Free*flow*

It's crunch time for the last free-flowing river in the Murray-Darling Basin. Will lessons learned elsewhere in the basin help save the Paroo? Kim Jenkins

In 1995, an advertisement in the Cunnamulla *Western Sun* heralded two proposals to irrigate from the Paroo River, a semi-arid waterway extending from southern Queensland to north-east of Wilcannia in New South Wales.

The advertisement, placed by Queensland's Department of Natural Resources, invited objections from residents less than eight kilometres upstream or 24 km downstream from the applicants, an area including only a few of the 80 or so families living along the river's length.

The applications to irrigate from the northern end of the Paroo River are for a total of three 650 mm-diameter pumps, with limits to the volume of water extracted to be determined by the department. Such pumps can extract 100 megalitres of water per day, enough to fill 1200 bathtubs. Indian hemp requires some eight megalitres of water per hectare during a six-month growing season.

One of the applications is from John Gardiner a grazier intending to bypass deflated beef and wool markets by diversifying into Indian hemp. Gardiner argues there is enough water in the Paroo for everyone, if it is managed properly. But others with an interest in the river are not so sure.

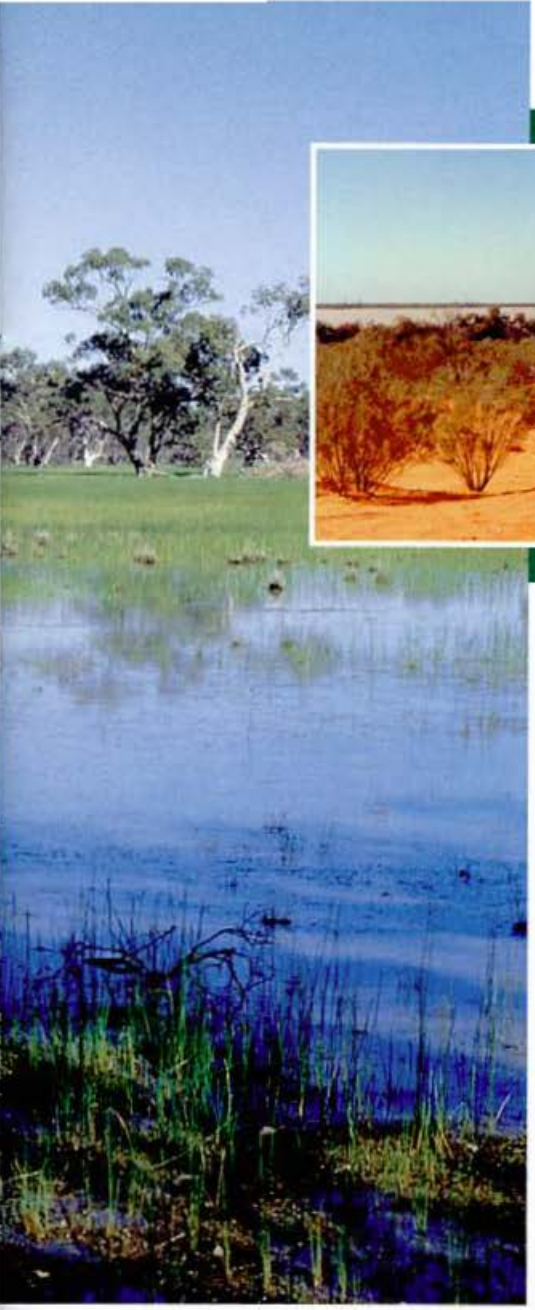
As news of the irrigation proposals filtered south, objections were raised by a range of parties far beyond the 32-km boundary specified in the *Western Sun*. Their objections stressed the river's priceless role in sustaining ecological and agricultural systems, often much further downstream than 32 km. The department, edified by this broad response, decided to place a hold on dealing with the licence applications.

Objectors to the irrigation proposal included state resource-management agencies, scientists, pastoralists and conservation groups.

The NSW National Parks and Wildlife Service and Queensland's Department of Environment were concerned about the effects on Paroo River wetland reserves under their management.

Similarly, objections by Dr Richard Kingsford from the NSW National Parks and Wildlife Service, his colleague Dr Mike Maher and Professor Brian Timms, of the University of Newcastle, emphasised the river system's outstanding ecological values.

The Zanker family runs a cattle and sheep station east of White Cliffs in NSW, some 600 kilometres away from the proposed water extraction, on the floodplains of the Paroo river's lower reaches. The family was concerned about



Far left: This black box swamp on the Paroo floodplain at Toonborough, NSW, is typical of the many small wetland areas along the Paroo.

