Reconnecting River Country Program

Introduction to environmental outcomes

August 2022

NSW GOVERNMENT

Australian Government

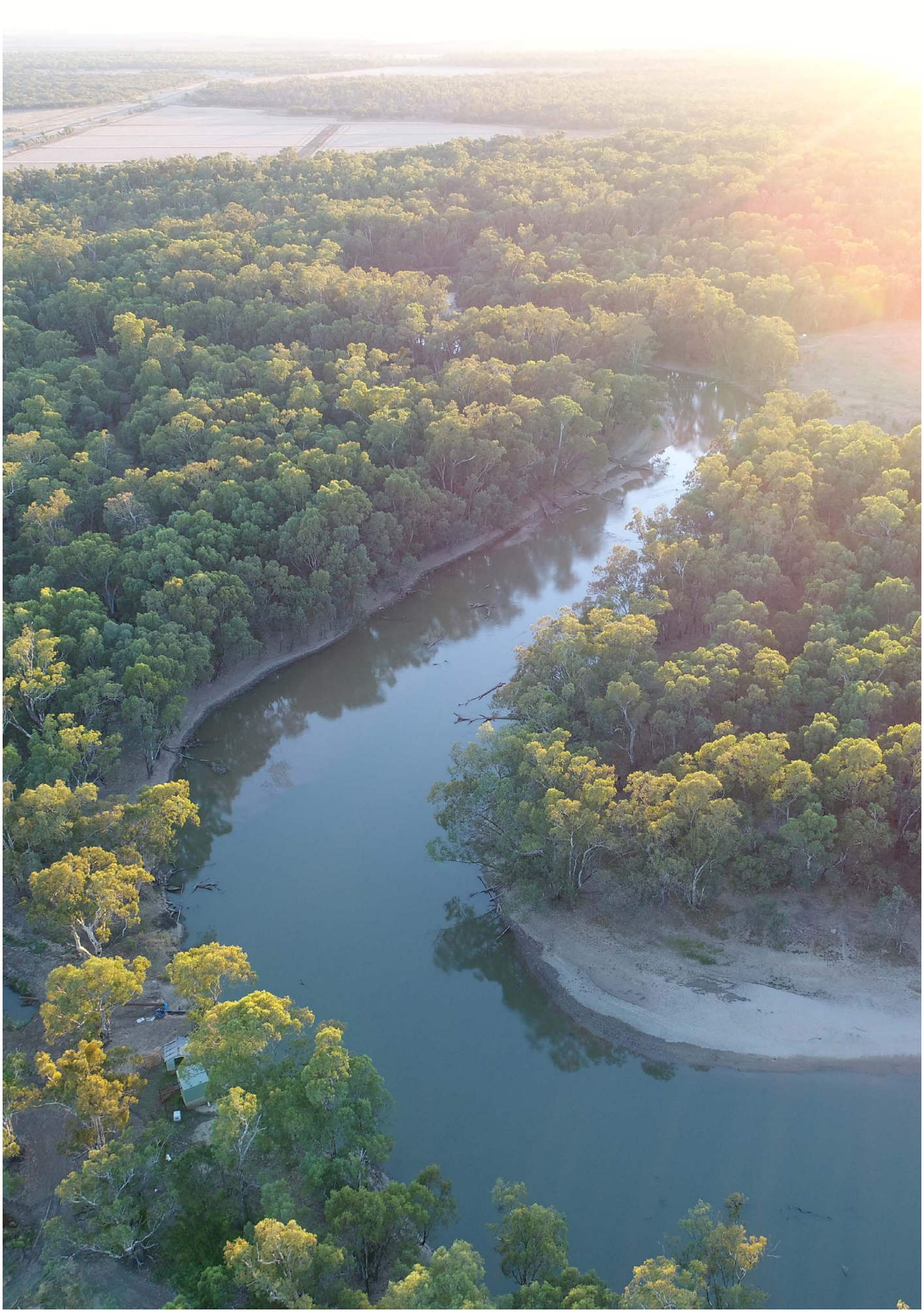


Image courtesy of Department of Planning and Environment. Darlington Point, Cookoothama.

