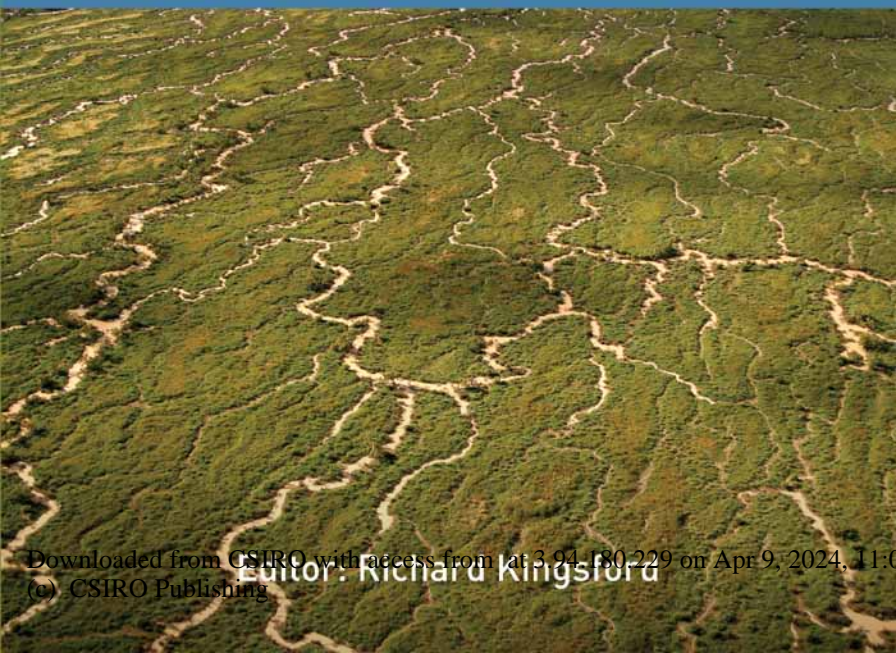




# LAKE EYRE BASIN RIVERS

ENVIRONMENTAL, SOCIAL AND ECONOMIC IMPORTANCE



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*To my wife Rosie and our children, Annabel, Charlie and Caroline  
for putting up with my obsession.*

# LAKE EYRE BASIN RIVERS

ENVIRONMENTAL, SOCIAL AND ECONOMIC IMPORTANCE



Editor: Richard Kingsford



PUBLISHING

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Front cover (clockwise from top left): Cooper Creek during a dry period showing the Birdsville track and punt for the wet times (photo, R.T. Kingsford); Waterbirds, such as these royal spoonbills, descend on mass onto the floodplains of the Lake Eyre Basin rivers (photo, A. Emmott); Aboriginal middens like this at Coongie Lake, with thousands of mussels, reflect a deep and long history of connection to country of up to 50 000 years, along the Lake Eyre Basin rivers (photo, R.T. Kingsford); Braided channels carry water across the floodplains of the Georgina River to eventually flow south to Kati Thanda-Lake Eyre (photo, R.T. Kingsford). Back cover: Flooding across the Diamantina River floodplain in 2016 creates habitats for many invertebrates, fish, frogs, turtles and waterbirds, as well as many different plant species (photo, R.T. Kingsford).

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## Foreword

The Lake Eyre Basin – one of the last naturally free-flowing river basins in the world – is ecologically rich and immeasurably important to Australia. Given the Basin's long-term future depends, fundamentally, on our fully appreciating its significance, this outstanding new book plays a positive and vital role. It canvasses the views of a wide range of people – people who are from different walks of life and look at the Basin from different perspectives, but are united in their determination to protect and enhance it for future generations. From South Australia's point of view, we are passionate about safeguarding the rivers from development, and supporting their remarkable diversity of plants and animals. The area is rich in Aboriginal heritage – which has continuing significance for the culture and wellbeing of the descendants of the early Aboriginal groups – and this is recognised by the 2012 agreement to use the ancient name of Kati Thanda. Also, the Basin is home to the beautiful Coongie Lakes wetlands system, which was declared a national park, in 2005, by the South Australian Government. The future of these and other important elements of the Basin are very much dependent on the quality of water flows from rivers that start in Queensland and the Northern Territory.