Left: Mullawoolka Basin near Laurelvale in NSW. Laurelvale landholder Leon Zanker can rely on a flood in two out of three years. Twenty kilometres north, the river receives on average one flood per year. Zanker said how far a flood travelled down the Paroo depended on the volume of the flood and how long the flood peak stayed up for. Both factors would be affected by water extraction to the north. Zanker cannot see why governments sanction irrigation that benefits a few people on the river, but affects the community and lifestyles of others.

the property's pastures, which are sustained by natural floods occurring every two to three years.

The applications to extract water from the Paroo River have come at a time of growing public recognition that water from Australia's inland rivers has been over-allocated. There are calls to give some water back to the environment; to increase 'environmental flows' as a counter to blue-green algal blooms and the degradation of rivers and catchments.

Water from the Murray-Darling Basin supports 70% of Australia's irrigated agriculture. A 1995 audit of water use in the basin revealed that in 1995 the median annual flow to the sea from all the rivers in the basin was only 21% of the flow that occurred before development of an irrigation industry. Water use had risen by 8% or 790 gigalitres (1.6 times the capacity of Sydney Harbour) between 1989 and 1994, and would continue to rise unless water-management arrangements were changed.

An interim cap on further increases in water diversions was introduced in 1995 by the Murray-Darling Basin Ministerial Council. In July this year, governments from NSW, Victoria and South Australia agreed to limit water extraction from the basin to 1994 levels.

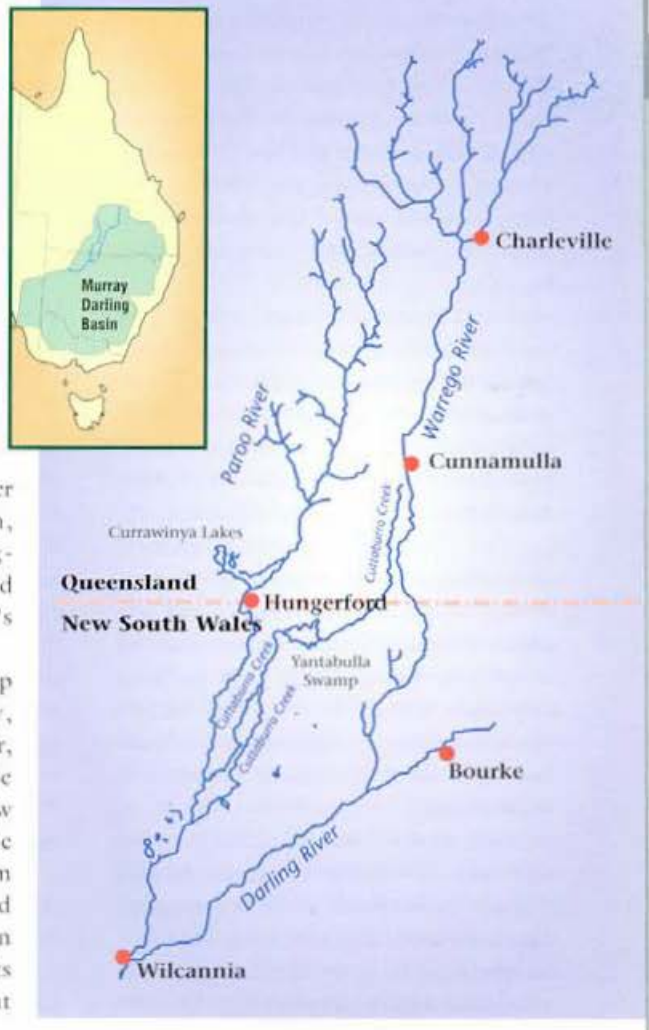
Queensland is developing water management plans as a means of implementing a cap, but argues that a blanket cap to 1994 levels is unfair as diversions in Queensland are at a much lower level than other states. (Some 25% of the basin is in Queensland, yet its water diversions average 4-5% of the total.)

Natural variability

The Paroo River is the last remaining free flowing river system in the Murray-Darling Basin and its wetlands are among the most pristine. In July 1997, the Paroo River Association, concerned about the effects of water diversion on the river system, organised a workshop at Hungerford, a Queensland town located about half way along the river's length.

Topics discussed at the workshop included the grazing industry, Aboriginal associations with the river, the economics of irrigation, the government review process and how water regulation would affect the river's ecology. Scientists from CSIRO and various universities and state agencies agreed that an unmodified flow regime with all its variability was the most important factor determining the rich assemblage of life on the Paroo River.

