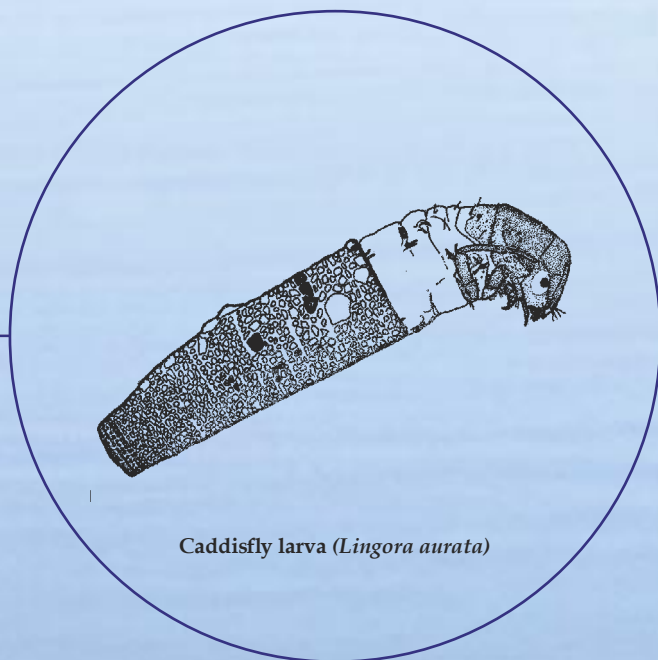


# River Health in the South East



Caddisfly larva (*Lingora aurata*)

## Aquatic macroinvertebrates in the South East

The region is biologically diverse, with more than 350 types of aquatic macroinvertebrates being recorded from 1994–1999. The most common members include nematodes (roundworms), oligochaetes (worms), hydrobiid snails, amphipod crustaceans (*Austrochiltonia australis*), chironomid midge larvae (e.g. *Cricotopus*, *Polypedilum* and *Chironomus* species), caddisfly larvae (e.g. *Notalina spira*, *Hellyethira malleoforma*, *Cheumatopsyche* species), mayfly nymphs (*Koornonga inconspicua*), and freshwater shrimps (*Paratya australiensis*).

Several rare families and types of macroinvertebrates are also found in the region. They prefer cool, permanently flowing, freshwater waterways, conditions that limit their distribution in South Australia. They include stonefly nymphs (*Austrocerca tasmanica*), lymnaeid snails (*Austropeplea tomentosa*), various beetles (e.g. *Hygrobia* species, *Austrolimnius* species, *Haliphus gibbus*) and freshwater crayfish (e.g. *Euastacus bispinosus*).



Hydropsychid caddisfly larva (*Cheumatopsyche* species) need flowing water over their tufted abdominal gills to allow them to breathe.

Photo: M. Marchetti, California State University

Since 1994 scientists from the Environment Protection Authority and Australian Water Quality Centre have been assessing the ecological health of rivers and streams throughout South Australia.

As part of this work, 50 sites in the South East have been assessed. This brochure describes the monitoring methods and the overall condition of the creeks and major drains in the South East.

## The AUSRIVAS Program

This work is part of the AUstralian RIVer Assessment System (AUSRIVAS), and represents the first national biological assessment of river health to be conducted on a continental scale anywhere in the world. It has involved sampling over 6000 sites across Australia, including about 650 sites in South Australia.

## What is river health?

Defining 'river health' is similar to defining human health, as it provides an overall assessment of the health of waterways. It is important to note that the concept of 'health' often has different meanings to different people, and largely depends on each person's values and knowledge. However, for our purposes when we describe river health we are really talking about the ecological condition of a waterway.

*It's not just about rivers, but also includes streams, creeks and earthen drains.*

## How do we measure river health?

We measure river health by comparing the condition of a river to similar rivers of the same type in an undisturbed, unimpacted state (i.e. reference condition). To provide a nationally consistent approach, all States and Territories have used aquatic macroinvertebrates as the major biological indicator group to focus on and model. Our assessments provide a measure of the degree of similarity between the aquatic macroinvertebrates found at each site and those predicted to occur at the site if it were not impacted.



## What are macroinvertebrates?

Macroinvertebrates are aquatic animals without backbones that are large enough to be seen with the naked eye. They include insects, crustaceans, snails, worms, mites and sponges. The insects include the larvae of flying insects (e.g. midges, two-winged flies, dragonflies, mayflies, stoneflies and caddisflies) and adults of some groups (e.g. waterbugs, beetles, springtails). The more familiar crustaceans include yabbies, and freshwater shrimps and prawns.



Scuds or side-swimmers (e.g. *Austrochiltonia australis*) are amphipod crustaceans that are commonly found in drains and creeks in the region.

