

The Commonwealth Environmental
Water Holder acknowledges
Australia's traditional owners and
respects their continued connection
to water, land and community.
We pay our respects to them and
their cultures and to their elders both
past and present.



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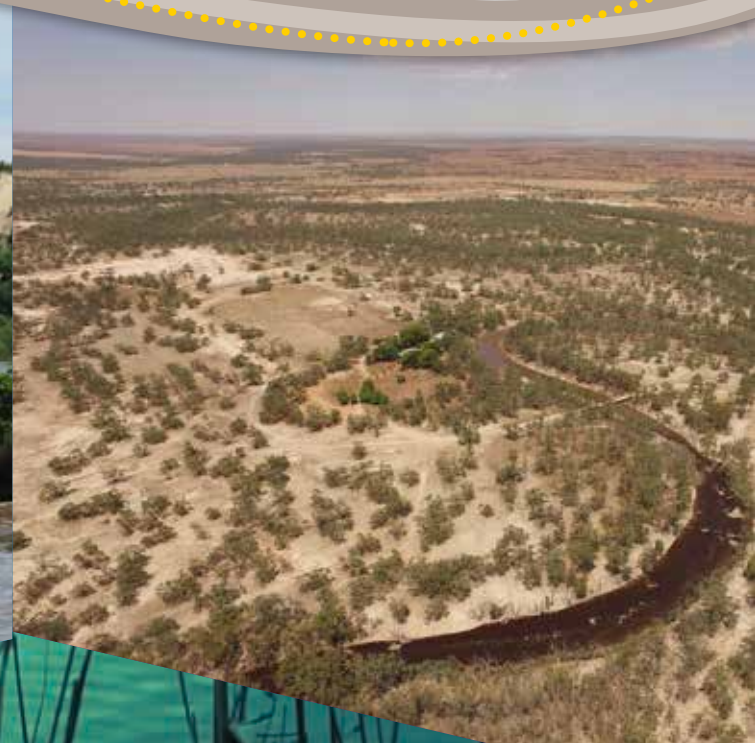
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Australian Government

Commonwealth Environmental Water Office

RESTORING AND PROTECTING THE
**LOWER
MURRAY-DARLING**
2017-18 SNAPSHOT



*Above: The lower reaches of the Great
Darling Anabranch in 2017
Cover: Environmental water starts making its way
down the Great Darling Anabranch in 2017
Back cover: Pelicans take a break on the edge
of the Coorong*

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noted otherwise.*



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We use environmental water to improve the health of our rivers, floodplains and wetlands

Throughout the Murray–Darling Basin, we deliver water to important locations to support the health of waterways and the many unique native animals, plants, birds and fish that depend on them to survive and thrive.

The Lower Murray–Darling region contains diverse and rich natural environments that supply water for domestic and extensive agricultural use. Its waterways are central to the cultural values and practices of Aboriginal traditional owners, and support tourism and recreational activities.

The Lower Murray–Darling's rivers, floodplains, swamps and wetlands provide habitat for threatened animals including the regent parrot, Australasian bittern, Murray cod, Murray hardyhead, silver perch, southern bell frog and Murray River tortoise. The region also features internationally significant wetlands, including the Coorong and lakes Alexandrina and Albert, the Riverland complex, Banrock Station and Hattah–Kulkyne Lakes.

The Commonwealth Environmental Water Office works in partnership with state government agencies and local organisations to plan and manage flows for the environment. We are working to achieve environmental outcomes as outlined in the Basin-wide Environmental Watering Strategy and the Murray–Darling Basin Plan.

Summary of longer term outcomes under the Basin-wide Environmental Watering Strategy



Maintain base river flows and increase the number of bank-full and 'fresh' events. A fresh event is an increase in a river's water levels beyond the base flow. It does not fill the river or go over the bank.

Improve overall flows in the River Murray by 30 per cent and to the Murray Mouth by 30–40 per cent.

Maintain levels in the Lower Lakes above 0.40 m.

Provide freshwater flows greater than 2000 GL per year into the Coorong (on a three-year rolling average).



Maintain the current area of river red gum and black box forests and woodlands, improve their condition and increase the survival rate of young trees.

Maintain the area and improve the condition of lignum communities, particularly in the Lower Darling and in the River Murray from its junction with the Wakool River to downstream of Lock 3, including Chowilla and Hattah Lakes.



Maintain the area of native plants on the banks and in stream, particularly in or near the River Murray, the Lower Darling River and the Great Darling Anabranch.



Maintain an adequate population of *Ruppia tuberosa* in the south lagoon of the Coorong.



