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

VICTORIAN RIVERS

2016–17

Above: Wemba Wemba man Uncle Ron Murray plays didgeridoo as part of the Welcome to Country Reconciliation Week event at Wanderer's Plains. Photo: David Kleinert
Cover: Moodie's Swamp
Back cover: Goulburn River
All images by Commonwealth Environmental Water Office unless noted otherwise.

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Environmental water is dedicated to improving the health of our rivers, floodplains and wetlands

The Murray-Darling Basin spans over half of Victoria, with a number of rivers flowing directly into Australia's longest river, the River Murray. Victoria's rivers are a source of water supply for domestic water use, extensive agriculture and irrigated production. Rivers, estuaries and wetlands support the cultural values and practices of local Aboriginal traditional owners and are at the heart of tourism and recreation, attracting canoeists, campers, anglers, bushwalkers, birdwatchers, water-skiers and boaters all year round.

Environmental water delivered at the right time and in the right place is restoring those natural waterways affected by river regulation and man-made infrastructure. The natural waterways of the Victorian Rivers system are highly connected. The Goulburn Broken and North Central catchments contain a myriad of significant floodplains and wetlands that are home to many unique native plants, animals, birds, frogs and fish including threatened species and communities listed under the *Environmental Protection and Biodiversity Conservation Act 1999*. These include the Murray cod, Macquarie perch, trout cod, Murray hardyhead and nine bird species listed under international water bird agreements including the great egret and Latham's snipe.

The lower Goulburn River floodplain contains a variety of permanent and temporary wetlands, which provide extensive habitat for waterbirds (including many colonial nesting species) and self-sustaining native fish communities. Meanwhile, the mid Goulburn River (below Lake Eildon) is made up of diverse geomorphic in-channel habitats (bedrock influenced pools, benches and gravel bars) and an extensive floodplain wetland system that is home to a diverse range of aquatic plants, unicellular organisms (micro-fauna) and native small fish and extensive river red gum forests and woodlands.

The delivery of environmental water in the Victorian Rivers region is planned and managed by the Commonwealth and Victorian Environmental Water Holders and the Murray-Darling Basin Authority's the Living Murray Program, in consultation with local communities and as part of Murray-Darling Basin Plan implementation. We are also working toward the achievement of 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

Maintain base river flows and increase the contribution of water and frequency of bank-full and 'fresh' events.

A fresh event describes an increase in levels of the river beyond the base flow, but does not fill the river or go over the bank.

Bank-full events describe an increase in river levels that are higher than a base flow and help to scourer the river banks and provide nutrients into the river.

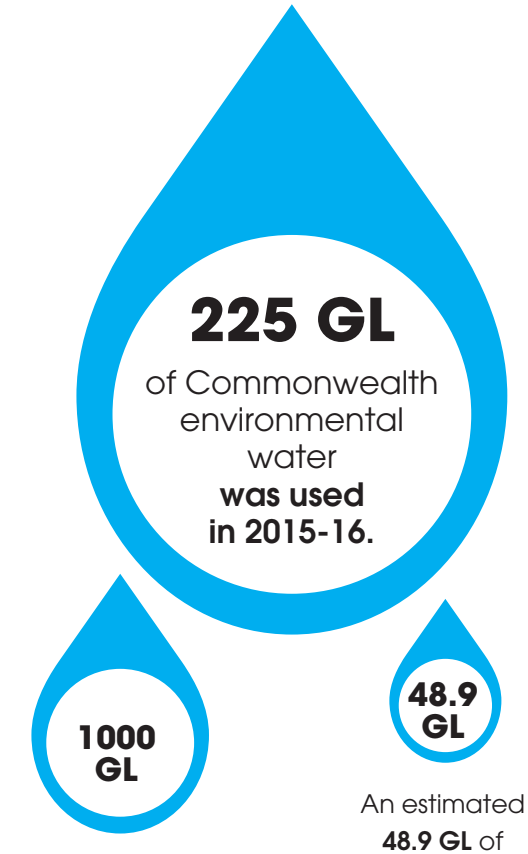
Maintain the current extent of forest and woodland vegetation, along with improvements to the condition and increased number of young trees. These communities are culturally significant to local Aboriginal people and provide food and habitat for many native animals.

Maintain the extent and improve the condition of lignum shrubland communities within the Goulburn River, Lower Broken and Upper Broken Creek wetlands.

Maintain the current extent of non-woody vegetation near river channels and on low-lying areas of the floodplain.

Maintain the current species diversity and increase abundance of waterbirds by supporting breeding opportunities.

Create the right conditions that encourage fish to move between areas and improve the age ranges, genetic diversity and health of their communities.