Dr John Pickard of Macquarie University has collected the oral history of floods for the lower reaches of the Paroo River from local graziers. He found that each flood was unique, but there were several repeating patterns. He said the Paroo flowed into the Darling River at Wilcannia very few times each century. More frequently, the Darling flooded north back into the Paroo.



Above: Lake Wyara, one of the Currawinya lakes near Hungerford in Queensland, sometimes supports more than 100 000 waterbirds.

Left: Tongo Lake, an overflow lake at the bottom end of the Paroo, just north of Wilcannia, NSW. Lignum growing in the lake provides habitat for breeding freckled duck.

Brian Timms described the river as a complex network of interconnecting channels with permanent waterholes, lignum swamps, rainfed claypans and salt and freshwater lakes. From Landsat images taken during the 1990 flood, Kingsford estimated the river and its wetlands covered more than one million hectares.

The Paroo floodplain is coloured by the rich ochre tones of Yapunyah trees which are unique to the Paroo and associated rivers. After a flood, waterbirds of all types arrive in numbers which, according to Richard Kingsford, rival the world-renowned wetlands of Kakadu.

The Currawinya Lakes can support more than 250 000 waterbirds of many species. Kingsford has counted the rare freckled duck in numbers more than 10 000 on the lakes, making them the most important refuge for freckled duck in Australia. Migratory wading birds are known to use these wetlands in their tens of thousands.

'We know that diverting water upstream from Australian rivers will degrade the wetlands at the bottom end,' Kingsford said. 'The waterbirds decline in numbers and diversity and diverting water also affects waterbird breeding.'

Dr Andrew Boulton from the University of New England said the variable flows of semi-arid rivers like the Paroo are vital to the survival of invertebrates, largely because they provide a variety of habitats. He said aquatic invertebrates kept rivers healthy by breaking down organic matter and feeding on algae and fungi, transforming nutrients and providing food for fish, waterbirds, amphibians and reptiles. Drying was vital to wetlands productivity.

Evidence was presented by Dr Craig Schiller from NSW Fisheries that river regulation favoured carp over native fish. Native fish communities were dominant in the Paroo and Darling Rivers, while exotic species were dominant in the regulated Murray and Murrumbidgee rivers. He said river regulation disrupted the reproductive cycles of native fish, and their food webs. Dr Robyn Watts of Charles Sturt University warned that altered river flows might fragment the Paroo's genetically-distinct golden perch populations into unviable breeding units.

The lack of plants on the lower reaches of the highly-regulated Murray, Murrumbidgee and Lachlan Rivers was considered by Dr Jane Roberts from CSIRO Land and Water at Griffith. Her research has sought to understand whether plants used to grow along these rivers, where they grew and when and why they disappeared. These questions have been difficult to answer due to a lack of scientific studies and poor historical documentation of water plants, either in rivers or billabongs or floodplains.

Roberts used oral history to produce 'a picture of the past in people's own words' for the Lachlan River (see opposite page). Piecing together these insights showed that the river had been changing since the 1940s, but that the most dramatic change was during the 1970s. 'This coincided with increased river regulation as well as the spread of carp and the loss of river plants,' she said.

Dr Peter Fairweather, also from CSIRO Land and Water, heads a research team at Griffith undertaking water quality research in the Murrumbidgee Irrigation Area of southern NSW and the cotton-growing regions of southern Queensland and northern NSW.

Fairweather said for 50% of the irrigation season, agricultural chemicals in rivers and wetlands exceeded environmental guidelines. Such chemicals had been detected in NSW and Queensland rivers soon after catastrophic fish kills.

Biodiversity of invertebrate communities was lower in rivers and wetlands that received irrigation drainage, Fairweather said. 'Chemical leaks can be reduced through best-practice management, but nowhere yet have we seen "leak-proof" containment,' he said. 'Introducing irrigated farming to the Paroo region would inevitably introduce chemicals to the river and its wetlands.'

The Paroo River Association concluded the workshop with a call to the Queensland, NSW and Federal governments to reject commercial irrigation applications along the Paroo River system, and for management plans to treat the river system in its entirety.

Clarification was requested of the processes by which the Border Rivers Commission determined policies on the Paroo River, and a major study into the oral history of the Paroo River and its people – to establish a benchmark for future studies into this river system – was recommended. Finally, the the Paroo River Association asked to be consulted and included in further developments affecting the river's future.

