Lake Bindegolly National Park, in south-west Queensland, conserves a string of outback lakes. These lakes vary greatly over time in both the amount of water they contain and the species of animals that live within and around them.

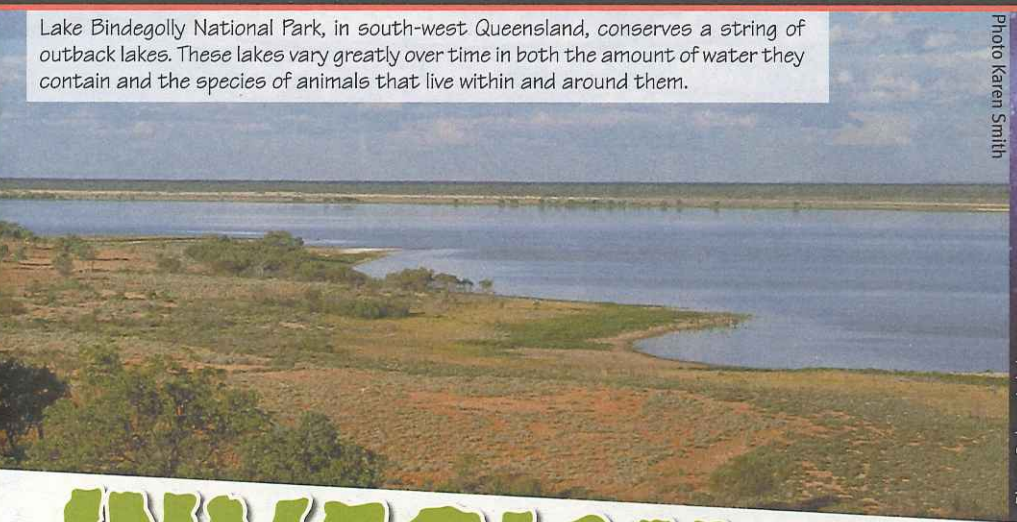


Photo Karen Smith

The arrival of water to outback lakes kick-starts a cycle of life. The waters of Bindegolly's lakes may contain a wide variety of small invertebrates and other creatures, the foundation of important foodchains.

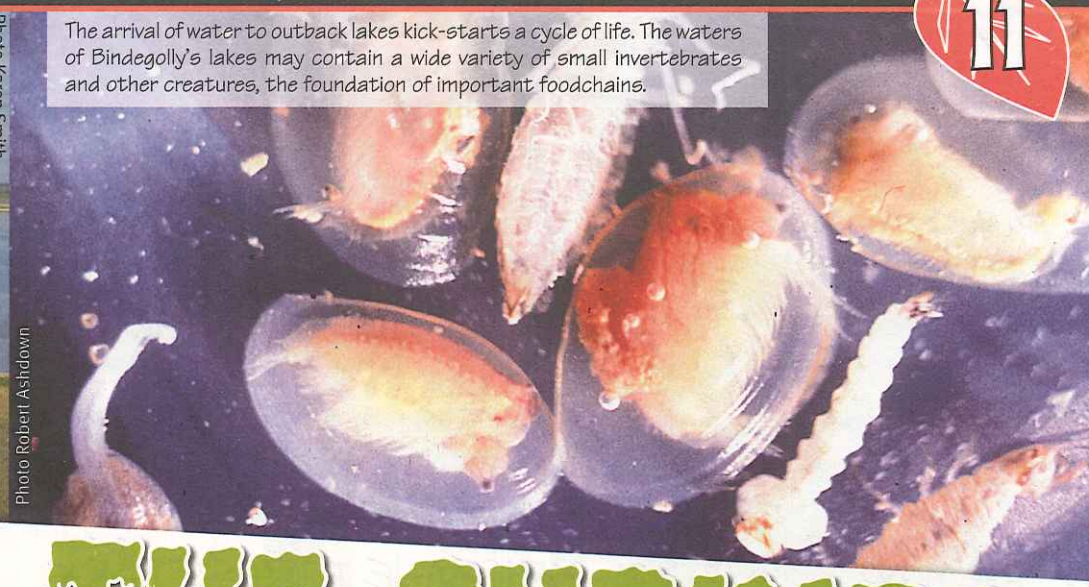


Photo Robert Ashdown

INVASION OF THE SHRIMPS

Unusual life colonises the lakes of the west

Lake Bindegolly National Park, near Thargomindah in south-west Queensland, conserves one of the most important wetland systems of the state's arid south-west. Here, Bundilla Creek ends as a string of lakes — lakes Toomaroo and Hutchinson and finally Lake Bindegolly.