Approximately 1000 GL of Commonwealth environmental water was delivered **between 2009-10 and 2015-16.**

An estimated **48.9 GL** of Commonwealth environmental water was **carried over** for use in 2016–17.

In November 2015 the Commonwealth Environmental Water Holder sold 22.864 gigalitres of temporary allocations for a return of $6.458 million for the first time in this region. The proceeds of the sale will be used in the interest of maximizing environmental outcomes elsewhere in the Murray-Darling Basin.

Environmental water use in the Victorian Rivers system to date

Following the breaking of the millennium drought and the record floods in 2010 and 2012, natural flooding and environmental watering actions have resulted in improvements in the condition of many Victorian Rivers in the Murray-Darling Basin and associated wetlands. This recovery has continued under drier conditions in 2015–16 with the provision of environmental water.

This year, Commonwealth environmental water will build on the positive responses from vegetation in consequence of past environmental watering and provide recruitment opportunities for waterbirds, native fish, turtles and frogs.

There are five main proposed sites for environmental water in 2016-17 including the Goulburn River, Lower Broken Creek, Goulburn-Broken catchment wetlands and the Campaspe and Lodden.

Recruitment describes a species' (like native fish or plants) survival through all life stages. Improved or supported recruitment means that over the long-term a species' population features a range of ages.

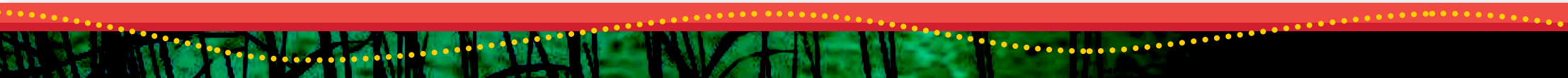
Commonwealth environmental water supply

The water acquired by the Australian Government, including through investment in more efficient irrigation infrastructure, and other measures, enables the Commonwealth Environmental Water Holder to help bring back some of the river flows needed to restore and protect the riverine and wetlands systems throughout the Basin's irrigation districts.

Commonwealth environmental water often supplements natural events and environmental water provided by other water holders and mangers, as well as water used for irrigation and domestic purposes.

Depending on river operating rules, flow constraints and climatic conditions, the Commonwealth Environmental Water Holder can agree 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 (sell or buy water) for equal or greater environmental benefit.



Our partners

The best approaches to environmental water management involve local knowledge and the latest science.

Commonwealth environmental water is planned, delivered and managed in partnership with a number of people and organisations in the Victorian Rivers region, including:

- Victorian Environmental Water Holder
- Goulburn-Murray Water
- Goulburn-Broken Catchment Management Authority
- North Central Catchment Management Authority
- North East Catchment Management Authority
- Wimmera Catchment Management Authority
- Mallee Catchment Management Authority
- Grampians Wimmera Mallee Water
- Murray-Darling Basin Authority

The Commonwealth Environmental Water Holder regularly attends community forums, events and committees within the catchments and we are continuing to forge local partnerships that allow community groups, including Aboriginal Traditional Owners, to help shape the regional planning and management of environmental water delivery over the long term.

Please contact your local engagement officer, Linda Duffy in Deniliquin, New South Wales or Richard Mintern in Mildura, Victoria to learn more about our work or offer suggestions for the use of environmental water locally.

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Murray cod, Photo: Murray-Darling Basin Authority

Southern Bell Frog

The Ovens River at Myrtleford in 2014

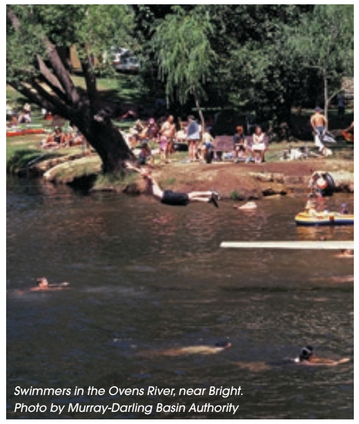
VICTORIAN RIVERS

The Victorian rivers in the Murray-Darling Basin are located in the Ovens, Goulburn-Broken, Loddon, Campaspe and Wimmera catchments. The northern Victorian rivers, particularly the Ovens and Goulburn-Broken, contribute significantly to the water resources of the River Murray with about 12 per cent of the Basin's stream flow originating in the Goulburn-Broken.