A desirable process?

Scientific evidence presented at the Hungerford workshop demonstrated to the Queensland Department of Natural Resources the ecological significance of the Paroo River system. Diverting water upstream from Australian rivers degrades wetlands at the bottom end of the river. Pastoralists relying on floods to replenish their pastures also are affected.

The department's Charleville district manager, Frank Walker, said the weight of objection to the water diversions had prompted a moratorium on dealing with licence applications until a Paroo River Water Management Plan was prepared.

Walker said the Water Management Plan would take into account the social, economic and ecological values of the Paroo River system, and the potential impacts and benefits of irrigation. The Plan would be jointly prepared by Queensland and NSW and would cover the whole of the Paroo River catchment. Comments and objections from interested parties would be considered in a process expected to be completed in 1998.

The last free-flowing river in the Murray-Darling Basin has won a temporary reprieve, thanks to the combined voices of environmental managers, scientists and landholders, and the department's willingness to listen. But is this a desirable way of addressing water management issues?

NSW National Parks and Wildlife Service ecologist Dr Richard Kingsford remains skeptical of Queensland's water allocation process for four major reasons.

The first relates to the role of Queensland's Department of Natural Resources as the sole determinant of irrigation applications. 'In NSW, conservation agencies – such as the National Parks and Wildlife Service and the Environment Protection Authority – have some say in determining water polices,' he said. 'This allows expertise and advice to be provided which ensures much more of a balance to water management.'

Kingsford's second concern relates to water regulation. 'The irrigators on the Paroo have applied for three large pumps,' he said. 'But because the water is free, there is no need for a meter. That makes monitoring and controlling the water use almost impossible.'

abstract

Applications to irrigate from the Paroo River have prompted objections from scientists, conservationists, pastoralists and resource management agencies concerned about potential damage to the river's ecology. Evidence of the effects of water regulation elsewhere in the Murray Darling Basin has been presented in an effort to protect the semi-arid and wetland habitats of the Paroo.

Keywords: Rivers; Irrigation; Water management; Water diversion; Water use; Environmental impact; Environmental management; Paroo River; Murray-Darling Basin

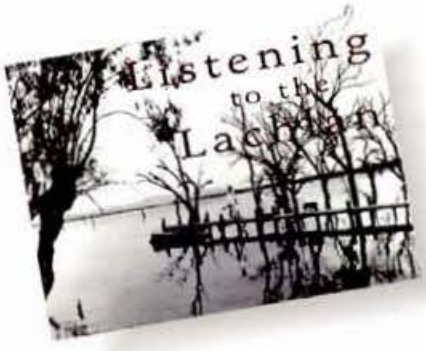
The third reason is the notification procedure. 'In the past, water resource agencies have seldom advised the community at large about irrigation applications,' he said.

Objections to the irrigation applications on the Paroo were invited from residents within a 32-kilometre limit. Only people living inside this boundary are able, under the Water Resources Act, to appeal against a department decision to the Queensland Land Court. The Queensland Department of Natural Resources is not legally bound to hear objections from further afield.

Finally, Kingsford is wary of Queensland's reluctance to cap diversions from rivers in the Murray Darling Basin to 1994 levels. 'Diversions in Queensland might be small compared to other states, but they also have a small part of the basin (25%) and more importantly, they are in the catchment where the rivers are smaller,' he said.

Conflict over water management in the Paroo, the Macquarie and elsewhere in the Murray-Darling Basin is not unlike conflicts that have raged in relation to forests for decades. Like trees, water is a limited and precious resource, as are the ecosystems that support them.

A key lesson learned from conflict over Australian forests has been the need to set up an appropriate conflict-resolution process. The Paroo community highlighted the need for consultation and transparent government reviews, and to heed scientific evidence of past mistakes.



CSIRO's Dr Jane Roberts has teamed with consultant aquatic plant ecologist Geoff Sainty to present an ecological history of the Lachlan River in Central New South Wales. The book, *Listening to the Lachlan*, presents the memories of some 50 people who have lived and worked by the river, and remain in the area. Records of local historical societies have also been used. The 'written memories' which range from the 1920s to the 1990s, are presented as source material for historians or river ecologists. People commonly remark on the precise types and abundance of fish, water plants and bird life that used to exist. It's clear from the book that biodiversity has declined. Nowadays would-be fishers complain there is nothing but carp. *Listening to the Lachlan* costs $24.95 and is available from Sainty and Associates (02) 9332 2661, fax (02) 9331 5372.