

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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Australian Government

Commonwealth Environmental Water Office

RESTORING AND PROTECTING THE
UNREGULATED RIVERS OF THE
NORTHERN BASIN
2017-18 SNAPSHOT



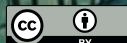
Above: Narran Lakes

Cover: Western Floodplain - Toorale.

Credit: Ecological Australia

Back cover: Peron's Tree Frogs (*Litoria peronii*) - Toorale. Credit: B Martin Eco Logical Australia

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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 plants, birds and other animals that depend on them to survive and thrive.

The diverse and rich natural environments of the unregulated rivers of the northern Basin—including the Condamine–Balonne, Warrego, Moonie and Barwon–Darling systems—support many unique plants and animals as well as domestic and agricultural water use, the cultural values and practices of local Aboriginal traditional owners, and tourism and recreation.

A vast network of rivers and channels across south-west Queensland and north-west New South Wales join to form the Barwon–Darling River, which flows for around 1,900 km through semi-arid country to its junction with the Murray River at Wentworth.

Rainfall in the elevated, ‘headwater’, parts of these catchments is the main source of flows. This rainfall is highly variable. As a result, run-off and river flows in the northern unregulated rivers are unpredictable and the amount of water available to the environment fluctuates considerably from year to year.

For most of their length, these rivers run like a maze of channels across a very flat landscape. Rainfall

and run-off are much lower in this flat landscape. Floodwaters spread out, creating extensive floodplains, complex channels and large areas of wetlands, which are home to plants and animals that have adapted to live in an extreme environment characterised by long dry spells and occasional flooding.

The lower Balonne system and the Moonie, Warrego and Paroo rivers run for less than half of the time and typically experience periods of no flow lasting months or even up to several years. Each flow event is particularly significant in these systems.

The Barwon–Darling River receives inflows from all the other northern rivers, so its flows are more regular.

Commonwealth environmental water is managed in partnership with state and local delivery partners to improve connections between rivers, floodplains and wetlands, particularly to sites that support nationally threatened species under the *Environmental Protection and Biodiversity Conservation Act 1999* and state legislation, and wetlands of international or national significance. This water contributes to achieving environmental outcomes as outlined in the Basin-wide Environmental Watering Strategy—part of the implementation of the Murray-Darling Basin Plan.

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



Restore and maintain the right conditions to support the spawning of native fish, increase their movement between areas and improve the health of their communities.



Maintain the diversity of waterbirds and increase their populations through improved breeding opportunities.



Increase the numbers of freshes and bank-full events in the Border Rivers and the Barwon–Darling, and freshes and low floodplain flow events in the Lower Balonne. 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.

Maintain current levels of connectivity in the Moonie, Nebine and Warrego rivers.



Maintain current forest and woodland vegetation, including river red gum, black box, coolibah, lignum shrublands and non-woody vegetation communities. Increase growth of vegetation communities in river corridors, wetlands and low-lying floodplains.

What makes a river ‘unregulated’?

Unregulated rivers are those that do not have large public dams or other man-made structures for storing water and controlling—‘regulating’—water availability.

An unregulated flow event does not come from a controlled release of water from a dam or weir but from rainfall and run-off from catchments flowing unimpeded through the system.

Unregulated water entitlements

State governments have issued unregulated water entitlements that specify when water can be extracted from rivers. In some river reaches, once the river rises to the specified level, entitlement holders can start pumping water out. In other areas (including the Lower Balonne and the Border Rivers) river managers must first declare an unregulated access period and may specify how long water can be pumped for or the volume available to each entitlement holder.

Unregulated licences can also specify daily, annual or multi-year use limits and restrict the volumes entitlement holders can access during planned flow events. Together, these access conditions set a ceiling on how much water can be extracted from a particular flow event and over the long term.

Many water users hold unregulated entitlements in the northern Basin. Across the region, the Commonwealth Environmental Water Holder has substantial volumes of unregulated entitlements—around 128 GL in long-term average terms. Mostly we use these entitlements in-stream to supplement or extend natural flow events to get the best possible ecological benefits for river and wetland health.

High levels of in-stream use are likely only in very wet years when there are large flow events that meet entitlement access conditions for long periods. As for other water users, the actual volume of Commonwealth environmental water available depends on the size and pattern of unregulated flow events during the year and on the conditions of our water entitlements.

Water availability

The volumes of water available to communities, food and fibre producers and unregulated entitlements held for environmental purposes are in proportion to the amount of water flowing in rivers and streams following rainfall. When setting the access conditions of unregulated entitlements, state governments set aside some of the flows to ensure a base flow for river health. We use Commonwealth water to supplement these flows.