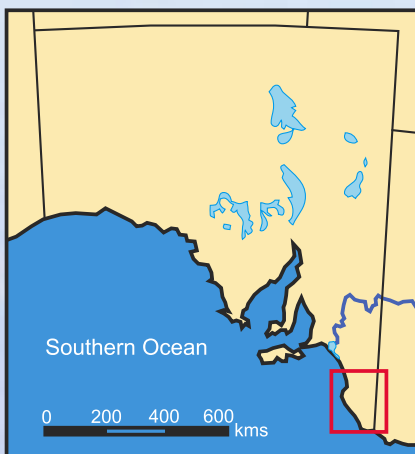
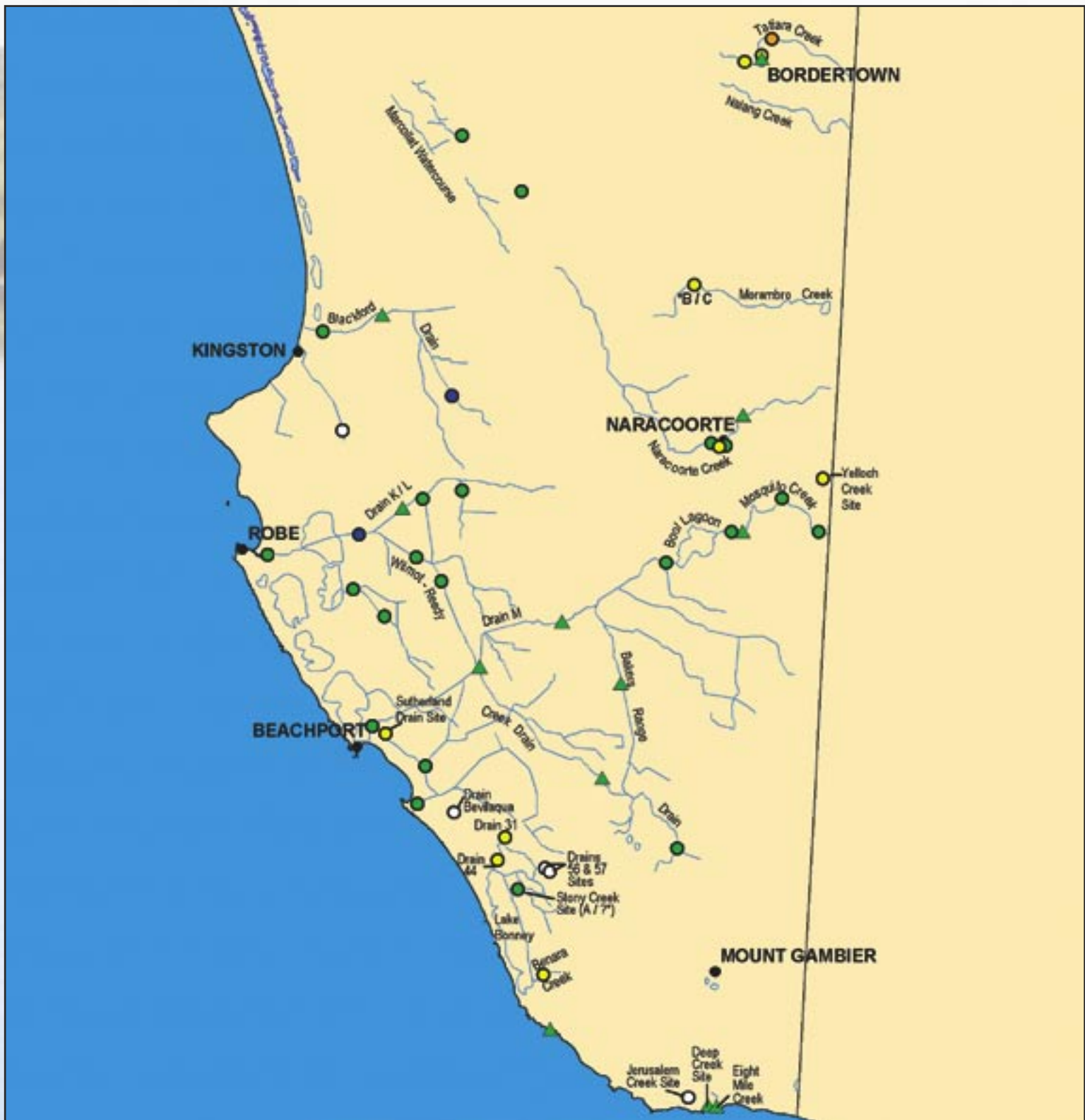
Photo: Cliff White, Missouri Dept. of Conservation

## Why use macroinvertebrates?

Macroinvertebrates are most commonly used in biological monitoring studies because they are common, widely distributed, easily sampled and most can be readily identified by experienced biologists.

