

Jim Puckridge: a pioneer in the ecology of dryland rivers

Keith F. Walker

School of Earth and Environmental Sciences, The University of Adelaide, SA 5005, Australia.

Present address: PO Box 331, Yankalilla, SA 5203, Australia.

Email: keith.walker@adelaide.edu.au

Introduction

Inspiration comes from those who look beyond the ideas of others and see the world anew. In Australia, ecologists sometimes have been unduly influenced by the perceptions of their boreal colleagues, and slow to recognise patterns and processes unlike those in the seasonal, humid, temperate regions of the world. One who has encouraged us to look again, and to think more deeply, is Jim Puckridge (Fig. 1). This Special Issue of *Marine and Freshwater Research* honours Jim's work as an ecologist, exploring the rivers of inland Australia.

A Life Well Lived

James Terence Puckridge was born in 1941, in Port Lincoln, South Australia. He was one of five children in a family with a love for the coast and sea, nurturing his lifelong passion for Nature. He moved to Adelaide to complete his schooling, and then went to teachers' college and a job teaching English in Port Augusta, where he met Dianna. They married in 1963 and raised two sons, Thornton and Jason. Years later, Jim undertook more study at the University of Sydney, cultivating a love of classic literature before returning to teach, this time in Samoa.

In the late 1980s, Jim returned to academia as an MSc student at The University of Adelaide. His focus was the ecology of a common native fish, the bony herring (*Nematalosa erebi*), and his thesis remains the definitive study of that species (Puckridge 1988). Sometimes in spring, large numbers of dead bony herring are strewn along the banks of the River Murray in South Australia. The mortalities probably result from stresses due to winter cold and spring spawning, making the fish vulnerable to a disease that, from Jim's work (Puckridge *et al.* 1989), we know to be a form of mycotic dermatitis.

Jim's field program would have horrified anyone seeking a comfortable sinecure. Even on the coldest winter's day he would set his nets for a few hours before swimming out to haul them in, diving to ease them over a snag, often pulling in hundreds of fish. The catch was measured and inspected in a small, austere caravan parked by the water's edge. He showed that bony herring spawn in water temperatures of 21–23°C, regardless of flooding, and mature after 2–3 years, developing prodigious fecundity as they grow (Puckridge and Walker 1990). They are one of few native species to thrive in the weir pools that now dominate the Lower Murray.

Even as his Murray work continued, Jim was able to join friends making a survey of the Coongie Lakes (27°27'S,

140°00'E), which are fed by Cooper Creek in the remote Lake Eyre Basin. In a mercurial, kaleidoscopic landscape to inspire every poet, Jim found his next calling. The topic for his PhD thesis was an easy progression because the most common fish at Coongie was the bony herring.

Jim's thesis (Puckridge 1999) is a classic in the annals of Australian ecology. Fortuitously, his work began when there was a rare flood, but it was followed by another, and another, and with each flood the responses were compounded. After five years, the majestic explosions of fish, birds and invertebrates staggered the imagination. In Adelaide, Jim would write and talk of logarithmic scales and orders of magnitude. He explored new horizons in statistical analysis and modelling. He would borrow as many desktop computers as he could, leaving them running over weekends until neural networks routines had converged on solutions. He attended conferences and wrote and spoke for the popular media, recruiting friends and volunteers to see for themselves the glories at Coongie.

Jim's PhD work embraced the DRY/WET project (Puckridge *et al.* 1999), exploring the ecology of the lakes. In 1996, he and his allies argued against plans to irrigate cotton crops from Cooper Creek (Walker *et al.* 1997). In the aftermath came more awareness of the need to protect the region from ill-considered development (Puckridge 1998), and the genesis of a million-dollar research program, ARIDFLO (Costelloe *et al.* 2004).

At the time Jim began work at Coongie, the seminal *Flood Pulse Concept* was a new idea acclaimed by ecologists, acknowledging floods as 'key drivers' in floodplain-river ecosystems. Jim too was excited by the idea, but balked at the suggestion that the floods were necessarily *regular* events. He saw that floods are vital for most Australian rivers, but that their 'pulse' is neither regular nor seasonal, and that intervening droughts may be no less influential. In dry regions, like Coongie, seasonal rhythms can be overwhelmed by a more insistent, erratic pulse that defies the conventional relativities of space and time (Walker *et al.* 1995). Jim helped us to think about the ecological significance of variability, adding his perspective to the work of colleagues in hydrology (Puckridge *et al.* 1998, 2000). In changeable environments, evolution has favoured opportunists, able to tolerate harsh conditions and, given a chance, ready to disperse, reproduce quickly and disperse again.