This is a very different wetland to those of the coast. As there is no such thing as "average conditions" when it comes to the arid environment of the south-west, the Bindegolly lakes vary dramatically over time in the amount of water they contain and the species of plants and animals found in and around them.

The waters of lakes Bindegolly and Toomaroo are usually salty — sometimes more so than seawater. While the lakes are usually dry or contain a small amount of water, about once every ten years they are full, with water up to several metres deep.

Along with the lakes of Currawinya National Park, the Bindegolly lake system is a major breeding habitat for waterfowl and other inland birds and is an important refuge for birds during drought. The lakes form part of an inland route for migratory waders and habitat for the rare freckled duck *Strictonetta naevosa*. Waterbirds are attracted to the lakes by the plants that grow there and the invertebrates that live in the waters and muds. The diverse collection of invertebrates of these lakes include waterfleas, copepods and seed shrimps in open waters, yabbies and shrimp on the bottom and insects such as backswimmers, boatmen and water beetles, which are everywhere.

Fairy shrimp.

Photo Brian Timms

In early 2006, and again in early 2007, small inflows of fresh water resulted in about 50 centimetres of fresh water in the Bindegolly lakes. The arrival of this water is a cue for the appearance of a range of fascinating invertebrates, including different species of shrimps.

The arrival of shrimp in the Bindegolly lakes is a significant part of the "boom and bust" cycle of life in the wetlands of the west. These invertebrates form a brief but significant part of a vital outback food chain. Most of the time, shrimp are found in temporary habitats such as clay plans and black box swamps, where fish predators are scarce or non-existent. Washed into the lakes, they take advantage of a brief window of opportunity to thrive, before growing fish eat them. Unravelling the mysterious lives of this group of animals has been a challenge for researchers.

Three types of shrimp are found in the lakes at this time — fairy, clam and shield shrimps. Five species of fairy shrimp, as well as five species of clam shrimp, were found in the upper two lakes, Hutchison and Toomaroo. Only the little reddish-coloured clam shrimp *Caenestheriella packardi* was abundant, in Lake Hutchison. On both occasions a new species of clam shrimp was found in lakes Hutchinson and Toomaroo. Only two other occurrences are presently known for this species.

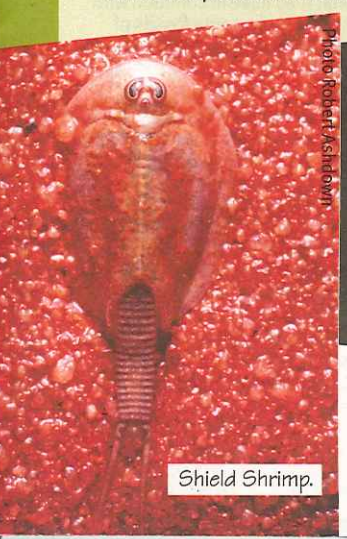
While fairy shrimps were not found as far down the system as Lake Bindegolly, this lake did have five species of clam shrimp, none common. Lake Hutchinson also has the conspicuously large shield shrimp *Triops australiensis*.

Where do all these shrimp come from, and where do they go? It is thought that these unusual lake colonisers hatch from eggs or arrive as larvae washed into the system. The eggs of fairy, clam and shield shrimps are resistant to dry periods and lie in the mud of ponds and lakes awaiting the return of water. The shrimp of the Bindegolly lakes disappear almost as soon as they arrive. Within a few weeks all are gone, except for the tough little red clam shrimps *C. packardi*. Many of them, apart from the fairy shrimps, seem to breed successfully within this time frame. Fish are the main predators of shrimp in these lakes, and it seems that only during windows of opportunity when fish numbers are low do the numbers of shrimp take off. At least three clam shrimp species possibly have self-sustaining populations in the lakes, but they only appear in these windows of lower predation pressure. Different species also have different preferred habitats, so they are found at different lakes within the system depending on the saltiness of the water and other factors.

The Bindegolly Lakes are not the only place where shrimps appear. The Blue Lakes on Rockwell Station east of Hungerford in early 2007 had many shrimp invaders. These lakes used to have fish, but the long drought of 2001–2007 exterminated them from the whole catchment. No shrimp were found in the lakes during a 1995–2004 study, but many individuals of many species were washed in after the rains of early 2007 and they have persisted and bred. Perhaps in the future they will become common and part of the ecosystem of these lakes, until a huge Paroo flood re-introduces fish to the lakes.

