NUMBER 017

NDSP TechNote

017

Know-how to tackle salinity for:

- CATCHMENTS

Assessment of a system to predict the loss of aquatic biodiversity from changes in salinity

Project Manager: Ben Kefford, RMIT University

BACKGROUND—WHAT WE WANTED TO KNOW

This project aims to develop and implement a methodology to determine how much maximum salinity can rise from a natural or initial value before unacceptable environmental impacts occur. It set out to trial the development of system that will predict the loss of biota from a rise in salinity.

Broadly, the project targeted natural resource managers, catchment management authorities and researchers to help them prioritise salinity remediation and stream restoration works, with the aim of preserving in-stream biodiversity.

The project was based on the Barwon River Catchment in south-west Victoria and involved staff from RMIT University and the Department of Sustainability and Environment.

OUTCOMES—WHAT WE NOW KNOW

The project has shown that it is feasible to develop a system to predict the loss of aquatic biota from rises in salinity and that acute lethal tolerances do relate to field occurrences. It has identified which taxa are sensitive/tolerant and the need to consider rare species. The project has given an indication of spatial variation in salinity tolerance and provided preliminary information on sub-lethal and critical life-stages.

A mathematical model is being considered in new work to predict the effect of changes in salinity on macroinvertebrates to help catchment managers to conduct ecological risk assessment, set catchment targets to protect aquatic biodiversity and assess the likely ecological effect of management actions that impact on salinity levels.

Methods were developed to rapidly test the relative salinity tolerance of a large number of species (57) although there is still uncertainty as to whether short-term lethal tolerance will relate to field distributions. It was not feasible to conduct experimentation in the field or conduct sub-lethal and critical life-stage test with so many species.

The results are summarised as follows:

- In determining the relative salinity tolerance of a range of aquatic macroinvertebrates, it was found (with a log-normal distribution) there are a few very sensitive species, most species are slightly more tolerant and a minority are extremely tolerant.
- The relative salinity tolerance of specific taxa was also assessed and a group of mayflies and non-arthropods (snails and worms) were found to be the most salt sensitive and macrocrustaceans were the most tolerant.

National DRYLAND SALINITY Program | Know-how to tackle salinity

- Rare species tended on average to be more tolerant than common species.
- It was acknowledged that salinity will affect macroinvertebrates in ways other than their short-term survival. Consequently for a sub-set of species researchers considered sub-lethal effects, longer-term lethal effects and tolerances of potentially more sensitive life-stages (critical life-stages) such as eggs and young. They found that such effects exist and although preliminary, can occur at a salinity of 10–30 per cent of their short-term lethal tolerance.

WANT TO KNOW MORE?

The project produced a number of documents, including:

- A fact sheet summarising findings; and
- A final report for distribution;

Go to:

- **National Dryland Salinity Program: www.ndsp.gov.au**

The National Dryland Salinity Program is jointly supported by the following organisations

Australian Government Department of Agriculture, Fisheries and Forestry
Land & Water Australia
Rural and Industries Research and Development Corporation
MEAT & LIVESTOCK AUSTRALIA
GRDC Grains Research & Development Corporation
CSIRO
MURRAY-DARLING BASIN COMMISSION
LandWater&Wool
CRC FOR PLANT–BASED MANAGEMENT OF DRYLAND SALINITY
National Land & Water Resources Audit
An Initiative of the Natural Heritage Trust

State Governments of South Australia, New South Wales, Queensland, Western Australia, Victoria and Tasmania.

ZOO 15035