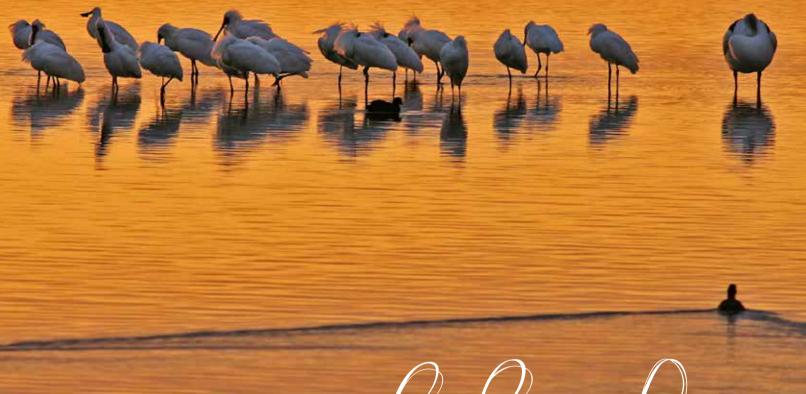


Australian Government

Department of Sustainability, Environment, Water, Population and Communities



one place, many stories

www.vaydartingbasin

This book showcases the unique and diverse landscapes, habitats, communities and industries of the Murray-Darling Basin.

It is part of the *Our Australia* series published by the Department of Sustainability, Environment, Water, Population and Communities.

For more information on the department's water programs and policies being delivered in the Murray-Darling Basin visit www.environment.gov.au/water

Cover: Royal spoonbills, Coorong National Pa Photo credit: Paul Wainright

(C) Commonwealth of Australia 2013

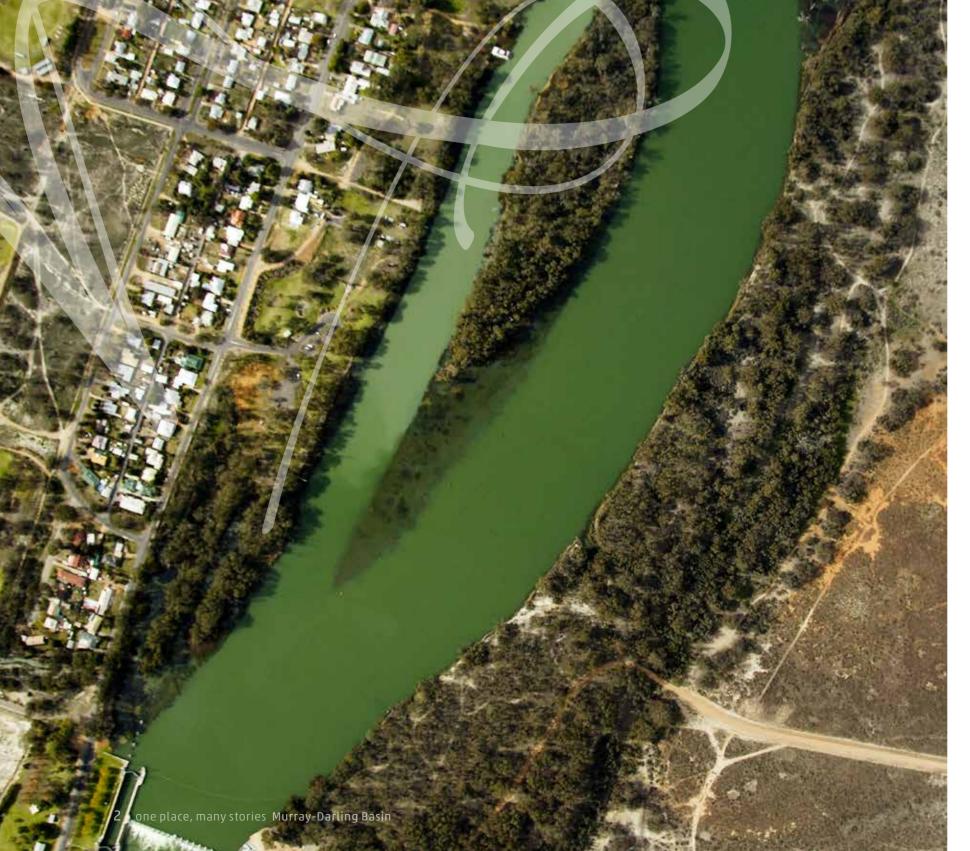
ISBN 978-1-921733-77-2

This work is protected by copyright law. Apart from any use permitted by the *Copyright Act 1968* (including research or study) no part may be produced by any process, reused or redistributed for any commercial purpose or distributed to a third party for such purpose, without prior written permission from the Department of Sustainability, Environment, Water, Population and Communities

All data included in this document are presumed to be correct as received from data providers No responsibility is taken by the Commonwealth for errors or omissions and the Commonweal does not accept responsibility in respect of any information or advice given in relation to, or a a consequence of anything contained therein

Design: Paper Monke

one place, many stories darking basin



ministers foreword



In November 2012 Australia ended more than a century of disagreement on how to manage the Murray-Darling Basin and the Murray-Darling Basin Plan became law.