Maintain the current waterbird species diversity and increase their populations by supporting breeding opportunities.

Maintain current populations of migratory shorebirds at the Coorong.



Create the right conditions to improve native fish health, spawning and movement, with the aim of increasing the overall fish populations.

Maintain estuarine fish in the Coorong, including by increasing mullet spawning and overall populations and expanding the range of black bream and greenback flounder.



Emus bathing in the Coorong

Water for the Lower Murray–Darling environment to date

The environmental need for water is a reflection of the health of rivers, wetlands and floodplains, and the plants and animals they support. Ecological health is influenced by flows and conditions in the past. In some cases this can date back many years—parts of the Lower–Murray Darling environment are still showing the effects of the millennium drought.

Between 2010 and 2012 natural flows and targeted environmental water delivery resulted in improvements in the condition of many wetlands in the Lower Murray–Darling and started the recovery from the millennium drought. In drier conditions from 2013 to 2016, some floodplain and wetland sites entered a natural drying phase, and the scale of river flows reduced. The Lower Darling River and Great Darling Anabranch experienced minimal or no flows from 2014 to mid-2016. In the Lower Murray there was negligible spawning of golden perch, probably because of the low flows. The low flows also led to increases in salinity in the Coorong, which had detrimental impacts on native fish and plants, including ruppia.

Heavy rainfall across the southern Murray–Darling Basin in the latter half of 2016 resulted in large volumes of water flowing through the Lower Murray, wetting many of the adjacent wetlands and woodlands higher up on the floodplain. There were mixed results for native fish in 2016–17. Natural flows into Menindee Lakes provided an opportunity for environmental watering of the Lower Darling and the Great Darling Anabranch to support a

large Murray cod spawning event and help young golden perch travel from nursery habitats in the lakes to the River Murray. On the downside, the natural floods caused a large hypoxic blackwater event that killed many fish.

The high natural flows and additional environmental flows during 2016–17 improved water quality and water levels in the Coorong, benefiting native fish. However, the southern Coorong still showed limited recovery. There was increased coverage and flowering of ruppia in 2016–17, but the growth of algal mats hampered the setting of seeds.

Key needs for 2017–18 include supporting the recovery of native fish populations (including providing habitat and food for fish from the Lower Darling), consolidating the growth of native plants after the flood and continuing flows into the Coorong to restore its unique habitat.

Supplying water for the environment

The water acquired by the Australian Government through investment in more efficient irrigation infrastructure and other measures enables the Commonwealth Environmental Water Holder to provide river flows needed to restore and protect the natural system throughout the Basin.

We often use this water to supplement natural floods and environmental water provided by the New South Wales Office of Environment and Heritage, the Victorian Environmental Water Holder, the South Australian Department of Environment, Water and Natural Resources, The Living Murray program and the River Murray Increased Flows program.

Depending on river operating rules, flow constraints and climatic conditions, the Commonwealth Environmental Water Holder can decide to:

- use water to meet identified environmental demands
- hold on to the water and carry it over for use in the next water year ('carryover')
- trade (buy or sell water) for equal or greater environmental benefits.



Birds welcome additional flows in 2017

Our partners

The best approaches to managing water for the environment involve local knowledge and the latest science.

Commonwealth environmental watering is planned, delivered and managed in partnership with individuals and groups in the Lower Murray–Darling region. Partners include:

- the New South Wales Office of Environment and Heritage (including the National Parks and Wildlife Service)
- the New South Wales Department of Primary Industries
- WaterNSW
- Lower Murray Water
- Murray Local Land Services
- Western Local Land Services
- the Victorian Environmental Water Holder
- Goulburn–Murray Water
- the Mallee Catchment Management Authority
- the South Australian Department of Environment, Water and Natural Resources
- the South Australian Murray–Darling Basin Natural Resources Management Board
- the South Australian Research and Development Institute
- SA Water

- the Nature Foundation South Australia
- Banrock Station
- Ngarrindjeri Regional Authority
- Renmark Irrigation Trust
- the Murray Darling Wetlands Working Group Ltd
- the Tar-Ru Lands Board of Management
- local councils and planning groups
- private landholders
- the Murray–Darling Basin Authority.

The Commonwealth Environmental Water Office regularly attends community forums, events and committees in the catchments. We continue to forge local partnerships to ensure that

community groups, including Aboriginal traditional owners, have the opportunity to help shape the regional planning and management of our delivery of water for the environment over the long term.

Please contact your local engagement officer to learn more about our work or offer suggestions for the use of environmental water.