Acknowledgement of Country

The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

Published by NSW Department of Planning and Environment
dpie.nsw.gov.au

Title Reconnecting River Country Program

Sub-title Introduction to environmental outcomes

First published August 2022

Department reference number DOC22/210187

Cover image Image courtesy of John Spencer, Department of Planning and Environment. Mid-Murray River at sunset.

More information dpie.nsw.gov.au/reconnecting-river-country

What can we do?

Our rivers are important for so many reasons. They carry water to our homes, schools, towns and farms. They support business, industry, tourism and recreation. And along the way they support entire ecosystems.

We know the health of our rivers, creeks and wetlands is under pressure.

We need to find a balance between the needs of all water users so our communities can thrive as part of a healthy, sustainable river system.

We have a way forward

The Reconnecting River Country Program is a chance to rethink the way we manage our rivers to provide greater flexibility in how we deliver water for the environment. By working with landholders, communities, First Nations people and other stakeholders we can further support the long-term health of our rivers and reach agreement on how best to do so.

The program will invest in mitigation measures including better bridges and creek crossings where required. These measures will provide ongoing benefits to landholders and communities, during both managed environmental flow releases and natural, unregulated flows.

By providing greater flexibility for the use of water for the environment in the Murray and Murrumbidgee rivers, we can provide more habitat for native fish to feed, breed and grow.

We can help generations of waterbirds reach maturity and support their survival into the future.

We can allow water to reach more of our local river red gum forests and improve habitat health for a range of wildlife.

And we can boost river productivity providing food for the plants and animals that call our rivers home.

Through the program we can:

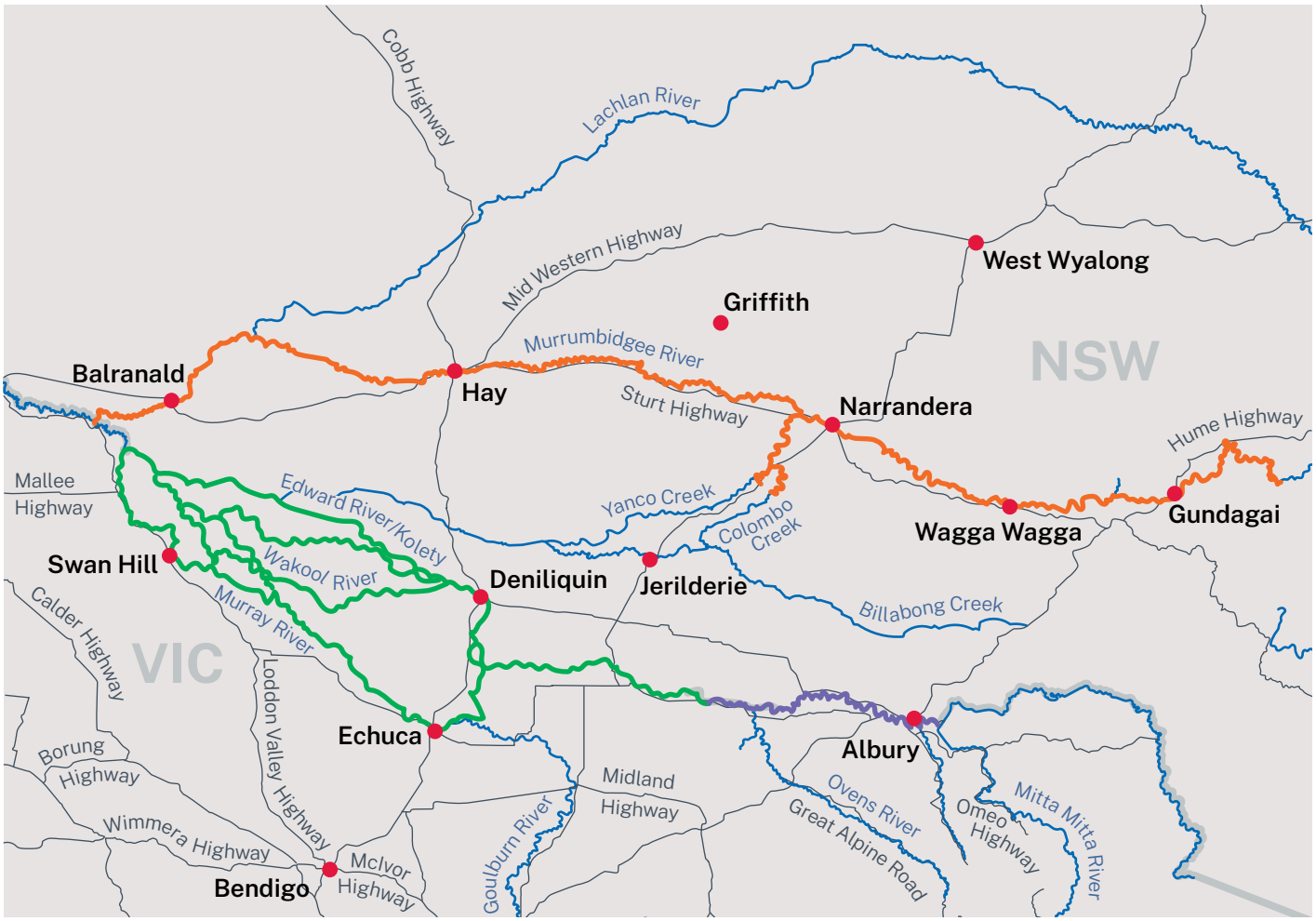
introduce more flexibility in the management of environmental flows

