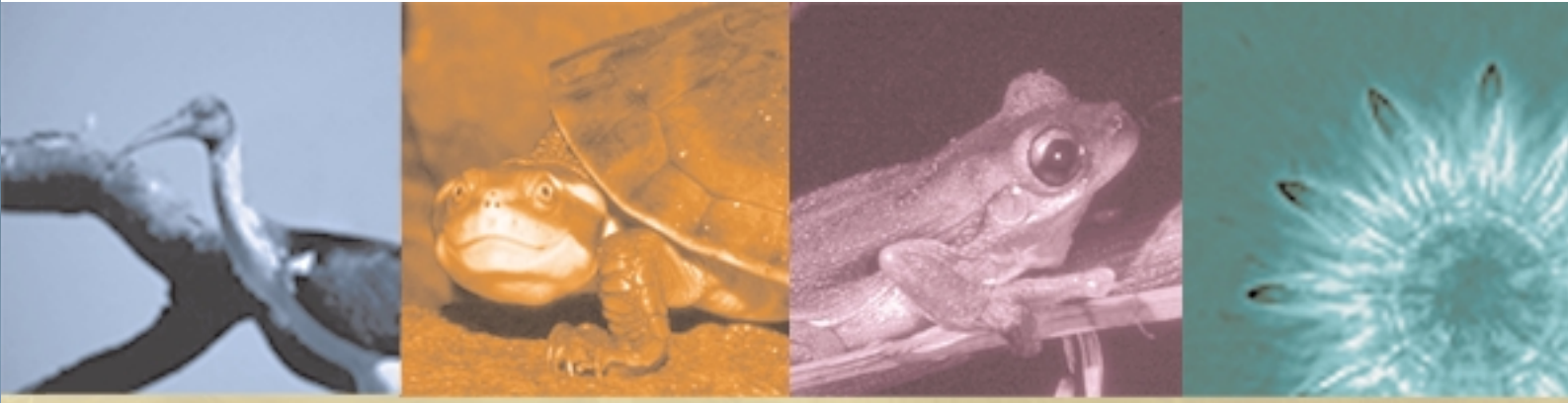


Understanding Our Waterways

Providing ecological understanding of rivers, lakes and wetlands to inform management

Cooperative Research Centre for Freshwater Ecology

Cover Photos:

Murray Cod, Australia's largets freshwater fish.
Macchullochella peeli peeli.
Photo: G Schmida

Snags provide important habitat for water birds like this ibis.
Photo: S Lawler.

Turtles depend on habitat and food provided by healthy rivers.
Emydura subglobosa *(Jardine River Turtle).*

Frogs need healthy river systems.

The green algae, Staurastrum, *floats in lakes, providing food for aquatic animals.*
Photo: R Shiel

Australians depend on healthy rivers for their water supply, for irrigation, recreation and to provide the biodiversity that makes our country habitable.

Australia is a dry country. Understanding how our river systems work is essential if we are to manage them in a sustainable way.

Diverting water from rivers to meet the needs of industry, agriculture and households affects the environment. In the Murray-Darling Basin, for example, the amount of water we take from the rivers is not ecologically sustainable. Today, two thirds of the water that used to flow into the sea from the Murray River never reaches the ocean, generating concern about the quality of Adelaide's water supply in the long-term.

While dams and weirs provide more reliable water control, they change the natural water flows and patterns that determine river health.

The impact of dams and weirs on rivers is made worse by introduced pests, pollution, increasing salinity, removal of snags and poor land management. We have created an environment where many rivers are suffering major problems and where introduced carp and willows thrive at the expense of native animals and plants. Declining water quality, declining native fish populations and blue-green algal blooms are obvious signs of this damage.

Top:

The Centre helps to protect and rehabilitate native fish populations like this endangered Trout Cod. Macchullochella maquariensis.
Photo: G Schmida

Above:

The Paroo River, Queensland.
Photo: A Tatnell

Left:

Braided channels of the Thomson River in Queensland, one of the Centre's research areas.
Photo: DNR

The Cooperative Research Ce

Specialising in river and wetland ecology, the Centre produces high-quality research to inform the sustainable management of our water resources. Managing our rivers well is only possible if we understand how rivers work and how we can help to sustain them. In the Centre, university, government and industry partners work together to understand river systems.

Understanding how rivers function is pivotal to the Centre's research efforts. The Centre's work on the Darling and Murrumbidgee rivers has shown that regular pulsing of small flows can inhibit the growth of blue-green algae. Scientists at the Centre have developed the AUSRIVAS model to assess the health of a river by using aquatic plants and animals as indicators.