### **Jay Weatherill**

Premier of South Australia

Slightly larger than the Murray–Darling Basin, and about the size of France, Germany and Italy combined, Lake Eyre Basin's significance and value to our nation is immeasurable. The iconic Lake Eyre Basin is a rarity, one of the world's last naturally free-flowing river systems. That it remains so is thanks largely to the Lake Eyre Basin Partnership, spearheaded by Professor Richard Kingsford, who has edited this outstanding collection. This book builds on the impassioned work of those who, for 20 years or more, have sought to protect the Basin and ensure its long-term future. For tens of thousands of years the Basin has supported Aboriginal settlement and use, and this is reflected in the many areas of high cultural significance. Today, a significant percentage of the 60 000 people living within Lake Eyre Basin are Aboriginal. The Lake Eyre Basin Intergovernmental Agreement ensures that Indigenous voices are not only heard, but play a key role in any decisions impacting on the Basin's future.

In Queensland, as a matter of priority, we are working on the long-term sustainability and protection of the Basin's rivers while also striking a balance with the proximate industries and the people who rely on them. Stories are powerful – maybe even powerful enough to change, if not a river's course, the course of its history. I commend these river stories, and the important contribution this book makes to the national conversation around the sustainability of the Lake Eyre Basin.

### **Annastacia Palaszczuk MP**

Premier of Queensland and Minister for Arts

It would be understandable for some to look at a map of the Lake Eyre Basin – see it so far removed from the east coast cities, occupying some of the harshest land on our harsh continent, of few roads, even fewer major population centres – and assume it to be of little consequence. Yet such short-sightedness neglects the Lake Eyre Basin's value to the Northern Territory as the life-blood of rare, native wildlife; remote communities and pastoralist enterprises; and as a sacred source of stories for some of the oldest living cultures on earth.

And this is to say nothing of its importance to the environmental wellbeing of the agricultural lands of our neighbours in South Australia and Queensland. The Lake Eyre Basin, covering about one-seventh of Australia's land mass, matters, and that is why I am proud, in some small way, to add my name, encouragement and endorsement to this important work.

This compilation seeks out those who rely on the Basin and those who understand its wider importance, blending the 'human' with the 'strategic', and in so doing presenting a much-needed and compelling case for continued vigilance and cooperation across state and federal lines to maintain the Basin's vitality.

**Michael Gunner**

Chief Minister of the Northern Territory

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## Preface

This book is about the values, the people and the many ‘battles’ (including those to come) over sustainability of Lake Eyre Basin rivers. I am passionate about these rivers and their incredible environmental dimensions. I have had the privilege of visiting many parts of the Basin, often during aerial surveys of waterbirds and when working with ABC TV crews, including the indefatigable Paul Lockyer, who tragically died with his colleagues on the edge of Lake Eyre. I have also come to know the remarkable people who care about the Basin, particularly those on the committees I have served on. These include Traditional Owners with their long connection with the rivers on which they rely for survival, reflected in the rich tapestry of dreamtime stories. Many other people depend on flooding of the Lake Eyre Basin rivers and all Australians appreciate the incredible wildlife response on display during floods. Much of the impetus for this book came from concern about making sure we don’t repeat the mistakes of the past in this great place. Various people, often supported by governments, have tried to develop the rivers of the Lake Eyre Basin. The environmental and social consequences, particularly those in the nearby Murray–Darling Basin, are all too well known.

The catalyst for this book was a conference held in Longreach, Queensland, in February 2013, when once again the rivers were under threat from policies of the Liberal National Party Government (2012–15). Most of the contributors to this book were there, presenting their view of their river – views informed by different lifetimes and experiences but fertile in variation. Most are deeply connected to the river basin, and many depend on the free-flowing rivers for their livelihoods. It struck me that few of these people had had an opportunity to tell their stories of why they care so deeply about the future of the Lake Eyre Basin rivers. An equally powerful theme of the conference was provided by river people from the Murray–Darling Basin. Their experiences of development on their rivers provided powerful cautionary tales of a potential future for Lake Eyre Basin rivers. And so this book began.