The invasion of outback lakes by the unusual and fascinating shrimp species is all part of the "boom and bust" ecology of the west, an ecology that continues to fascinate those who seek to unravel its many mysteries.

Brian Timms, University of Newcastle, New South Wales
Mark Handley, Queensland Parks and Wildlife, Thargomindah



Shield Shrimp.

Photo Robert Ashdown

Clam shrimp.

Photo Brian Timms

Shrimps
are some of the most interesting and least-understood invertebrates of outback wetlands. Three groups of shrimps turn up in the waters the Bindegolly lakes after water replenishes them following drought.

Two new species of fairy shrimp

Two new species of Australian fairy shrimp (Branchipodidae) have recently been described by D. Christopher Rogers and colleagues in the scientific journal *Zootaxa*. Not only do these crustaceans represent a new species but also a new genus *Australobranchipus*. The first species *Australobranchipus parooensis* is known from Paroo region in north-west New South Wales and from a claypan in Queensland's Currawinya National Park. The Currawinya shrimps were collected by Brian Timms of the University of Newcastle, an authority on the biology of our western wetlands.

The second species *Australobranchipus gilgaiphila* was first collected in Eringibba National Park near the small Queensland township of Glenmorgan on 1 December 2001. The specimens were collected by Craig Eddie who was working for QPW Roma at the time. Other specimens were to follow including three males and nine females collected by Richard Johnson in Southwood National Park near Moonie in southern Queensland, on the 8 December 2005. Richard is stationed at QPW's Roma office. Craig and Richard were both working on fauna surveys of southern Brigalow Belt parks conducted by staff from the QPW Toowoomba office when they made their finds.

Rod Hobson, Queensland Parks and Wildlife

Large numbers of waterbirds gather on the water of waters of Lake Bindegolly National park's lake system when conditions are right.

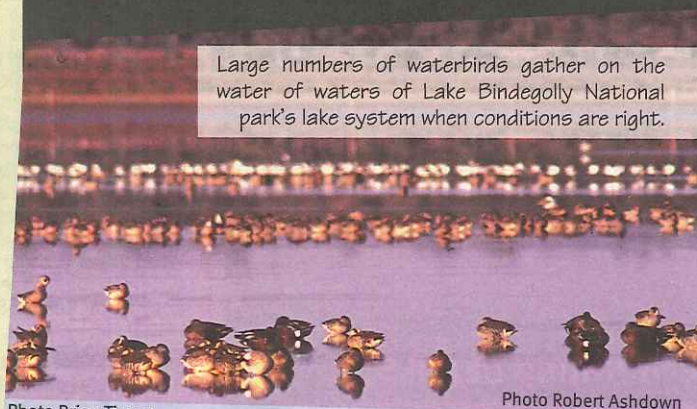
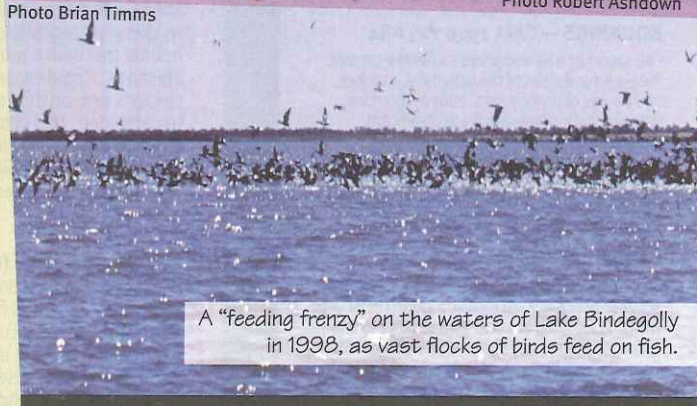


Photo Brian Timms

Photo Robert Ashdown



A "feeding frenzy" on the waters of Lake Bindegolly in 1998, as vast flocks of birds feed on fish.

Lake Bindegolly National Park is a remote and fragile outback park. Visitors to the park should plan their travel carefully. For up-to-date information on park conditions and access visit the "Parks and Forests" and "Park Alerts" sections of the Environmental Protection Agency's website: www.epa.qld.gov.au