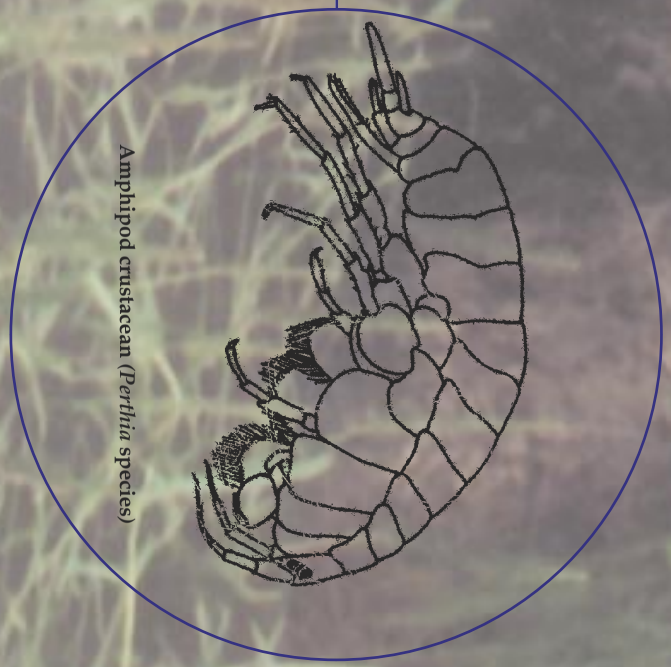
River Health in the Mount Lofty Ranges



Amphipod crustacean (*Perthia* species)

Aquatic macroinvertebrates in the Mount Lofty Ranges

The region is biologically diverse, with more than 500 types of aquatic macroinvertebrates being recorded from 1994–1999. The most common members include oligochaetes (worms), hydrobiid snails, amphipod crustaceans *(Austrochiltonia australis),* chironomid midge larvae *(Cricotopus* and *Chironomus* species), blackfly larvae *(Simulium ornatipes)* and hypogastrurid springtails.

A number of rare types of macroinvertebrates are found in the region. They include several types that live in permanently flowing streams in cool, moist localities, such as caddisfly larvae *(Apsilochorema gisbum, Tasimia* species, *Orphninotrichia maculata, Atriplectides dubius* and *Anisocentropus latifascia),* beetles *(Sclerocyphon fuscus* and *Simsonia leai)* and the worm *(Antarctodrilus proboscidea).* Other rare examples include the snail *Thiara balonnensis* from the North Para and lower reach of Torrens rivers, a rare mite (*Austrotrombella* species) from Tanunda Creek, and a midge (*Aphroteniella* species) and a nannochoristid mecopteran (scorpion-fly) from First Creek.

The baetid mayfly *Cloeon fluviatile* is common throughout the Mt Lofty Ranges.

Photo: M.Marachetti, 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, 192 sites in the Mt Lofty Ranges have been assessed. This brochure describes the monitoring methods and the overall condition of the rivers and streams in the Mt Lofty Ranges that drain into Gulf St Vincent from the Gawler River to Sellicks Hill region.

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.

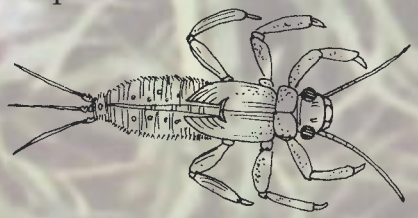
What is river health?

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.