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Environment water provided flow in the Lower Darling River

Australian Government
Commonwealth Environmental Water Office

The Lower Murray–Darling region is made up of the River Murray downstream of Lock 15, near Euston, to the Murray Mouth in South Australia, the Darling River below Menindee Lakes and the Great Darling Anabranch.

In its lower catchment, the River Murray flows through semi-arid mallee country, where the only substantial water source is the river itself. Large floodplains have developed along the river's path. The Murray flows into Lake Alexandrina and Lake Albert, then into the extensive Coorong lagoon system before flowing out to the Southern Ocean through the Murray Mouth.

The water resources of the River Murray are regulated from its source to the ocean, to provide water for hydro-electric power generation, urban centres, irrigated agriculture and the environment. Lake Victoria is the major water storage in the Lower Murray-Darling region, supplying regulated flows to South Australia.

Water from Menindee Lakes is used to manage and augment supplies to the Lower Murray system. End-of-river flows are captured in Lake Alexandrina and Lake Albert and released into the Coorong and through the Murray Mouth via the barrages. Along the length of the River Murray, water is also pumped directly from the river or diverted through small weirs to secure water for individual properties.

Responding to environmental demands in 2017–18

The following plans for 2017–18 are based on careful consideration of the urgency of water needs from year to year and over multiple years, and what we believe can be achieved, depending on water availability.

River Murray channel: We are planning to deliver water from Hume Dam to provide whole-of-system flows. As in previous years, water releases will be guided by rainfall and other natural triggers.

The whole-of-system flows will be scalable so that our water delivery is responsive to seasonal and operational conditions. This means that if conditions are dry and the triggers are small,

the focus will be on in-stream watering—such as varying flows and connecting with low-lying creeks and wetlands—to support the health and movement of fish and the growth of riverbank and in-stream plants.

If conditions are wetter, flows may target low-lying wetlands and floodplains (within constraints to avoid impacts on others), to support floodplain plants, fish breeding and waterbird breeding.

Flows moving through the system will be available to use for other seasonally appropriate activities, such as delivery to off-channel wetland sites.

Floodplain and wetlands from Euston to the Lower Lakes: There is moderate demand to provide flows to low-lying wetlands and anabranches, which are still recovering from the millennium drought. These flows will continue to support the recovery of native plant, bird, fish and frog communities. Water may be provided to support weir pool manipulation—raising or lowering weir pools, which can benefit fringing plants and sites that are not normally connected to the river. This will also transport nutrients and organic matter to the river channel. Overbank flows to support the ongoing recovery of floodplain and wetland plants may be in scope, depending on seasonal conditions.