Jim was not merely a scientist of distinction, but a wonderful poet. In his technical writing, his sense of drama, his love for the wild world and his humanity shine through. In his poetry, one of

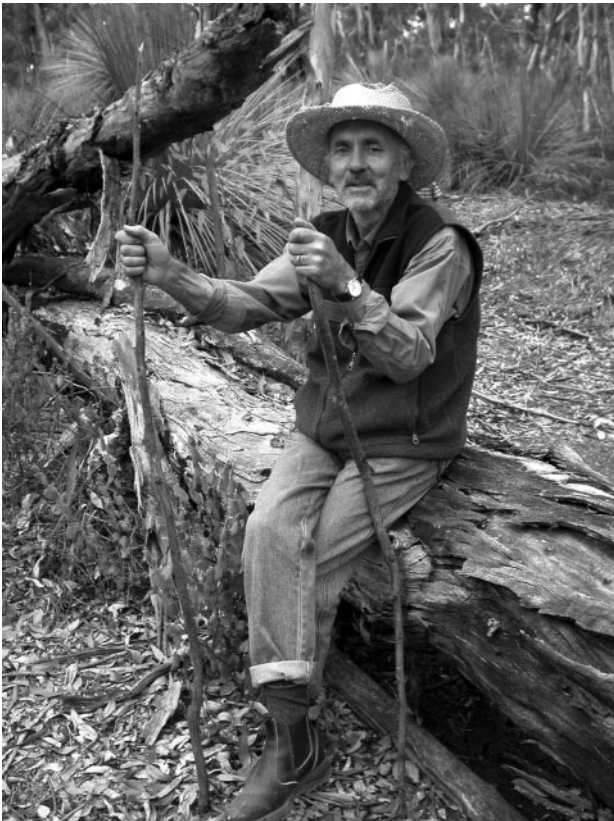


Fig. 1. Jim Puckridge, 2004 (photo: Hugh Kneebone).

his most evocative works describes soaring pelicans at Coongie, above images of scientists at work (see Accessory Publication).

Illness struck in the 1990s, and Jim entered the new millennium under the cruel yoke of Parkinson's Disease. He was resolute, maintaining his science and poetry, and soon moved to a home near Stokes Bay on Kangaroo Island, South Australia. With him was his companion Philippa Kneebone, whom he had met a decade earlier through the Conservation Council and Wilderness Society. Together, Jim and Philippa planted thousands of trees and shrubs, rejuvenating the land. As Jim's mobility deteriorated, dementia followed. He was no longer able to read or write, but he could swim, and plant trees, and when even those pleasures were lost he could still awaken, at times, to recite from Shakespeare. He died on 6 June 2008.

Jim was one of Nature's gentlemen – a kindly, caring person who strayed from paths that could easily have seen him retire as a teacher, an academic, a writer or poet. He travelled all of those paths, and succeeded in ways that perhaps he never knew. He was, and is, an inspiration.

Special Issue

This issue of *Marine and Freshwater Research* contains seven papers that explore the ways that riverine ecosystems, especially their fauna, respond to the vagaries of a desert climate. In times of drought, waterbirds can travel long distances to find wetlands (Kingsford *et al.* 2010), whereas fish, invertebrates and other less mobile species rely on waterholes or other refugia (Sheldon

et al. 2010) where their fate depends on water quality (Sheldon and Fellows 2010) and local hydrology and morphology (Arthington *et al.* 2010). The security of these refugia can be undermined, however, by water diversions and alien species (Costelloe *et al.* 2010). The refugia underpin the ecosystem's responses to floods, so that the imperative for conservation is greatest when water is scarce. As responses are compounded over time (Leigh *et al.* 2010), the effect of one flood builds upon those in the past (Puckridge *et al.* 2010). As boom insures against bust, it ensures another boom.

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