No one can understate the significance of this achievement.

When Australia's states were sorting out Federation in the 1890s one of the arguments they couldn't fix was the Murray-Darling Basin. One hundred and twenty years later it has finally been sorted out.

For too long the system was managed by state governments as if its rivers ended at state borders. And the health of the river suffered.

This resulted in toxic algal blooms, diminishing numbers of native fish and waterbirds, salinity, redgums dying from lack of water, and a lack of flushing through the Murray Mouth.

It was obvious that the rivers don't respect state boundaries when the mouth of the Murray closed in the recent drought.

But the real game changer came in 1991 when a blue-green algae outbreak occurred, stretching for one thousand kilometres.

This was when the environment first turned up to the negotiating table and proved to be more ruthless and less compromising than any of the states.

Effectively, the rivers decided collectively that if we were going to manage the water as though it stopped at state boundaries then the water could not continue to function as a healthy working system.

Only a national plan was going to put things right.

Now because of the actions now taken, Australia — a century late but hopefully just in time — has its first Murray-Darling Basin Plan.

This reform restores the Murray-Darling Basin to health.

The first ever Basin Plan, signed into law last year allows us to pursue the outcomes of returning 3,200 gigalitres to the system.

The Plan itself restores 2,750 gigalitres of surface water to the environment and sets new, sustainable limits on water use.

It also allows these environmental objectives to be reached in ways which minimise the impact on communities throughout the basin.

Knowing our rivers needed more of an insurance policy to face future challenges, the Commonwealth Parliament has authorised an additional \$1.7 billion to deliver a further 450 gigalitres for the environment and remove flow constraints.

It's been a century in the waiting, but the ink is now dry on the page. The law is now in place. And the Murray-Darling Basin will be restored to health.

After more than a century, the negotiating is over – the rivers won.

The Hon Mark Butler

Minister for Environment, Heritage and Water





For all its size and complexity, and despite the diversity of ecosystems it supports and landscapes it traverses, the Murray-Darling system is best understood as a single organism in which anything that affects a part also affects the whole. Like many organisms, it has been remarkably adaptable to human activity — but only up to a point.

Towards the end of the 20th century the river system was reaching the limit of its tolerance. Action was required to rebalance the amounts of water being used for human consumption (towns, irrigation and industry) and the availability of water to sustain a healthy environment.

The Murray-Darling is hugely important not only to the people who live there but also to the whole country. Use of Basin water has driven regional and national economic growth for more than 150 years. However, it has also affected the environment in ways that threaten both the ecologies of the Basin rivers and the long-term viability of local economies. This makes the goal of creating a healthy working Basin something that unites governments and communities even as they struggle to reconcile the many different interests involved.

In essence the story of the Basin over the past almost two centuries is one of human enterprise taking the river to the limits of its adaptability, the river asserting its inability to carry on, and human ingenuity being applied to bringing the river back to life while remaining productive.

6 one place, many stories Murray-Darling Basin

abundance

Throughout the Murray-Darling river system, fish health is a barometer of overall health. For this reason — and returning to the metaphor of the giant fish — the story of what has happened to Murray cod is highly illustrative.

Murray cod is Australia's (and one of the world's) largest freshwater fish. It was considered excellent to eat and was a major food source for Aboriginal people in the Basin. Early European explorers and settlers were delighted to find such a rich resource in a daunting landscape. The explorer John Oxley wrote in 1817 of the Lachlan River:

If however the country itself is poor, the river is rich in the most excellent fish, procurable in the utmost abundance. One man in less than an hour caught eighteen large fish, one of which was a curiosity from its immense size and the beauty of its colours ...