There followed a long journey, first involving recording speakers’ passionate talks. I subsequently worked with each person, many with relatively little experience of writing, making sure that their written word captured their thoughts, knowledge and experience of Lake Eyre Basin rivers. My aim is that their collective story will help everyone understand what is at stake and keep these magnificent rivers and floodplains flowing freely, unencumbered by dams and diversions. The book is not intended to be a comprehensive account of relevant environmental, cultural or socio-economic issues, but I hope it captures the essence of current and likely future debate about the sustainability of the magnificent rivers of the Lake Eyre Basin. It is fitting in the foreword that the three leaders of the Northern Territory, Queensland and South Australia, where the rivers of the Lake Eyre Basin run, acknowledge these values and recognise the critical role that their governments play in the future sustainability of the rivers of the Lake Eyre Basin.

This means protecting the natural cycles of the rivers and their water, on which all living things depend on. Water is scarce in the Lake Eyre Basin in the heart of Australia,

with an average of less than 500 mm of rainfall each year. Sometimes water comes in a rush or flood, driven by intense rainfall in the catchments of the mighty rivers of the Lake Eyre Basin – Cooper Creek, the Diamantina and Georgina Rivers – and the many smaller tributaries such as Eyre Creek, Mulligan River and Neales River. I have tried to capture the ‘difficult’ word of sustainability through three sections in this book: a description of the Lake Eyre Basin environment; the social, cultural and economic dimensions; and, finally, looking after the rivers.

In 2014, a partnership of people from the Lake Eyre Basin, including many of those who contributed to this book, won the Australian Riverprize in recognition of their effective protection of this wonderful river system. The following year, there was global recognition when the international community awarded the Lake Eyre Basin partnership the International Riverprize – the first time this had ever happened for protecting a river. This basin and its rivers are a national treasure in all dimensions, recognised globally. It’s incumbent on all of us to keep it this way.

## Acknowledgements

This book could not have happened without not only the contributors but also the many people who helped me along the way. I thank all the contributors for their patience and perseverance as they documented their stories of the rivers. Michelle Rodrigo, Vol Norris and Adam Kerezszy were invaluable, not only contributing, but also in guiding, advising and editing. Many others helped as anonymous reviewers of the contributions – a debt I owe you all because your reviews substantially improved the quality of the chapters. I thank the organisations, including Desert Channels Queensland, the Pew Foundation and the Australian Floodplain Association, who helped with the 2013 ‘Lake Eyre Basin Under the Spotlight’ conference in Longreach, which was the genesis of this book. Some particular individuals contributed to make the conference happen, including Amber Davis, Angus Emmott, Tom Crothers, Terry Korn, Adam Kerezszy, Rupert Quinlan and Barry Trail. Of course, all the people who turned up and contributed enthusiastically have in no small way shaped this book. From Desert Channels Queensland, Alun Hoggett manned the camera and audio while Mark Kleinschmidt coordinated the subsequent transcriptions which formed the bases of the chapters. Finally, I thank Diane Harshbarger, who had the unenviable job of helping me pull the figures and references together for each of the chapters.

## List of contributors

### Editor



**Professor Richard Kingsford** is Professor of Environmental Science and the Director of the Centre for Ecosystem Science, UNSW, Australia. He has a background in freshwater science and conservation biology. Richard has a great passion for the people and environments of the Lake Eyre Basin, built up from involvement with both, stretching back to the mid-1980s. He has served on many of the government committees of the Lake Eyre Basin, including the Cooper Creek Catchment Committee, the Community Advisory Committee, the Lake Eyre Basin Scientific Advisory Panel and the Western Rivers Advisory Panel.

### Contributors



**Professor Angela Arthington** is Emeritus Professor in the Australian Rivers Institute at Griffith University, Brisbane. Her main research interests are fish ecology, the impacts of dams and flow regulation on rivers, and the management of environmental flows to maintain the ecological integrity of freshwater ecosystems. Angela is a member of the Lake Eyre Basin Scientific Advisory Panel, and in 2013–14 was a member of the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, Office of Water Science.