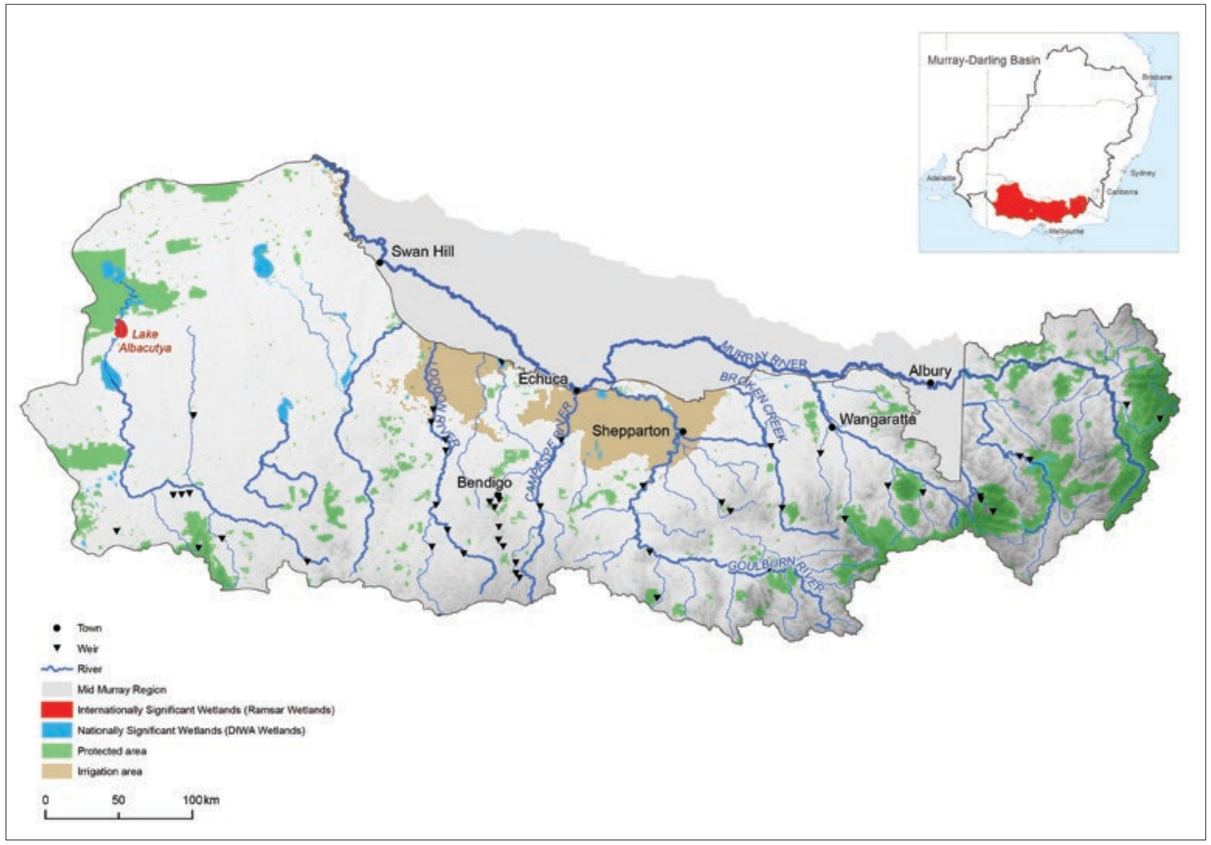
The Wimmera River in central-west Victoria flows into Lakes Hindmarsh and Albacutya terminal wetlands and does not connect to the River Murray.

This area of the Murray-Darling Basin is highly regulated, with storages in the Ovens (Lake Buffalo, Lake William Hovell), Goulburn-Broken (Lake Eildon and Waranga Basin), Loddon (Cairn Curran Reservoir and Tullaroop Reservoir) and Campaspe (Lake Eppalock) catchments.

The Victorian Rivers region is home to the nationally significant Lower Goulburn Floodplain and internationally significant Kerang Wetlands and Lake Albacutya. The floodplain covers about 200,000 hectares and includes some of the largest lignum wetlands in Victoria. The whole region supports significant bird, animal and plant life including the great egret and superb parrot, Murray cod, growling grass frog (also known as the southern bell frog) and iconic platypus populations as well as river red gum forest and woodland communities which provide important breeding and habitat areas for many species.



Swimmers in the Ovens River, near Bright. Photo by Murray-Darling Basin Authority



Responding to environmental demands

Like all water users, Commonwealth and state water holders and managers must consider variable seasonal conditions when determining the best way to restore the Basin's rivers, floodplains and wetlands.

This involves careful consideration of the urgency of environmental demands each year (and from year to year and over multiple years) and what we believe can be achieved depending on water availability due to conditions.