Murray cod was commercially fished in the southern Basin rivers from the mid-1800s until the early 2000s, when commercial fishing was prohibited. Its abundant numbers across the Basin declined in the 20th century, first gradually and then, from about the middle of the century, more dramatically. Likely factors in this decline — all of which reflect the overall health of the Basin — include:

- over-fishing of a long-lived, slow-growing species with widely spaced generations — intense pressure on a valuable but vulnerable resource
- contamination from toxic chemicals (such as sheep dip) released from grazing lands of the northern Basin in the early 1900s – shortsighted farming practices upstream affecting the whole system
- competition from and predation by an introduced species, redfin (English perch)
 opportunistic exotics threatening more vulnerable indigenous species
- changes to water flows and temperatures
 caused by river regulation structures
 (dams, weirs, levee banks) affecting
 breeding and survival into adulthood
 – the wider, long-term ecological
 impacts of extensive river regulation.



Dasin overview

The Murray-Darling Basin covers over a million square kilometres of south-eastern Australia — 14% of the continent: three-quarters of New South Wales, all of the Australian Capital Territory, half of Victoria and a large part of South Australia. It is Australia's largest environmental asset and most important production asset.

The Murray-Darling is a predominantly low-lying, flat and slow-flowing river system. The volume of water in the Basin is low — the average annual volume of water flowing through the Murray is less than the average daily flow of the Amazon. The long-term average natural flow into the Basin is around 33,000 gigalitres.



Geography and climate

The Basin's 23 rivers have some of the lowest and most variable flows in the world. Many of its vast network — over 77,000 kilometres — of rivers, creeks and watercourses only carry water or connect to other rivers in times of flood; for the rest of the time they are dry or disconnected.

The amount of rain that falls across the Basin on average each year is estimated to total 530,618 gigalitres. Of this, around 94% evaporates or transpires through plants, 2% drains into the ground and 4% runs off into the river system. This amounts to about 32,500 gigalitres. The capacity of major water storages in the Basin is about 34,500 gigalitres.

Floods and droughts have always been central to how the Murray-Darling system works, bringing wide variability of water availability throughout the year, from year to year and over longer periods.

The Murray-Darling Basin has more than 30,000 wetlands — 16 of which are listed under the Ramsar Convention on Wetlands of International Importance — and a richly diverse range of ecosystems supporting iconic vegetation communities such as river red gums and a wide variety of native plant and animal species.





The Basin has a population of more than two million, many of them in Canberra and a number of regional cities. Another 1.3 million people, including the residents of Adelaide, depend on water from the Murray-Darling.

For communities within it, the Murray-Darling is much more than an essential economic resource; it is a source of identity, recreation, connection, aesthetic appreciation and cultural inspiration.

Agriculture is a defining feature for many of the Basin's communities.

Many residents have a strong connection with the land, which forms part of their identity. Many towns were explicitly established as irrigation communities to encourage economic and social development, e.g. as part of postwar soldier settlement or the development of the Snowy River hydroelectric scheme.

The Murray-Darling Basin produces more than a third of Australia's food and about 40% of the national agricultural output. Related industries like transport, food processing and other manufacturing also contribute significantly to the regional and national economy.

Tourism and recreation are vital to the Murray-Darling economy, providing employment for as much as 25% of the Basin's workforce. Its national parks, wetlands, rivers, flora and fauna, cultural heritage and historical significance draw millions of visitors each year. Healthy ecosystems and water levels drive the popularity of activities such as camping, birdwatching, fishing, yabbying, boating, kayaking and canoeing, bushwalking and photography.

Basin water resources are used for water sports and other recreational activities. It is estimated 430,000 people use Basin water resources for more than five million recreational fishing trips a year.

The Basin is home to some 30 Aboriginal nations whose connection with the land and water goes back more than 50,000 years. Their cultural heritage, laws and customs are based on a close spiritual relationship with the land and water of the Murray-Darling.

For Aboriginal people across the Basin the rivers sustain their life and identity and they are an integral part of the river system.

The river system should be free-flowing. As Aboriginal people, we are free-flowing. Non-Aboriginal people like to put things in boxes. The system is becoming dysfunctional and sick. We are feeling the impact of this and we are becoming dysfunctional and sick — socially, economically and culturally.

Matt Rigney, Ngarrindjeri Elder (deceased).

Jimaringle Creek before environmental watering (2 March 2012) and after environmental watering (11 April 2012).

Jimaringle Creek is in the Edward-Wakool river system, NSW.



In response to clear indications of ecological damage associated with low and altered river flows, governments began environmental watering in the early 2000s. Environmental watering activities are targeted interventions to return water previously extracted for consumptive uses to the environment.

Frequency of waterbird breeding events and size of breeding populations in many key wetlands declined dramatically due to river regulation and water resource development. Many species of waterbirds breed in large numbers only during flooding of wetlands and lakes.