**Dr Stephen (Harry) Balcombe** is a Research Fellow in the Australian Rivers Institute at Griffith University. His research focus is largely targeted towards understanding dynamics of fish populations in lowland floodplain rivers, particularly in arid and semi-arid regions. Research areas include fish trophic dynamics, recruitment patterns in response to ecological drivers, determinants of body condition under different environmental settings and the importance of floodplain–river interactions for fish population persistence.



**David Brook** is a founding Director, a shareholder and the Chairman of OBE Organic, a company exporting organic beef, since 1998. His family settled on a property near Birdsville in the early 1900s, where he has lived since 1947 on the floodplains of the Lake Eyre Basin. His family now owns about 3 million ha of properties in the region around Birdsville, including Adria Downs. In 2002, he received an Order of Australia for his contribution to the community, local government and the establishment of organic beef production. David has been active in local government for over thirty years, and was elected as Mayor of the Diamantina Shire (the second-largest shire in Queensland) for 13 consecutive years. He was also board member of the Australian Stockman's Hall of Fame, and in 2009 was elected to the position of Chairman.



**Dr Justin Costelloe** from the University of Melbourne has worked on the hydrology of rivers in the Lake Eyre Basin for the past 14 years. He has studied many aspects of Lake Eyre Basin rivers, including monitoring and modelling flow events, mapping flood patterns, and studying interactions between the rivers and groundwater. He is particularly interested in the spectacular boom–bust links between the hydrology of the rivers and their ecological functions. Justin especially enjoys collecting field data and seeing these rivers and their landscapes in their constantly changing moods.



**Tom Crothers** started his career in 1975 in Toowoomba as a Soil Conservation Officer, working in natural resource management until he was appointed in 2004 as a Regional Services Director of the Queensland Department of Natural Resources. In 2006, he was appointed as a senior executive of the department, as General Manager of the Water Allocation and Planning Group. He supervised completion of 11 Water Resource Plans and 12 Resource Operations Plans. He is currently the Director of Stellar Advisory Services, providing specialist services in the water planning and management, rural water policy and water entitlements.



**Professor Chris Dickman** is co-leader of the Desert Ecology Research Group in the School of Life and Environmental Sciences at the University of Sydney, and co-leader of the Desert Ecology Plot Network, within the Long-term Ecological Research Network. Chris has long been fascinated by patterns in biodiversity and what drives them. He has worked in a wide range of Australian and overseas environments, including forest, woodland, heathland, urban, alpine and arid desert habitats, and on offshore islands.



**Angus Emmott** is a pastoralist and beef cattle producer, who lives in the top end of the Queensland Channel Country, a major component of the Lake Eyre Basin. He is highly regarded by the general public and government, industry and science communities. He is a keen natural historian with an acute interest in sustainable natural resource management. He recently retired as the Independent Chair of the Lake Eyre Basin Community Advisory Committee, representing pastoral, community and natural resource management interests for 12 years. He is currently a member of the Great Artesian Basin Coordinating Committee and a member of the Australian Floodplain Association. He strongly advocates improved protection of the Channel Country rivers. In 2004, the University of Central Queensland awarded him an honorary Master of Science degree for his exceptional work on arid zone flora and fauna and for his involvement in natural resource management. In 2017, he was awarded an Order of Australia for his contribution to sustainability of the rivers of the Lake Eyre Basin.



**Ed Fessey** was born on Bullabellalie, a sheep and cattle station, which straddles the Culgoa River, where he has lived for more than 50 years. He took over running the station from his father. Bullabellalie lies on the Lower Balonne floodplain of the Condamine-Balonne in the Murray–Darling Basin, an area of more than 1 million ha. Rivers are essential for his livelihood and his environment. As a result, he has been actively engaged in the planning and management of rivers in his region, comprising the northern Murray–Darling Basin, for more than a decade.





**Professor Arthur Georges** is an ecologist and herpetologist in the Institute for Applied Ecology in the University of Canberra whose research interests lie in the evolution, ecology and systematics of Australian reptiles. A fundamental interest in these fascinating animals takes him into the field and the laboratory to learn more of their biology and to apply what he has learned in solving contemporary challenges for their conservation. Arthur has a broad interest in fostering research that underpins decisions on the management of our natural environment, but also a particular interest in turtles.