The following scenarios for the use of Commonwealth environmental water in 2016-17 are based on our assessment of environmental demands (in the context of targeted outcomes and watering requirements, watering history, asset condition and the available supply according to different scenarios).

Goulburn River: The river bank and in-stream vegetation of the Goulburn River is still recovering following the millennium drought and 2010-11 and 2011-12 floods, and require frequent watering to maintain health. Due to this, there is high demand for variable year-round base flows to maintain water quality and provide habitat and food resources for fish and macroinvertebrates. Providing these flows will be the main priority in 2016-17.

If additional water becomes available during 2016-17, freshes in spring and autumn may be delivered to support the condition and survival of native vegetation; macroinvertebrates and the breeding and movement of native fish; provide river channel maintenance to promote the transport of nutrients, carbon and sediment; and improve water quality.

The delivery of environmental water within the Goulburn River will also support outcomes further down in the River Murray valley including flow on to the Coorong, Lower Lakes and Murray Mouth.

Lower Broken Creek: There is high demand for water annually to maintain water quality to support plants, native fish, birds and other animals and to help native fish move through fishways. Over the past year the Creek has experienced low dissolved oxygen levels for extended periods as a result of a dry winter with high water temperatures and a blue-green algae outbreak in early 2016.

Watering in 2016-17 will focus on contributing to variable baseflows to support native fish passage through fishways; provide improved native fish habitat during breeding and migration seasons; improve water quality, in particular maintaining dissolved oxygen levels above tolerable thresholds for biota; and managing excessive Azolla (water fern) growth.

Goulburn-Broken catchment wetlands: Following a managed drying phase there is a moderate to high demand for water in these wetlands. In 2016-17 watering in late winter-early spring would promote the growth of nationally significant vegetation and encourage brolga breeding in Moodie Swamp.

Campaspe River: Ongoing recovery from the millennium drought and record floods in 2010-12 means there is continued high demand for in-stream watering to support recovery and protection of vegetation and the health and reproduction of native fish.

In 2016-17 watering will contribute to in stream flows year-round (baseflows and freshes) to support vegetation growth and survival, native fish reproduction and condition, adult River Red Gums, platypus populations, hydrological connectivity, biotic dispersal and improved water quality including controlling salinity and stratification in deep pools.

Stratification describes the vertical variation in water temperature, for example, very cold at the bottom of a pool but warm at the top.

Lake Eildon, Goulburn River. Photo: Murray-Darling Basin Authority

Loddon River: Following a very dry year in 2015-16, there is high demand for continued in-stream watering. Watering in 2016-17 will contribute to in-stream flows year round (baseflows and freshes) to support plant growth, native fish health and breeding, macroinvertebrates, platypus, water rats, connectivity and water quality.

Campaspe River

Environmental water reuse—making the most of our flows

In many northern Victorian systems, environmental water delivered through upstream sites can be re-used again further downstream. This water is known as a return flow. A return flow increases the efficiency of environmental water use and helps reduce the volume of water needed to be recovered for the environment from consumptive water users. If not needed in Victoria, the Victorian Environmental Water Holder, Living Murray and Commonwealth Environmental Water Holder return flows will continue to flow across the border to South Australia, where they will be used to provide environmental benefits at sites such as the Coorong, Lower Lakes and Murray Mouth region

Azure Kingfisher. Photo: Murray-Darling Basin Authority

Outcomes snapshot

Monitoring and evaluation activities are helping to identify what is working and what is not, with the results considered as part of the planning and decision-making process undertaken by the Commonwealth Environmental Water Office and our state and local delivery partners.

Scientific monitoring shows that water delivered to the Victorian Rivers is providing food, habitat and breeding opportunities for many of the region's unique native fish, waterbirds, plants and wildlife.

Full monitoring reports are available each year on our website: www.environment.gov.au/water/cewo/catchment/nothern-victorian-rivers/monitoring.

2014-15 – Goulburn River

- Spring flows resulted in strong golden perch spawning. A record number of eggs and larvae were collected which have not been seen since the 2010 floods.
- Environmental flows also promoted fish movement, with golden perch moving to breeding areas.
- The critically endangered silver perch also spawned following increased flows.
- Spring flows helped maintain and improve vegetation abundance and diversity, particularly in the regions that were inundated previously.
- The condition and cover of native species increased, including Lesser Joyweed and Creeping Knotweed. Re-establishment of flood-tolerant bank vegetation will provide habitat for a number of native species and also assist with bank stability during natural floods and heavy rainfall.

2013-14 – Goulburn River

- By reinstating variable flows, environmental water provided opportunities for native fish to migrate and reproduce in the lower Goulburn.
- New growth of native plant species has improved habitat and riverbank stabilisation.