During 2011–12, 147.5 gigalitres of Commonwealth environmental water was delivered to the mid-Murray. Some of this water was delivered to Jimaringle and Cockran creeks to improve the health of native plant communities, such as fringing river red gum and black box. This in turn provided good-quality habitat for native fish, frogs, birds and other native animals.

The involvement of local landholders has been critical to the successful planning, delivery and use of environmental water.



landscapes of the Basin The Darling River nassive structures harnessing 'mighty Murray' in the south-ea

The Barwon-Darling river system provides the only surface-water connection between the northern and southern parts of the Basin. The catchment is typical of a large dryland river system with low gradient and large floodplain, climatic variability and arid to semi-arid conditions. Agricultural production is dominated by dryland grazing but approximately 60,000 hectares are irrigated, mostly for cotton.



The Darling is the longest river in Australia but its flows are much lower and less reliable than those of the Murray (the second longest).

snapshats

the Basin is a place of many

different landscapes.



unvegutated vivers
Paroo and Warrego

The rivers and streams of the north-western Basin are largely unregulated. The landscape is characterised by low gradients and extensive floodplains, arid to semi-arid conditions and low and intermittent flows. Dryland grazing is the predominant land use in this sparsely populated region. The Paroo and Warrego catchments represent the Basin in its wildest state.

The Paroo Valley is the only catchment area in the Basin that achieved an ecosystem health rating of 'good' in the Sustainable Rivers Audit 2008–2010.

The Warrego River headwaters rise near the Warrego and Chesterton ranges at the northern edge of the Basin and the river reaches the Darling only during floods. There are no instream storages other than weirs. The health of the Warrego Valley river ecosystem was rated 'moderate' (the only one in this category) in the Sustainable Rivers Audit 2008-2010.



intensive of agriculture Condamine-Balonne

One of the most intensively farmed regions in eastern Australia is the Condamine–Balonne, which extends from southern Queensland west of Toowoomba into northern New South Wales. Major land uses here are grazing, dryland cropping and irrigated cropping — predominantly cotton growing.

The landscape ranges from high country in the east to wide alluvial plains in the lower Balonne, with vegetation graduating from thickly forested areas at higher altitude to open forest, shrublands and grassy plains in the west. The Condamine catchment has some of the most fertile soils and highest agricultural productivity in Australia.

In contrast to the major irrigation areas of the southern Basin, more water is held in private offstream dams than in public instream storages. Large-scale harvesting of waters from the floodplain affects the river flow regime.

As with most of the Basin catchments, the health of the Condamine Valley river ecosystem was rated 'poor' in the Sustainable Rivers Audit 2008–2010. Irrigators are working with governments to make their irrigation infrastructure more efficient. Water savings are used by the irrigators for productive purposes and shared with governments for return to the environment.

Governments also purchase water from irrigators in the Condamine–Balonne that can be used to benefit wetlands and floodplains in that catchment and downstream in the Basin.

subalpine wetland Ginini Flats

For many of us the Murray-Darling Basin brings to mind images of big, brown rivers running through agricultural countryside. The Basin is a place of many landscapes and one is the Australian Alps. The Alpine National Parks are pristine areas in the Basin and include the streams that form the headwaters of the Murray.

The Ginini Flats Ramsar wetland site in the Australian Capital Territory's Namadgi National Park is one of the largest, deepest and least disturbed subalpine sphagnum bogs in mainland south-eastern Australia. It is important in maintaining the genetic and ecological diversity of a number of endemic and restricted species found in subalpine wet heaths and bogs.

It has diverse flora and fauna only found in this wetland type, and provides important breeding habitat for the nationally threatened northern corroboree frog.

Snow cover on the subalpine ranges in this area provides a significant winter water storage that is released slowly as the snow melts.

It is likely that the open flats were traditionally used as a route by Indigenous people during their annual visits to the high peaks to harvest bogong moths. Now part of a national park, Ginini Flats is used for conservation, catchment management, education and recreational activities such as bushwalking and cross-country skiing.







The Murray begins as a small stream near Mount Kosciuszko in the Australian Alps and flows south-west towards Lake Mulwala in northern Victoria. Apart from several large population centres (notably Albury–Wodonga) much of the region is undeveloped, including the Alpine National Parks. Tourism is an important source of income.

In its natural state the upper Murray was an unpredictable water source — a trickle in summer and a large, fast-flowing river in winter and spring, fed by mountain streams and melting snow. To create a more reliable supply, the river flows have been artificially regulated almost from the beginning of European settlement in the area.

