protecting the environment from oversight and errors easily made by administrators not familiar with the area or the scientific concerns."

Yours faithfully,
Kent Truehl
Manager
Development Planning Group
NRM Support Division
Dept of Water, Land and Biodiversity Conservation

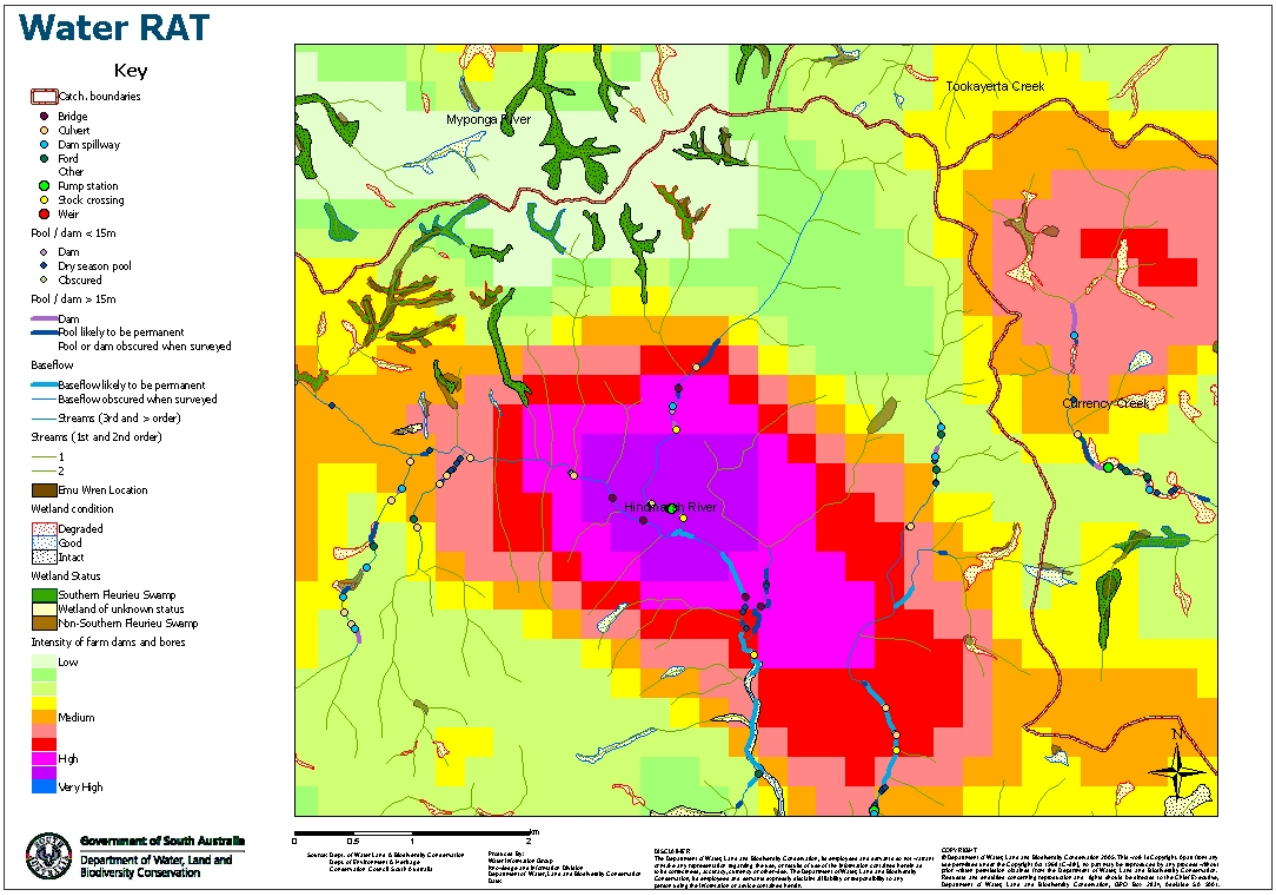

Fig.1 Ecosystem asset / threat coverage

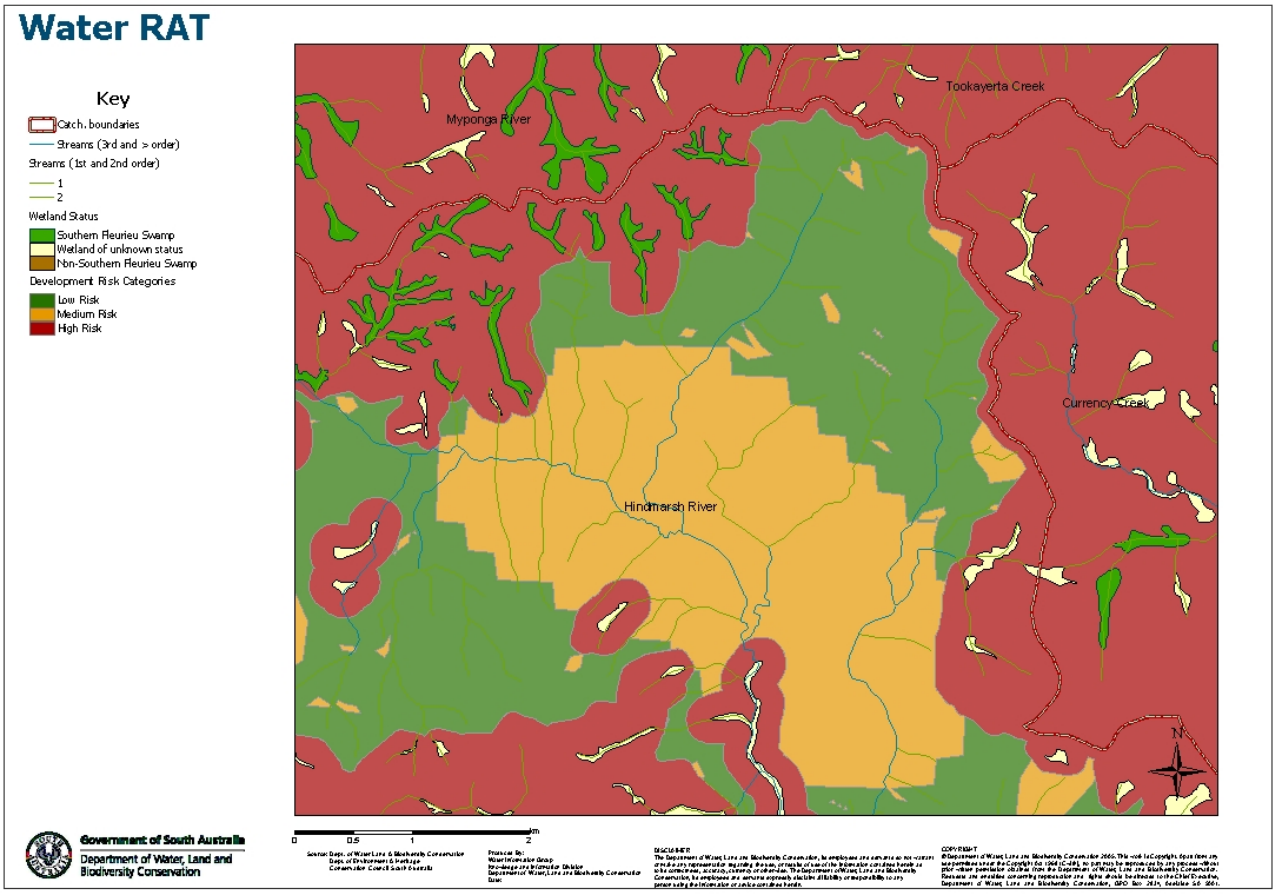

Fig.2 Development risk categories

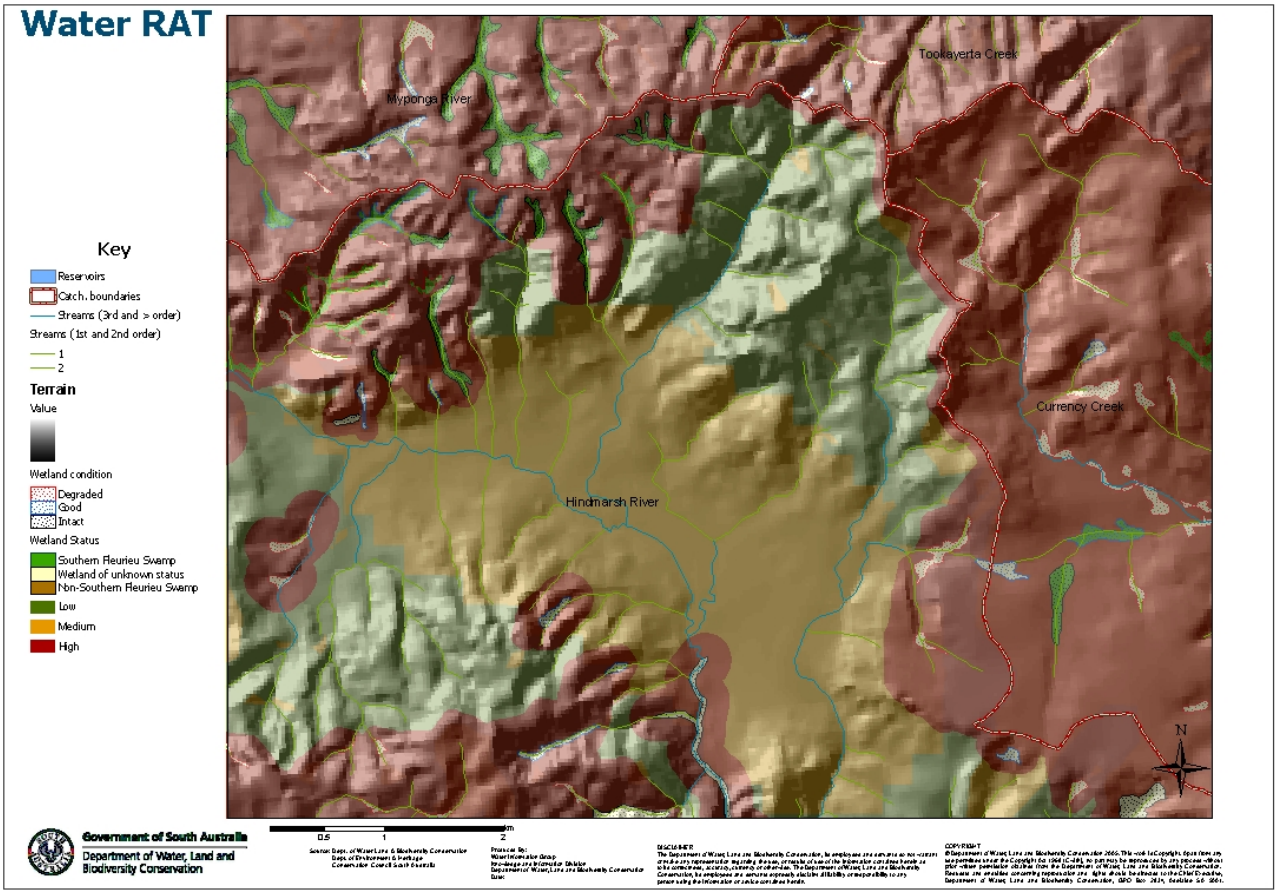

Fig.3 Development risk categories with 'terrain' displaying topography and aspect