## Why worry about river health?

The decline of water quality, blooms of blue-green algae, contamination with pesticides, nutrients and sediment, microbes that threaten drinking water supplies, fish deaths, and the threats posed by increasing salinity are some of the widespread issues that affect many waterways in Australia. This often leads to questions about the overall health of rivers and streams and the actions we should take to improve the environmental condition of our waterways.

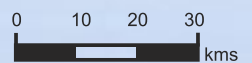


### Site Description

- More biologically diverse than reference sites (needs detailed investigation) (X)
- ▲ Reference site
- Reference condition (A)
- Significantly impaired (B)
- Severely impaired (C)
- Beyond the capacity of current AUSRIVAS models (?)

### Land Type

- Lake
- Land
- Ocean
- River
- Towns
- Streams



\* Site that varies in condition from one year to the next (eg. B / C )

## Riverine environments in the South East



There are in fact no rivers in the 400 km from the mouth of the River Murray to the Glenelg River in the lower South East. This is caused by the geology in the region and effects of sea level changes during the Quaternary Period (i.e. the last 2 million years). This has resulted in the formation of 13 distinct dunes or ranges in the South East that follow the current shoreline in a north-west to south-east direction.

The ranges prevented the natural development of waterways flowing into the sea. The interdunal flats collected the local rainfall in a series of swamps that slowly drained in a north-westerly direction. This meant that a large part of the South East was flooded during winter, sometimes for several months.

This led to the construction of the current network of drains from the 1860s to the present to allow different agricultural and pastoral activities to thrive, as well as human settlement to expand. Drain M is the largest drain in the region. It receives overflow from Bool Lagoon and discharges into the sea near Beachport. Other large drains in the region include Blackford, Drain K/L, Wilmot-Reedy Creek, and Bakers Range drains.



Hydrobiid snails (e.g. *Potamopyrgus antipodarum*) can occur in large numbers in streams and drains in the South East.

Photo: Dan Gustafsson, Montana State University

Several creek systems in the region originate in western Victoria and drain into swamps in the Bordertown to Struan area. They include Tatiara, Morambro, Nalang and Naracoorte creeks, and Yelloch and Mosquito creeks that join together to drain into Bool Lagoon.

In the lower South East there are also a number of coastal creeks (e.g. Eight Mile, Deep and Jerusalem creeks) that are groundwater-fed with very fresh water, and have had their lower sections modified by drains to create connections to the sea. The only other streams of note in the region are Stony and Benara creeks, which drain into Lake Bonney.

The general climate in the South East is Mediterranean with cool, wet winters and warm to hot, dry summers. Average yearly rainfall ranges from more than 800 mm from Mt Burr to Mt Gambier in the south to less than 500 mm from Bordertown to Keith in the north.

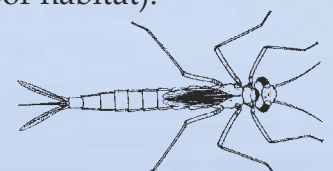
The high rainfall and varied drainage networks create a range of habitats that include permanently flowing coastal streams (e.g. Eight Mile and Deep creeks), slow-flowing permanent waterways (e.g. Drains M and L, Naracoorte and Mosquito creeks), and seasonal waterways (e.g. Bakers Range Drain, Nalang and Morambro creeks).

## River health in the South East

The map provides an overall assessment of the health of individual sites in the region. The results are quite variable with many sites in good condition and a similar number in less than reference condition.

The better waterways include freshwater habitats from Drains L and M, Mosquito Creek, Naracoorte Creek, Reedy Creek-Mt Hope Drain and Jip Jip Waterhole, and saline sites from Jacky White and Blackford drains.

The waterways that rated poorly included Morambro, Tatiara, Naracoorte (urban site), Yelloch and Benara creeks and several coastal drains. Many of these were affected by high turbidity and nutrients, poor habitat structure and altered hydrology. Several drains were also so unusual that they were unable to be assessed by the AUSRIVAS models. They included drains 56 and 57 (paper pulp mill impacts), the drain at Bevilaqua ford (poor habitat) and Jerusalem Creek (high nitrogen, poor habitat).



Peter Goonan is the Project Manager for S.A. and can be contacted at the Environment Protection Authority on (08) 8204 2044. Chris Madden, Paul McEvoy and Daria Taylor provided technical input to this project and can be contacted at the Australian Water Quality Centre on (08) 8259 0336. Bruce Gray from Environment Australia administered this national program and can be contacted on (02) 6274 2526.

Additional details are available at  
<http://ausrivas.canberra.edu.au>  
<http://www.ea.gov.au/water/rivers/nrhp/index.html>



Government  
of South Australia



South Australia