Significant volumes are stored in large dams for downstream use in towns and irrigation. Although it is only about 2% of the Basin's land area, the upper Murray contains about 40% of the total water in the Basin.

The Snowy Mountains hydroelectricity and irrigation scheme captures flows from the Snowy Mountains and diverts them to the Murray River and Murrumbidgee River via a system of mountain tunnels.

Hoodplain forest Barmah

The Barmah Forest Ramsar site, on the Victorian side of the River Murray floodplain, is predominantly river red gum open forest and, with Millewa State Forest on the New South Wales side of the river, forms the largest stand of river red gums in the world.

Most of the forest functions as a single floodplain wetland system that depends on regular spring flooding to keep the river red gum healthy and allow waterbirds to breed and raise their young.

Wetlands within the forest vary from permanent lakes and billabongs to shallow pools with prolonged seasonal flooding. An extensive area of moira grass plains provides significant breeding and feeding habitat for waterbirds including Australian white ibis and straw-necked ibis.

Water resource development has meant the Barmah-Millewa Forest gets flooded less frequently. As a result the condition of river red gums and moira grass plains has declined. Waterbird breeding events have also become less regular. To support the recovery of native plants and animals, 1500 megalitres of Commonwealth environmental water has been delivered to the Barmah-Millewa Forest since 2009





heritage town Echuca

After various voyages in the 1850s to test the practical limits of river trade on the Murray, Murrumbidgee and Darling rivers, it was apparent that the only reliable waters that could be safely navigated were those of the Murray from Echuca downstream.

Construction of a wharf and railway (with a direct link to Melbourne) at Echuca in the late 1860s changed the course of Australia's economic history by enabling goods to be transported quickly and cheaply from the Riverina and western New South Wales to Melbourne and Adelaide. The river trade in the Murray-Darling Basin reshaped pastoral industries. The difficulty of transporting wool overland to market was removed, and sheep numbers grew rapidly.

As the pastoral districts thrived, the river trade grew. By 1864 Echuca was Australia's largest inland port. At its peak in the early 1880s, more than 200 vessels used the wharf each week and more than 93,000 tonnes of goods were transported through it every year.

Echuca was unchallenged as a major trading centre for nearly 20 years until the opening of the railway from Junee to Hay in 1882.

Echuca's massive red gum wharf has survived and is still operational, although the three paddle-steamers that use it now — P.S. Adelaide, P.S. Alexander Arbuthnot and P.S. Pevensey — carry tourists rather than commodities.

Echuca Wharf is on the National Heritage List It is still a working port, although tourism has replaced trade. irrigation community
Griffith

In the heart of the productive Murrumbidgee Irrigation Area of the Riverina, Griffith exemplifies the Basin's role as the food bowl of Australia. Wine, citrus fruits, rice and other food crops dominate the local economy.

The town of Griffith was proclaimed in 1916, being purpose built as part of the irrigation area that started supplying water to farms in 1912. Through the last century this irrigation community has survived challenges such as crop failures and farm restructures, as well as numerous droughts and floods.

The Griffith community of the twenty-first century is resilient and adaptable in the face of changing market demands for food and fibre, and the changing availability of irrigation water.

Today the Murrumbidgee Irrigation Area contributes over \$2.5 billion annually to the Australian economy.

The passionate commitment of local residents to the past, present and future of this and other Basin communities was demonstrated in 2010 when the Murray-Darling Basin Authority released its Guide to the Proposed Basin Plan. Town residents, farmers and business owners responded by coming out in force in support of their community.

In 2011 the Authority announced its commitment to strengthening community involvement in designing and implementing the Basin Plan:

We are not willing to experiment with the lives of real people living real lives in the Basin. The result should, indeed must, have regard for the people who live in the Basin, their lives and livelihoods, not dealt out because they don't fit in with some scientific model, but dealt in because they are valued and needed as part of our great Australian landscape.

Craig Knowles, Murray-Darling Basin Authority Chair, April 2012





Irrigated agriculture is the backbone of Griffith and many other Basin communities.



the Coorong and Lower Lakes

At the end of the River Murray in South Australia lie the Coorong and Lower Lakes (Lakes Alexandrina and Albert). The river flows into Lake Alexandrina and out to the Southern Ocean through the Murray Mouth estuary. Lake Albert is a terminal lake connected to Lake Alexandrina by a narrow channel.

The whole area is a Ramsar site, supporting extensive and diverse bird, fish and plant communities. These include threatened species such as the silver daisy-bush, metallic sun-orchid, southern bell frog, Murray cod, and Mount Lofty Ranges southern emu-wren. It is an important area for waterbirds, including 25 species listed under international migratory bird conservation agreements.