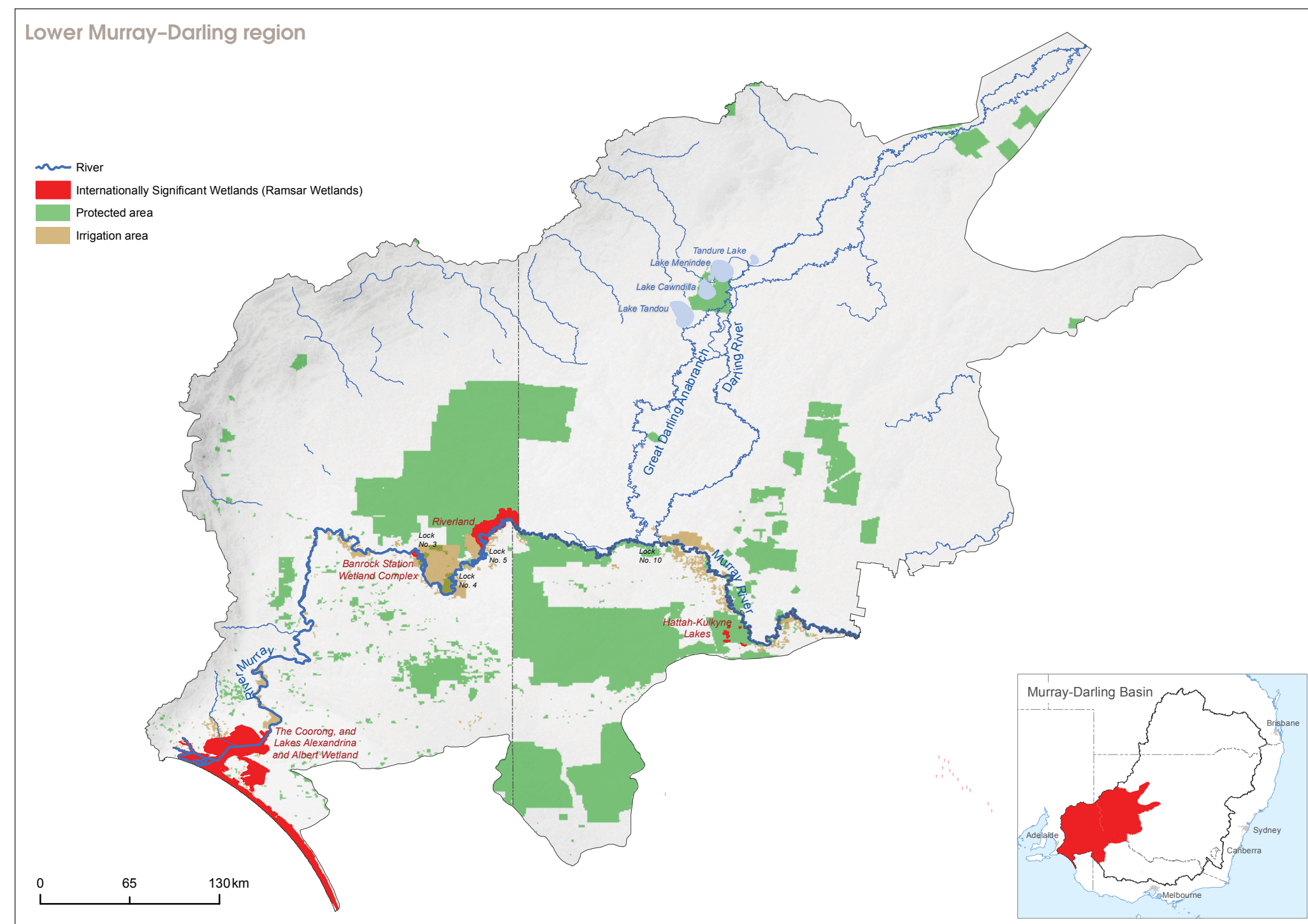
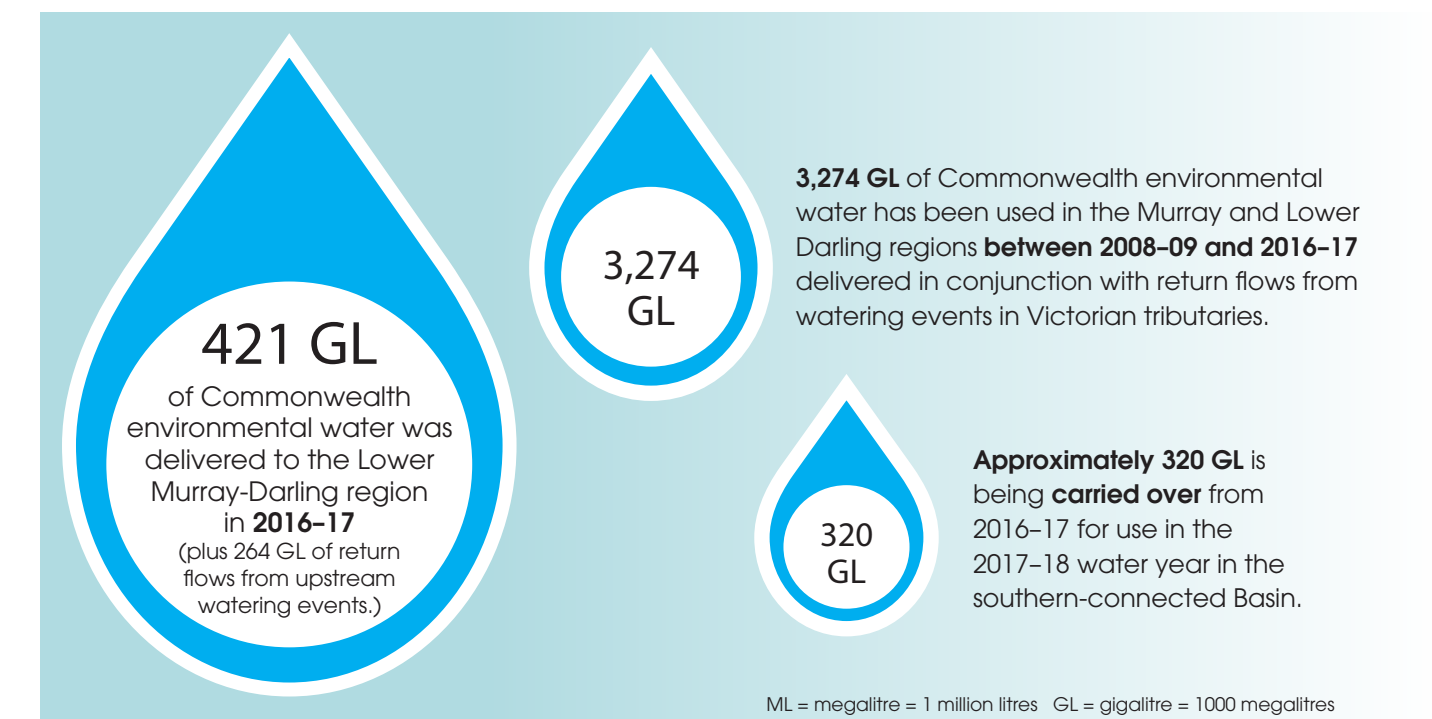
Water is also being used to top up Hattah Lakes to support black box trees higher on the floodplain, which are in poor condition.