Research by the Centre in the Campaspe River in Victoria has shown it is in poor shape. Researchers found less than a third of the species of native fish they expected to find and two introduced fish species, carp and redfin, dominate the river.

The Campaspe River, like many of Australia's inland rivers, has been dammed, and the natural pattern of heavy winter and light summer flows reversed to supply water for irrigation. Half the river's flow is used for irrigation. The Centre, in partnership with Goulburn-Murray Rural Water Authority, is testing an approach that will follow the natural flow more closely and improve the overall health of this river while still maintaining the supply to irrigators over summer.

A central part of the Centre's work is to assess the environmental impacts of water diversions and changed flows. This knowledge will help us to manage the river systems more sustainably, to restore flow patterns,

The Centre's research focusses on four main themes:

Ecological Effects of Flows

- Improving river systems through better management of water releases,
- Effects of flow regulation on aquatic animals and plants, and
- How lowland rivers function.

Conservation Ecology

- Conserving key threatened aquatic species,
- Maintaining biological diversity in freshwater systems, and
- The role and importance of water-holes in dryland regions.

Restoration Ecology

- Rehabilitating disturbed rivers and streams,
- Managing urban water, and
- How aquatic plants and animals recolonise disturbed sites.

Water Quality and Ecological Assessment

- Measuring river health
- Predicting ecological risk due to contaminants, and
- The impact of land use on water quality.

Collecting invertebrates to assess the health of Paddys River, ACT. Photo: A Tatnell

entre for Freshwater Ecology

which maintain the health of the river, while continuing to provide downstream users with water.

Centre researchers are also testing the best ways to rehabilitate degraded rivers.

Based on the best available science, the Centre advises government and other organisations about water resource policy and management. Its input is crucial to policies like The Cap and The COAG Water Reforms, and how they are implemented in the states.

The Cooperative Research Centre for Freshwater Ecology's 200 staff and students are located in Queensland, New South Wales, Australian Capital Territory, Victoria and South Australia. The Centre operates three regional laboratories: the Murray-Darling Freshwater Research Centre at Albury, the Lower Basin Laborarory at Mildura and the Northern Laboratory at Goondiwindi, providing easy access to many of the Centre's research sites.

Interception outlet near Mildura, Victoria. Salty groundwater is pumped into evaporation basins to prevent it coming to the surface and affecting crops. Digital image: Megan Jones

The Centre's research focusses on national issues such as:

- Assessment and monitoring of river health,
- Biodiversity,
- Ecosystem processes in rivers,
- Fish ecology,
- Flow requirements for rivers,
- Impacts of land use on water quality,
- River–floodplain interactions,
- River rehabilitation,
- Urban water management, and
- Water quality guidelines.

Salt crystals stick to a dead tree trunk at Quairading, WA.
Photo: B van Aken, CSIRO Land and Water

Education program

The Centre's Education Program includes community, school, undergraduate and postgraduate training and offers ongoing training for professionals in the water industry.

The Centre offers postgraduate scholarships and additional funding for selected students with other scholarships. Some summer scholarships are also available for promising undergraduate students.

Postgraduate students at the Centre benefit from access to supervisors from both industry and universities and are offered opportunities to participate in conferences, workshops and training courses specifically tailored to meet their needs. Postgraduate studies are available through five universities.

"CRCFE students are provided with a great deal of support and encouragement" ...PhD student, University of Canberra

Knowledge exchange program

The CRC for Freshwater Ecology assists the water industry to manage water resources sustainably by providing the best ecological information available. Through the Knowledge Exchange Program, the Centre provides information and advice to the water industry and the community via expert panels, consultancies, publications, problem-solving workshops, public events and advice to committees.

Top left:

Midge larvae, an important part of the river's food web.
Photo: J Hawking

Top right:

Testing the water, Paddys River, ACT.
Photo: A Tatnell

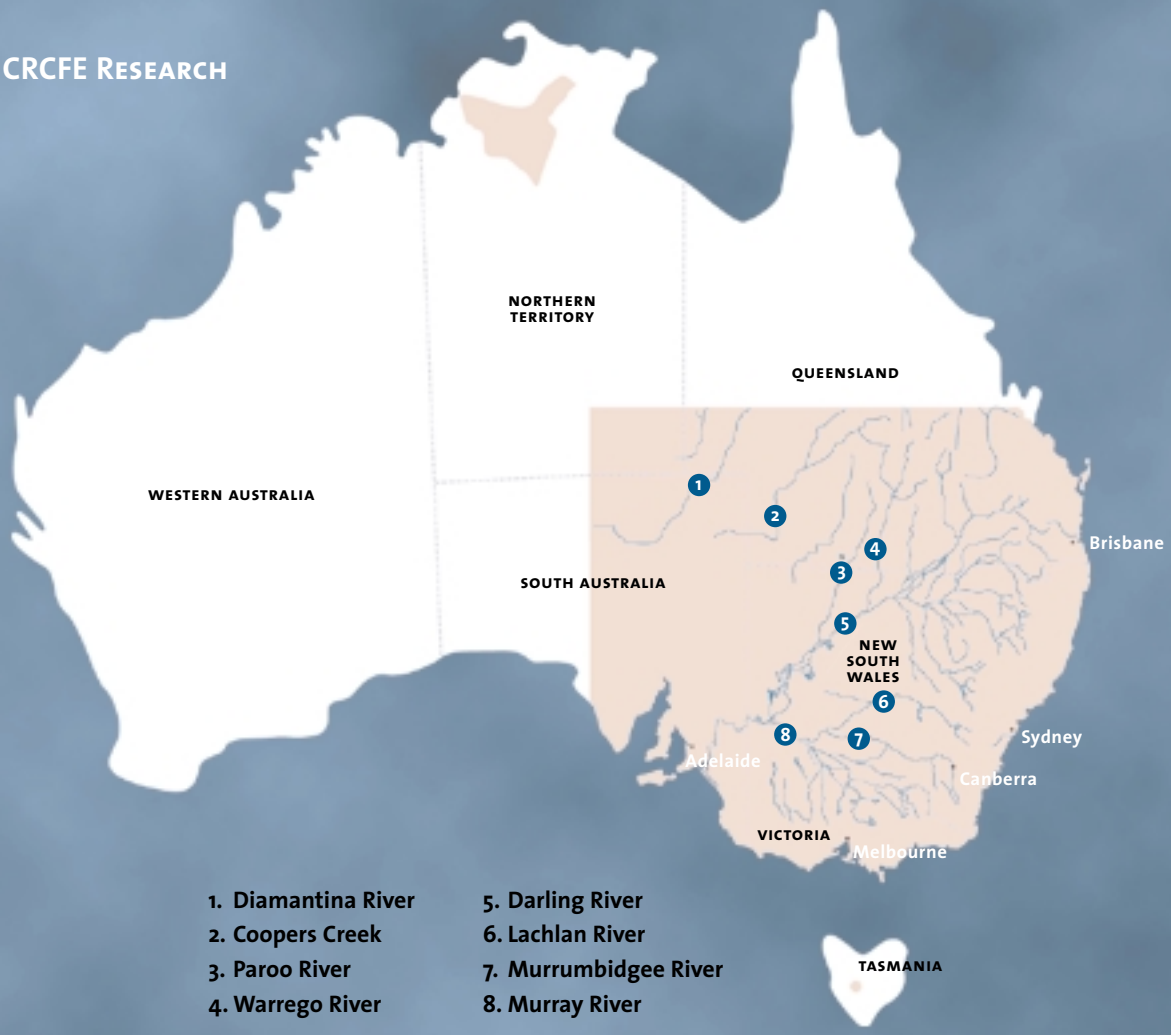
Above:

Students from a Queensland school learn about their local river.
Photo: Courtesy of Waterwatch by Lyle Radford

Right:

Hattah Lakes on the Murray River.
Photo: B Gawne

Scope of CRCFE Research



1. Diamantina River
2. Coopers Creek
3. Paroo River
4. Warrego River
5. Darling River
6. Lachlan River
7. Murrumbidgee River
8. Murray River

The Cooperative Research Centre for Freshwater Ecology's participants are:

ACTEW Corporation
CSIRO Land and Water
Department of Land and Water Conservation, NSW
Department of Natural Resources, Queensland
Department of Natural Resources and Environment, Victoria
Environment ACT
Environment Protection Authority, NSW
Environment Protection Authority, Victoria
Goulburn-Murray Rural Water Authority
Griffith University
La Trobe University
Lower Murray Water
Melbourne Water
Monash University
Murray-Darling Basin Commission
Sunraysia Rural Water Authority
Sydney Catchment Authority
University of Canberra

For further information or to receive the Centre's newsletter, WaterShed

Visit the CRC for Freshwater Ecology web site:
http://freshwater.canberra.edu.au

Or contact

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The Murray River winding its way through the Barmah-Millewah Forest, Victoria. Photo: D Eastburn

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