Prolonged drought, extraction of high volumes of water for human consumption and other uses, and the early impacts of climate change have adversely affected water availability at the Coorong and Lower Lakes and been linked to declines in abundance of a number of fish and waterbird species.

During the drought years of the decade to 2009, flows at the Murray Mouth were particularly low. This caused siltation of the Murray Mouth channel and extreme hypersalinisation of the South Lagoon, where salinity reached more than four times that of the ocean.

The Coorong is a long, shallow, brackish to hypersaline lagoon more than 100 kilometres ong, separated from the Southern Ocean by a narrow sand dune peninsula. A series of barrages keep saline waters from the Coorong and Murray Mouth from entering he Lower Lakes and the Murray River.

34 one place, many stories Murray-Darling Basin times that of the ocean.

Using water well requires governments working with communities to allocate water for consumptive purposes at sustainable levels and to use recovered water efficiently to meet environmental needs.

Environmental triggers

By the 1960s there was some awareness of the environmental complications of overextraction of water from the Basin. However, it took a series of river crises in the early 1990s to bring the Basin states together with the Australian Government to work towards essential water use reforms. Finally, it seemed, the river system had balked at the way it was being managed and the demands that were being made on it.

The Water Act 2007 established the Murray-Darling Basin Authority to develop the Basin Plan as a framework for the management of Basin water resources. The Australian Government started to acquire water for strategic environmental watering to mitigate some of the worst effects of drought.

Traditional approach

Sharing water has long been a complex challenge for everyone with an interest in the Basin. Widely respected Ngarrindjeri elder Tom Trevorrow (deceased) cut through the complexity when he expressed the approach of Traditional Owners to caring for the natural landscape, including water:

Our traditional management plan was don't be greedy, don't take any more than you need and respect everything around you. That's the management plan — it's such a simple management plan, but so hard for people to carry out.





Many remarkable individuals have contributed to achieving water reform in the Murray-Darling Basin.

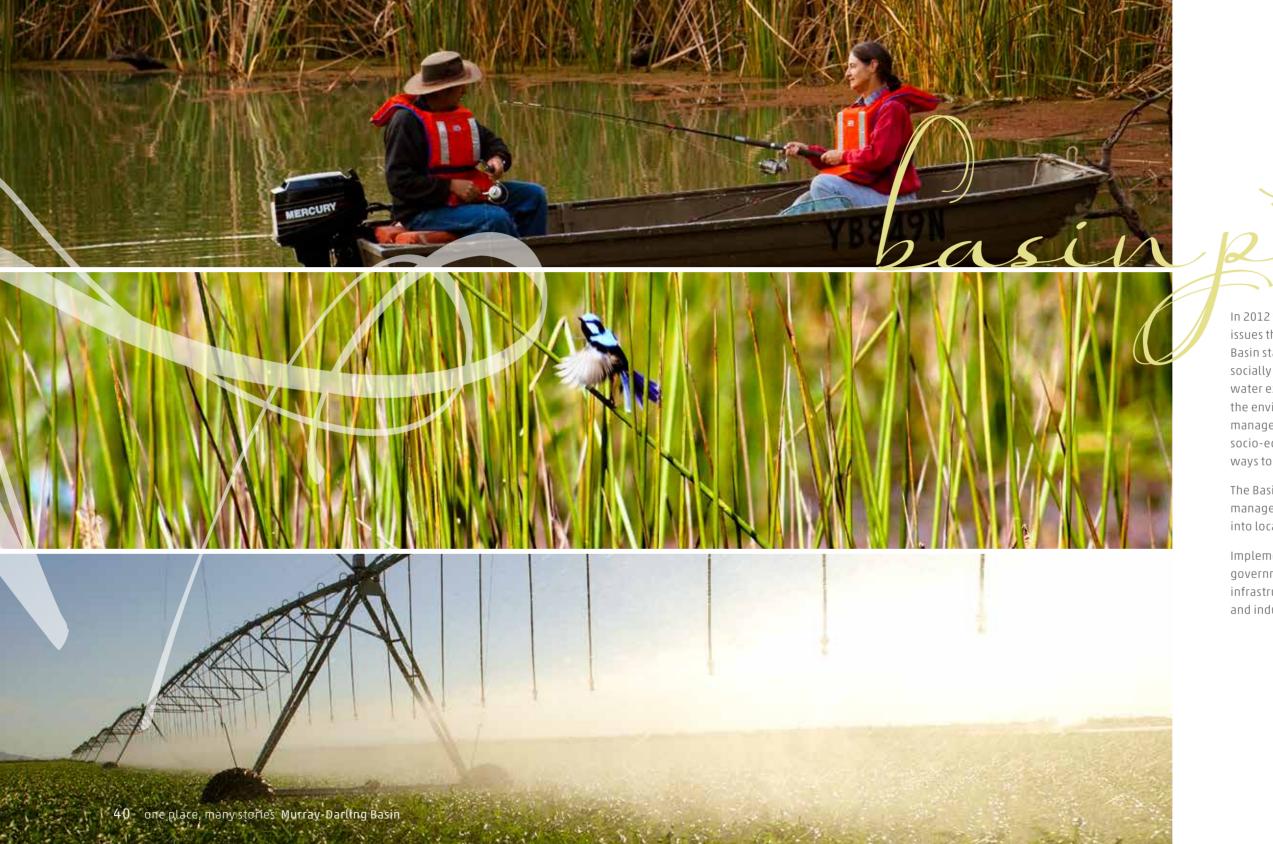
There is no better example than Henry Jones, a fourth-generation fisherman on South Australia's Lower Lakes. For decades Mr Jones has been a tireless advocate for the Basin environment.