Coorong, Lower Lakes and Murray Mouth: Under low-flow conditions, the aim will be to maintain minimum flows through the barrages to the Coorong throughout the year. In wetter conditions, we may provide additional water over spring and summer to increase flows to the Coorong to improve water quality and water levels. Where possible, the environmental water will come from flows that have returned to the river from upstream actions. In this way, water will achieve multiple environmental outcomes as it travels down the river.

Lower Darling River and Great Darling Anabranch: There is high demand for water in the Lower Darling River to support native fish populations, including young Murray cod spawned in 2016. It may be difficult to meet this need if conditions are dry. If water availability improves, environmental watering to manage water quality and provide fish habitat will be a high priority.

Following the positive outcomes from flows in early 2017, there is lower demand for water in the anabranch. It is unlikely to be watered in 2017-18 unless there are high inflows from the Barwon-Darling River.

For more information on our planning process, see the 2017-18 Portfolio Management Plan for the Lower Murray-Darling region at www.environment.gov.au/water/cewo





Outcomes snapshot

Scientific monitoring shows that water delivered to the Lower Murray-Darling is providing habitat and breeding opportunities for many of the region's unique native plants and animals.

Full monitoring reports are available on our website: www.environment.gov.au/water/cewo/catchment/lower-murray-darling/monitoring


2016-17


Preliminary results from monitoring in the Lower Darling River and Great Darling Anabranch are:

-  Delivery of water supported large numbers of Murray cod larvae spawned in the Lower Darling River in 2016–17. The abundance of larvae suggests that it was one of the largest spawning events in this system in 20 years.
-  Large numbers of golden perch were detected in both the Darling River and the Great Darling Anabranch. These fish are dispersing throughout the river system.

2014-16

Our long-term monitoring program in the Lower Murray found that:

-  Environmental water reduced salinity levels in the Lower Murray channel, Lower Lakes, Coorong and Murray Mouth. It also transported nutrients through the river system and, in doing so, may have provided 'food' for aquatic plants and animals. Commonwealth environmental water provided 100 per cent of flows into the Coorong from November 2014 to June 2015 and again from September 2015 to June 2016.
- Raising weir pools in the Lower Murray improved connections between the floodplain and the river. In low-flow years, changes in weir pool levels, along with environmental watering, can provide benefits such as the exchange of organic matter and nutrients between the river and floodplain and the wetting of fringing plants.

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- Because of the low flows in 2015-16, there was little spawning of golden and silver perch in the Lower Murray. Compared to the previous year (2014-15), the numbers and diversity of small-bodied fish remained high, but there was an increase in numbers of exotic goldfish and common carp.
- For the second consecutive year, small Murray cod were found in the Lower Murray, indicating successful recruitment. The conditions that supported this recruitment remain unclear. Recruitment means the survival of a species through all life stages and into the next generation.
- Maintaining the integrity (the physical, chemical and biological aspects) of flow from upstream to the lower River Murray is critical to supporting native fish and other animals living in the river, lakes and Coorong.
- Monitoring by our partners in South Australian wetlands over the past five years found that:
- The populations of the endangered Murray hardyhead improved at Berri and Disher Creek sites following several years of Commonwealth environmental watering. In early 2015 a sub-population was moved to Brickworks Billabong in Victoria, a site also being rehabilitated with Commonwealth environmental water. There has since been evidence of those fish reproducing at the new site.
 - Across all sites, river red gum, black box and lignum increased in growth extent and density, tip growth and flowering.
 - Seven frog species, including the vulnerable southern bell frog, were found at several sites.
 - A variety of waterbird species, including threatened and endangered species, were recorded at watering sites. This indicates that the sites provided diverse habitat and food types.