**Scott Gorrington** is a Mithaka man from far western Queensland. He has lived his early life in the Channel Country, and regularly returns to country with his family to visit and care for significant cultural areas. Scott's approach is founded on the belief that all groups of people have the collective knowledge, values and ethics to provide solid foundations from which to build. He believes the challenge is to reconnect with self, others and environment. Scott has worked for Education Queensland where he established mentoring and teacher induction programs. He also worked for the University of Queensland, where his role was a Learning Facilitator in leadership and facilitation, as well as in the area of Native Title Services. As the Director of Murrimatters Consulting, Scott now works nationally and internationally as a consultant on educational leadership, governance and cultural change management. He is passionate about bringing people together around approaches to complex challenges.



**Dr Aaron Greenville** is a Post-doctoral Research Associate in the Desert Ecology Research Group in the School of Life and Environmental Sciences at the University of Sydney. He studies how the environment influences species and how they relate to each other in the food web.



**Dr Fiorenzo Guarino** is an ecologist and ecohydrologist in the Institute for Applied Ecology in the University of Canberra. He has research interests shared between rivers and how they function, and turtle biology. Fiorenzo has worked in universities, government and private industry throughout Australia, South America and Papua New Guinea on rivers, creeks and waterholes. He is currently evaluating hydrological aspects of the Commonwealth's water buy-back program in the Murray–Darling Basin.





**Garry Hall** and his wife, Leanne, run a cattle property in the Macquarie Marshes which depends on the Macquarie River, part of the Murray–Darling Basin. His family has owned their property, The Mole, for four generations, relying on the floods in the Macquarie Marshes to produce beef cattle for the feedlot industry. Garry has lived in the Marshes all his life and carries the striking childhood memory of a Marshes much wetter than today. Dry periods have become more and more frequent. The causes are clear, requiring Garry to become increasingly engaged in how the river is managed. He is the current Chair of the Macquarie Marshes Environmental Landholders Association and is also a member of the Environmental Flows Reference Group, which advises the New South Wales and Australian governments about management of environmental flows to the Macquarie Marshes.



**Dr Adam Kerezsy** is a freshwater ecologist based at Lake Cargelligo in western New South Wales. His primary area of research interest is the rivers and springs of central and inland Australia, and most particularly western Queensland and western New South Wales. Adam is the author of many peer-reviewed scientific papers and conference papers. In 2011 his natural history book, *Desert Fishing Lessons: Adventures in Australia's Rivers*, was published by University of Western Australia Publishing and in 2012 the book received a certificate of commendation at the Whitley Awards as an outstanding publication on Australian fauna. Adam is an Adjunct Research Fellow at Griffith University (Queensland) and Charles Sturt University (New South Wales).



**Bob Morrish** lived in the natural landscapes of the Lake Eyre Basin in Western Queensland for 38 years, mostly on a small pastoral holding on Kyabra Creek south-east of Windorah, part of the Cooper Creek Channel Country. Bob has long been entranced by the natural beauty of the Channel Country, the deserts and the wetlands through to Lake Eyre. For 19 years, he has been Chair of the Cooper's Creek Protection Group, a local group who remain committed to preserving the landscapes, ecosystems and biodiversity of the unique Lake Eyre Basin. Bob has qualifications from the University of Queensland in psychophysiological research, but left the academic life to live in the outback landscapes that are dear to his heart.



**Professor Mark Morrison** is an economist and Associate Dean of Research in the Faculty of Business, Justice and Behavioural Sciences at Charles Sturt University. His research interest is in economics, including non-market valuation, technology adoption, market-based instruments, entrepreneurship and regional development, and climate change communications.



**Dr Gavin Mudd** is an Associate Professor in Environmental Engineering within the School of Engineering at RMIT University. He has expertise in the environmental sustainability of mining, reflecting his research, which has shown the growing environmental impacts of mining from declining ore grades, increasing mine wastes, growing energy and water needs, and challenges in mine site rehabilitation. He also assesses potential impacts of mining and gas exploration and development on groundwater resources, as well as public sustainability reporting by mining companies.