Hosting prime ministers, premiers and other representatives from across the political spectrum on the lakes he knows so well, he showed them how management of the Murray-Darling Basin was affecting the environment at the end of the system.

If you've got a healthy, sustainable river then it's great to be able to irrigate and grow stuff. But if the river's not sustainable it starts to die. That's what's happening down here. Year after year we're seeing species being lost from the area. There's no leeches here anymore, there's no shrimps here anymore, there's no little snails in the water that the swans and the musk ducks and the diving birds used to feed on — they're not here anymore. Without that water to be able to flush salt out of the system, things are just dying slowly before our eyes.

Henry Jones

Henry Jones has devoted countless hours to submissions on River Murray reform. He has been actively involved in many community based and government committees, and worked with the South Australian media to raise the profile of environmental issues in the Coorong and Lower Lakes.



In 2012 the Basin Plan was enacted, addressing issues that had troubled relations between the Basin states since Federation. It sets environmentally, socially and economically sustainable levels of water extraction. The Plan has flexibility to increase the environmental share as innovations in water management are rolled out, and to reduce socio-economic impacts through more efficient ways to use water for environmental outcomes.

The Basin Plan recognises the need for adaptive management as well as mechanisms for tapping into local knowledge and expertise.

Implementing the Basin Plan involves significant government investment in public and on-farm infrastructure modernisation, as well as communities and industries adapting to new ways of using water.

Meeting water savings targets through industry and on-farm efficiencies

Cotton and rice

Australia's cotton growers have improved water efficiency by 250% since the 1970s – they now produce 8 bales/ hectare compared to 3.3 bales/hectare. The industry is targeting a doubling of water use efficiency in the next 10 years.

Efficiency savings come from innovations that increase water availability to the cotton root system, on-farm water storage, water recycling and irrigation scheduling methods to conserve water. Nearly all cotton farms are now designed with systems that re-use water and capture the first flush of storm run-off from the farm.

The rice industry is also saving water for return to the environment. In the past 10 years, Australian rice farmers have improved water use efficiency by 60% - growing more rice with much less water. Australian growers use 50% less water to grow one kilo of rice than the world average.

Irrigation infrastructure

The Trangie-Nevertire Cooperative Ltd has used Australian Government irrigation infrastructure funding to stem an unsustainable rate of water loss. Losses were reduced by installing automated realtime water metering, automated gates and improved telemetry to provide greater control over water use. Channels were reshaped and lined with a new type of durable rubber that not only limits water loss but also helps control weeds, resulting in less use of harmful chemicals.

Before the upgrade, the cooperative tried to minimise water loss by providing water down the system to everyone at the same time. This meant that everyone had to use their water at a similar time each year, so each farmer grew the same crops. With the new system, farmers can now diversify their crops.

Secure and reliable water means secure and reliable income for farmers, which in turn means secure and reliable trade for local communities. This makes it easier to maintain services such as doctors and schools, making the local towns more attractive to families.