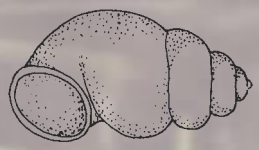
Springtails (*Collembola*) are common on the surface of waterways in the Mt Lofty Ranges.
Photo: M.Marchetti, California State University

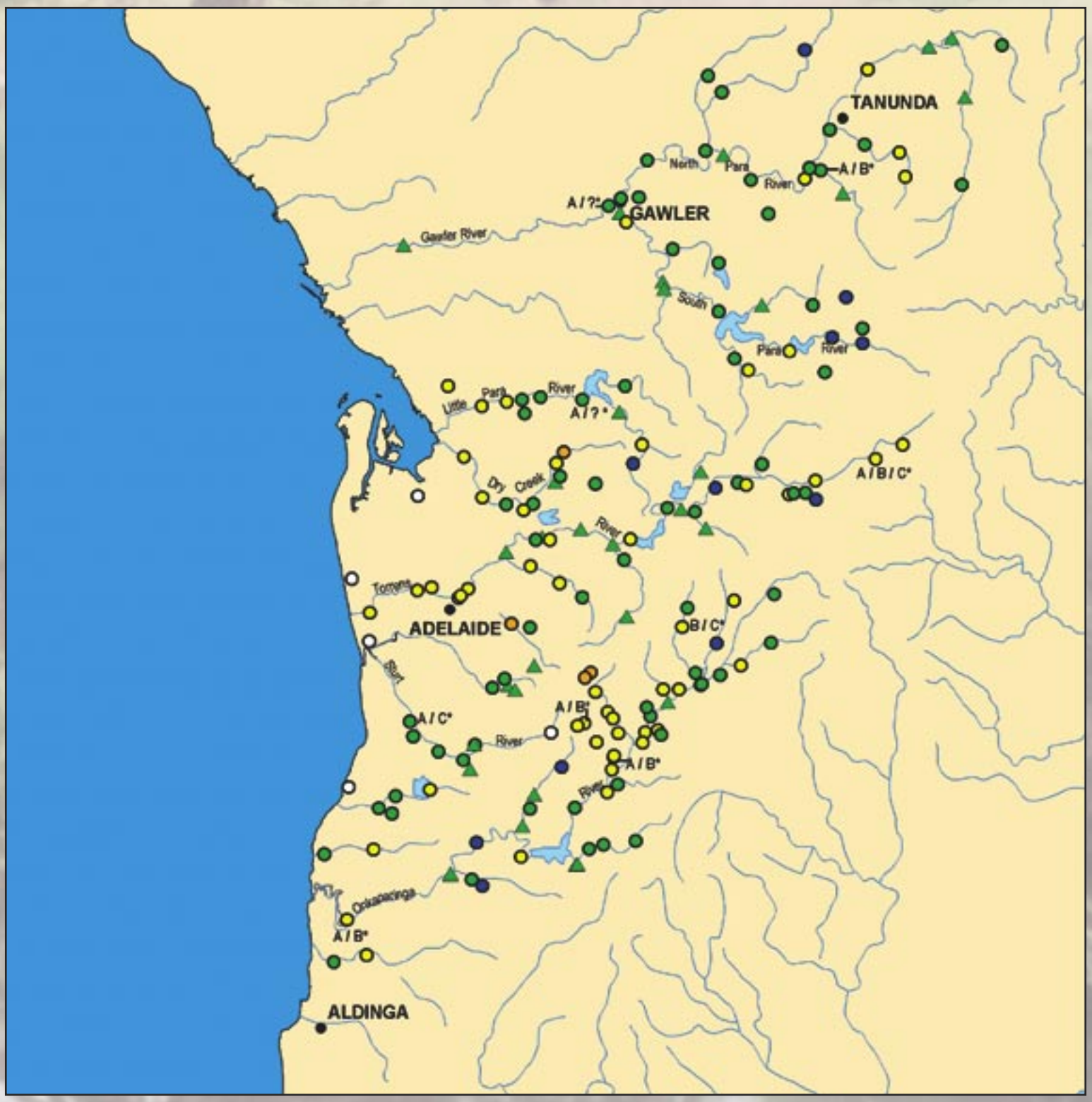
Why use macroinvertebrates?