Most of the water used by entitlement holders in the northern unregulated rivers is pumped directly from rivers or from water that breaks out of rivers onto the floodplain during unregulated flow events. Large-scale irrigation enterprises in the region generally extract water when the opportunity arises into large on-farm storages (ring tanks) for later crop irrigation.



Darling River at Bourke.

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 unregulated rivers of the Northern Basin. Partners include:

- the Queensland Department of Natural Resources and Mines
- the Queensland Department of Science, Information Technology and Innovation
- the New South Wales Office of Environment and Heritage

- the New South Wales National Parks and Wildlife Service
- the New South Wales Department of Primary Industries
- WaterNSW
- Eco Logical Australia.

The Commonwealth Environmental Water Office regularly attends community forums, events and committees within 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 environmental water over the long term.

To learn more about our work or offer suggestions for the use of environmental water, please contact your local engagement officer on M: 0437 141 495 or E: ewater@environment.gov.au



Threatened floodplain plant found at Toorale.



Monitoring and research at Toorale. Credit: AClements



Pink Eared Duck (Malacorhynchus membranaceus) – Toorale. Credit: L Copeland - Eco Logical Australia

THE UNREGULATED RIVERS OF THE NORTHERN BASIN



Australian Government
Commonwealth Environmental Water Office

The unregulated rivers of the northern Basin cover a vast area across southern Queensland and north-west New South Wales.

The **Lower Balonne River** floodplain covers 2 million hectares in Queensland and New South Wales and supports more wetlands than any other catchment in the Basin. The native grasslands and coolibah woodlands on the floodplain are some of the most extensive in Australia. The distributary channels provide habitat for many aquatic plants, animals and threatened fish such as silver perch and Murray cod. Permanent waterholes within these channels become vital refuges during dry periods, with many species of fish, frogs and invertebrates surviving in these pools until reconnecting flows occur.

Narran Lakes is a terminal wetland—meaning that water does not flow back into the river system—of the Narran River. It is an internationally significant site for waterbirds, with some of Australia's largest and most diverse waterbird breeding events and highest densities and numbers of waterbirds. The lignum shrublands are some of the largest

undisturbed communities of this type in New South Wales. The lakes have ecological and cultural significance to Aboriginal people, including as a source of food and medicine and as a meeting place.

The **Warrego catchment**, along with the Condamine–Balonne, supports the largest area of wetlands of any catchment in the Murray–Darling Basin, including lignum swamps, flood channels and waterholes, black box and spike rush swamps, claypans, freshwater lakes and saline lakes. The nationally significant **Warrego River Waterholes** near Charleville are an important breeding area for native fish including Murray cod and silver perch. **Yantabulla Swamp**, a mosaic of channels, floodways and wetlands within the Cuttaburra Creek system, supports large numbers and a high diversity of waterbirds. When flooding, it provides breeding sites for ducks and colonial waterbirds.

The **Western Floodplain** at Toorale, near the junction of the Warrego and Darling rivers, is a large wetland covering over 10,000 hectares. It supports diverse floodplain and wetland vegetation communities, including lignum, and provides habitat for numerous threatened waterbird species.

The **Moonie River** has relatively long and deep waterholes that are critical for sustaining healthy native fish populations in the often long periods between flows in this system. The lower catchment supports many wetlands.

The **Barwon–Darling River** connects the lower floodplain rivers, lakes and wetlands of the northern Basin, providing a critical dry period refuge and movement corridor for fish and waterbirds. Its diverse in-stream habitats and hundreds of wetlands in anabranches, floodrunners, billabongs, distributary channels and floodplain lakes support a significant native fish community, turtles, mussels, shrimp and other aquatic species. Lakes and wetlands along the floodplain provide waterbird breeding sites and staging posts for migratory species.

The **Talyawalka Anabranch–Teryaweynya Creek** supports many thousands of waterbirds when inundated and is known for its coolibah and black box vegetation.



Meeting the environmental needs of the northern unregulated rivers

The frequency and volume of water available to sustain the rivers, floodplains, lakes and wetlands of the northern Basin have been affected by the diversion of water for domestic use and agriculture. This in turn affects habitat, breeding sites and drought refuges, threatening the survival of the many native animals, plants, birds and fish unique to the region.

Water that becomes available from the Commonwealth Environmental Water Holder's entitlements is mostly left in-stream. This will continue to be the main method used to achieve environmental outcomes in the northern unregulated rivers. This water restores some of the flows needed for aquatic and floodplain species to survive and thrive. Over time it provides more natural and variable river flows that improve the connection between rivers and floodplains, helping to restore and protect riverbank and floodplain vegetation and waterbird and native fish populations.

Active management

The Commonwealth Environmental Water Office is investigating options for more active management of flow events in unregulated rivers. In the near future, for example, this will mean helping to meet targeted environmental needs by extending the size and duration of flow events.