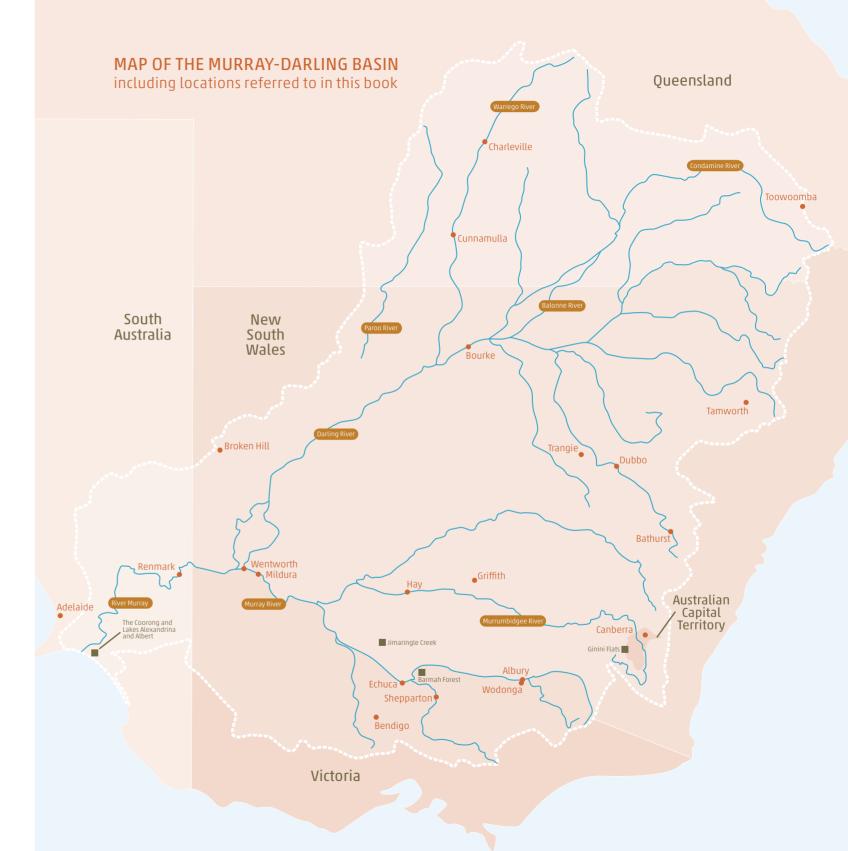
The water savings from this project will provide nearly 30,000 megalitres of water entitlements to the Commonwealth for environmental use.





Image credits

Cover	Royal spoonbills, Coorong National Park	Paul Wainright
2	Blue-green algae at junction	IOJ Aerial Photography, © MDBA
_	of Murray and Darling	To Menatr Hotography, @ Fibbh
4-5	Murray cod	Gunther Schmida
6-7	Ben Chifley Dam	Jette McKellar, courtesy of Bathurst Regional Council
9	Salinity at Hart's Lagoon near Waikerie	John Baker
10-11	Murtho cliffs, River Murray	Linda Selg
12	Children jumping into the Murray River	Irene Dowdy, © MDBA
12	Picking oranges in the Murrumbidgee Irrigation Area 1965	NAA: A12111, 1/1965/16/135. From the collection of the National Archives of Australia
12	Packing oranges in the Murrumbidgee Irrigation Area 1965	NAA: A12111, 1/1965/16/134. From the collection of the National Archives of Australia
14-15	Before and after environmental watering at Jimaringle Creek	Josh Campbell, Murray CMA
16-17	Junction of the Darling and Murray Rivers	Andrew Tatnell
17	Weir on the Barwon River	Arthur Mostead
18	Paroo River	Andrew Tatnell
19	Paroo River	Andrew Tatnell
20-21	Cotton crop	Queensland Country Life
22-23	Ginini Wetlands	Di Conrick
24	Ben Chifley Dam	Jette McKellar, courtesy of Bathurst Regional Council
24-25	Park irrigation, Kings Parade, Bathurst	David McKellar, courtesy of Bathurst Regional Council
26-27	Snowy River environmental water release	Alex Zuk
28-29	Barmah National Park	John Baker
30-31	Port of Echuca	John Baker
33	Orchard drip irrigation	Mark Mohell
33	Solar powered irrigation channel gate	Mark Mohell
34-35	Mouth of the Murray River, Coorong National Park	Theresa Myburgh, Lower Murray Infrastructure, courtesy of DWLBC (SA)
36-37	Lake Mulwala	TrevorJlerino
38-39	Minister Tony Burke with Henry Jones	Matt Turner/NEWSPIX
40-41	Fishing in the backwaters of the Murray River	Corey Brown, © MDBA
40-41	Superb fairy-wren	Rebecca Gee
40-41	Irrigated crop	Arthur Mostead
43	Cotton crop	Arthur Mostead, © MDBA
43	Sorghum crop	Arthur Mostead, © MDBA





www.environment.gov.au

© Commonwealth of Australia 2013