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

N

0 5 10 15 kms

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

Riverine environments in the Mt Lofty Ranges

The major physical features of the Mt Lofty Ranges are the prominent linear uplands region, which runs from north to south-west, and several different benches and coastal plains. This landscape displays the effects of a number of geological faults and the processes of weathering, erosion and deposition of sediments over many millions of years.

The general climate of the region is highly variable due to the effects of air movement over the ranges. This results in the Adelaide Plains and Mt Lofty Ranges receiving significant rainfall for several months. However, during summer, prolonged dry spells for 2–3 months occur in the region. Mean annual rainfall ranges from as high as 1600 mm at the summit of Mt Lofty to less than 400 mm near the coast at Port Adelaide.

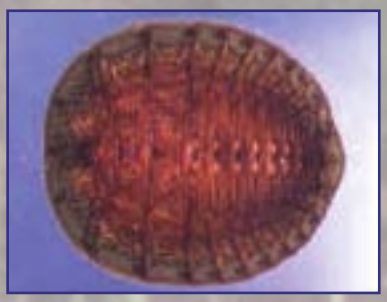
The major freshwater streams from Gawler to Sellicks Hill that drain into Gulf St Vincent include the Gawler, Little Para, Torrens, Sturt and Onkaparinga rivers and their many tributary streams. Other smaller systems in the region include Cobbler, Dry, Glen Osmond, Brownhill, Pedler, Christies and Pt Willunga creeks. The high rainfall in the ranges creates near-permanent water in many of these waterways, although, over summer, most cease to flow and some of the smaller coastal streams dry completely for several months.

Water from the River Murray is pumped into the Torrens and Onkaparinga rivers via pipelines and transferred to reservoirs to supplement the metropolitan water supply. This often creates unseasonal flows, whereby flowing water habitats may persist throughout the year for long periods in each waterway. The Sturt River and Hahndorf Creek receive regular discharges of treated sewage effluent, which also results in near-permanently flowing sections of waterway near these inflows. It should also be recognised that the flows of River Murray and effluent water are of very different water quality compared to the natural flows in waterways in the region.

River health in the Mt Lofty Ranges

The map provides an overall assessment of the health of individual sites in the region. The better waterways were generally from catchments with large proportions of native vegetation such as Scott, Bakers Gully, Echunga, Brownhill, Sixth and Jacob creeks, the rural section of the Little Para River, parts of the North Para River and most of the main channel of the Onkaparinga River. A number of urban sites on Dry Creek and the Torrens River from Silkes Road to Windsor Grove were also in good condition on most occasions. The more biodiverse sites were generally from the mid to upper reaches of streams in the region, characterised by high rainfall and minimal human disturbance. They included sites from Scott and Peter creeks and the Onkaparinga River in the south, the Torrens River at Gumeracha and from Angas Creek from the Torrens catchment, and several sites from the South and North Para Rivers in the north of the region.

The waterways that rated poorly were generally from streams that flowed through urban areas or received considerable runoff from agricultural lands. The urban stormwater impacts were noted from part of the North Para River, the lower reaches of the Little Para and Torrens rivers, and the lower part of the Onkaparinga River. The urban sections of First and Fifth creeks, Sturt River, and some sites from Dry Creek appear to be moderately impacted.



Water pennies are the flattened, oval shaped larvae of psephenid beetles (e.g. *Sclerocyphon fuscus*) that cling to rocks in rapidly flowing water.

Photo: Stream Biomonitoring Unit, New York State DEC

Transfers of River Murray water impact on the Torrens River from Mt Pleasant to the junction with Sixth Creek, and also in the Onkaparinga River from downstream of the inflow to Mt Bold Reservoir. Horticultural and agricultural impacts are evident in Cox, Lenswood, Aldgate and Inverbrackie creeks. Wastewater treatment plant discharges impact sections of the Sturt River and Hahndorf Creek.

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

Government of South Australia

EPA South Australia

Environment Australia

EGI Environmental and Geographic Information

Australian Water Quality Centre