**Vol Norris** is Project Manager for Desert Channels Group in Longreach, Queensland. He worked for 11 years as Lake Eyre Basin Facilitator in Longreach, employed under the Lake Eyre Basin Intergovernmental Agreement, working closely with the Lake Eyre Basin Community Advisory Committee and Scientific Advisory Panel. Vol has worked in group facilitation, remote Aboriginal natural resource management, environmental management systems and auditing, and water policy research. He is passionate about bringing disparate groups of people together to find common ground and ways of collaborating for better natural resource outcomes.



**Leonie Nunn** lives ~134 km south-west of Longreach on the property Sunnyside in the Cooper Creek catchment. Sunnyside is a 40 000 ha sheep and cattle property of red mulga country, channels, open Mitchell grass flats and patches of gidgee scrub. She and her husband run the property. She has worked as a teacher with primary school children, including as a teaching principal. She spent her first few years on a large cattle station near Birdsville in the Diamantina River catchment. Her husband was head stockman on Durham Downs in the Channel Country, the 'jewel in the crown' of 'Cattle King' Sidney Kidman's empire in the Lake Eyre Basin. They are passionate about the importance of free-flowing rivers for the Lake Eyre Basin properties.



**Pop Petersen** was born and raised on a sheep station, west of Longreach in the Lake Eyre Basin in Queensland, where her mother taught her and her six sisters through correspondence school. She then went to boarding school for secondary education. She married Peter and helped manage cattle and sheep properties in New South Wales, before settling on Brenda Station on the Culgoa River in the Murray–Darling Basin in 1979, living there for 27 years. She developed a deep understanding and knowledge of the Culgoa River and its floods and droughts, knowing not only that their livelihood depended on regular flooding but also that they were custodians of a rich floodplain environment.



**Michelle Rodrigo** has lived in Alice Springs, the largest town in the Lake Eyre Basin, for 20 years. As Communications Officer with the Lake Eyre Basin Intergovernmental Agreement for seven years, she had the pleasure of collaborating with the Lake Eyre Basin community, including the Community Advisory Committee and Scientific Advisory Panel, on initiatives to broaden community awareness of the Basin's natural and cultural values and the work of the Lake Eyre Basin Ministerial Forum. A background in natural resource management brought her to central Australia in roles with Greening Australia, Territory Natural Resource Management and the Australia Government. Now a Program Manager with the Terrestrial Ecosystem Research Network, she remains closely connected to the people and landscapes of the Basin.



**Colin Saltmere** is an Indjalandji–Dhidhanu man, living and working on his traditional country in north-west Queensland. He helped establish the Myuma Group to manage his people's not-for-profit Aboriginal enterprise initiatives. He leads the ongoing development and expansion of Indigenous civil construction, hospitality, catering, labour hire, training, employment service and land management businesses.



**Professor Poh-Ling Tan** is the International Watercentre's Professor for Water Law and Governance, based in Griffith University, Brisbane. Born in Kuala Lumpur, she has academic and professional legal qualifications from both Malaysia and Australia. She serves as the water governance expert on the Advisory Committee on Social, Economic and Environmental Sciences, Murray–Darling Basin Authority, and on the Water Expert Panel for the Queensland Minister for Energy and Water Supply. Until 2014, she served on the Water Resource Operations Plan Referral Panel set up under the *Water Act 2000* (Qld) to make recommendations on issues arising from water planning.



**Professor Glenda Wardle** is co-leader of the Desert Ecology Research Group in the School of Life and Environmental Sciences at the University of Sydney, New South Wales since 2006, and co-leader of the Desert Ecology Plot Network within the Long-term Ecological Research Network. Glenda studies the dynamics of populations, species and ecological interactions, particularly for conservation and management of deserts. She has spent the past 20 years unravelling how plants and animals interact in the Simpson Desert of central Australia.



**Trevor Wright** spent his childhood living in Boort in northern Victoria. He now lives in the small town of William Creek in far north of South Australia, 70 km west of Kati Thanda-Lake Eyre. He first arrived here in the late 1980s and early 1990s, hoping to capitalise on the small town's proximity to Lake Eyre and the opportunities for tourism. He was going to trial it for three months and now two decades later he has a thriving tourism business. Trevor provides flight packages for tourists over Lake Eyre, but also services tourists with accommodation and the William Creek Hotel, which he now owns.

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