We are considering using event-based mechanisms when and where they can be most effective to complement the ongoing in-stream use of Commonwealth water entitlements. These mechanisms could include:

- buying temporary water entitlements or using water stored in private infrastructure such as ring tanks, channels and weirs to change the timing of delivery of water to protect a flow event and achieve ecologically important flow targets
- delivering environmental water to an off-stream wetland or site through private infrastructure, or transferring water between river channels
- diverting environmental water into on-farm storages and releasing it later to alter the timing, location or rate of flows to achieve better environmental outcomes.

We would only use event-based mechanisms if they:

- are efficient and effective
- would significantly improve ecological outcomes
- could contribute to the Basin-wide Environmental Watering Strategy outcomes
- avoid (or, by agreement, minimise) unacceptable impacts on third parties such as other water users or landholders, in line with our 'good neighbour' policy.

Outcomes snapshot

Monitoring and evaluation activities are helping to identify what is working and what is not. The results of these activities are considered in the planning and decision-making processes of the Commonwealth Environmental Water Office and our state and local delivery partners.

Full monitoring reports are available on our website: www.environment.gov.au/water/cewo/catchment/northern-unregulated-rivers/monitoring



Increased hydrological connectivity and end-of-system flows

Commonwealth environmental water use in-stream in the Lower Balonne extended and improved the ecological outcomes of natural small flow events in late summer in 2017 (17 GL), 2016 (9.5 GL), 2015 (17.3 GL) and 2014 (22 GL). These contributions helped ensure that flows reached the end of the Narran River and provided a small inflow to Narran Lakes. Environmental water also extended the period of connection between the Culgoa and Barwon–Darling rivers, enabling the passage of fish and other aquatic species. In 2015 and 2017 the additional flows also helped to connect the Birrie and Bokhara rivers to the Barwon–Darling.

The Commonwealth entitlement in the Moonie River has been fully utilised (providing 1.4 GL of in-stream flows) in all years since 2010, except 2015–16, contributing to floodplain and fresh flows and end-of-system inflows from the Moonie into the Darling River.

Most unregulated flows in the Lower Balonne, Warrego and Moonie in recent years have been small events that occurred after long periods of no flow, so a key benefit of Commonwealth environmental water was to refill and replenish waterholes that provide refuge for fish and other aquatic fauna to help them survive dry periods.



Benefits to wetlands and floodplains

Unregulated entitlements in the northern Basin have contributed to bank-full and overbank flows, with benefits to floodplain and terminal wetland systems, including:

Western Floodplain at the junction of the Warrego and Darling Rivers. In a series of flows in the Warrego over the second half of 2016, Commonwealth environmental water contributed 9.7 GL, or a third of total inflows, to the Western Floodplain, extending the inundation of this area. In a smaller flow event in summer 2015, environmental water management led to inundation of 37 ha of the floodplain, the first time it had been inundated since 2011–12. The extended inundation helped to increase plant diversity and cover, and a range of waterbirds, aquatic invertebrates and frog species also benefited

Narran Lakes. In a moderate flow in October 2016, Commonwealth environmental water (28 GL across the Lower Balonne) increased inflows into Narran Lakes by at least an estimated 5 GL, increasing the extent of inundation of the lakes and of wetland communities in the Narran Lakes Nature Reserve. Overall about 1,500 ha were estimated to have been inundated in the event. Lignum stands used by waterbirds for nesting around Back Lake and Clear Lake were inundated for up to two months. The condition of this lignum, which had not received inflows for over three years, improved dramatically. Commonwealth environmental water previously made a significant contribution to inflows when Narran Lakes was inundated in April 2013.



Improved in-channel flows for fish and ecological processes

Commonwealth environmental water contributed significantly to in-channel fresh flows in the Barwon–Darling River and the Warrego, Culgoa and Moonie Rivers in Queensland during the spring of 2016. These rivers rose to levels that have been associated with fish movement and spawning in species such as golden perch. Enhanced flows in the Culgoa River in autumn 2014 also provided conditions conducive to fish movement and dispersal.

In 2016–17, Commonwealth environmental water from local and upstream unregulated entitlements contributed to flows in the Barwon–Darling River that initiated a major native fish spawning event. Larval and juvenile fish from this spawning dispersed across the Basin, including within the Barwon–Darling and into the Macquarie River, Menindee Lakes and the Lower Darling and Murray rivers. Native species that spawned in this event included golden perch, Murray cod, rainbow fish and bony bream.

Environmental water in the Warrego River at Toorale has been used to improve flows through the lower Warrego River and into the Darling River on several occasions, including flow events in October 2017 (8 GL) and in 2011–12 (8.1 GL). These flows improved and extended inundation of habitats that are important for nutrient cycling within these river channels and enabled fish movement by increasing connections between the rivers.



The Northern Basin unregulated rivers