invest in support for landholders and communities to respond to change

plan for a healthier future that benefits communities and the rivers we all love.

Image courtesy of Vince Bucello.
Niemur River at Moulamein Road bridge.

Figure 1. Map of Southern Basin



Legend

- Town/city
- Major river
- Major road
- State border

Reconnecting River Country Program

- Hume to Yarrawonga
- Murrumbidgee
- Yarrawonga to Wakool Junction

Image courtesy of Carmen Amos. Southern Bell frog.

Flow options and inundation

Figure 3. Stylised flow illustration and potential river health outcomes

Legend:

Summer operational flow: provides instream environmental benefits.

Spring low environmental flow: remains in channel and provides benefits to instream habitat and productivity.

Winter-spring wetland-connecting environmental flow: reconnects floodplain creeks, wetlands and low-lying areas of river red gum forest, providing habitats for aquatic and terrestrial wildlife, some productivity benefits with small return flows to rivers.

Winter-spring small overbank environmental flow: greater connection to creeks and wetlands, inundation of larger areas of floodplain (river red gum forest) supports a range of aquatic and terrestrial habitats, also provides larger return flows to rivers and a productivity boom for rivers, creeks and wetlands.

Flow outcomes

Flows of different sizes achieve a range of outcomes for river and wetland health and productivity.

Smaller flows stay within the main river channel.

Slightly higher flows reach out into low-lying floodplain creeks or billabongs, reconnecting the wetlands that provide important habitat for local wildlife.

Higher flows extend this area of inundation and provide more habitat, release more carbon into the food web and support a larger area of habitat higher on the floodplain.

Communities are being asked to provide input into a range of issues associated with flow options including:

- economic, social, cultural and environmental benefits and impacts
- modelling of inundation footprints
- assessment of environmental benefits and risks
- outcomes for First Nations people
- mitigation measures.

The range of flow options being assessed includes:

- **Murray – Hume to Yarrawonga** (flows reported at Doctors Point gauge).
  - 25,000 megalitres per day – current operational limit in the Water Sharing Plan (WSP)
  - 30,000 megalitres per day
  - 40,000 megalitres per day.
- **Murray – Yarrawonga to Wakool Junction** (flows reported at downstream of Yarrawonga Weir)
  - 15,000 megalitres per day (current temporary operational limit)
  - 25,000 megalitres per day
  - 30,000 megalitres per day
  - 35,000 megalitres per day
  - 40,000 megalitres per day
  - 45,000 megalitres per day.

Preferred flow limits will not be recommended until the full impact-benefit assessment is finalised, consultation with the community is complete and all feedback evaluated.

- **Murrumbidgee** (flows reported at Wagga Wagga)
  - 22,000 megalitres per day (current temporary operational limit)
  - 32,000 megalitres per day
  - 36,000 megalitres per day
  - 40,000 megalitres per day.

Note: The WSP flow limit is 32,000 megalitres per day at Gundagai. WaterNSW has adopted the lower temporary 'known constraint level'.

Note: 35,000 ML/d flow options were added for both Hume to Yarrawonga, and Yarrawonga to Wakool Junction in early 2023, to enable a more robust assessment of the change in impacts and benefits across the range of flows being considered.

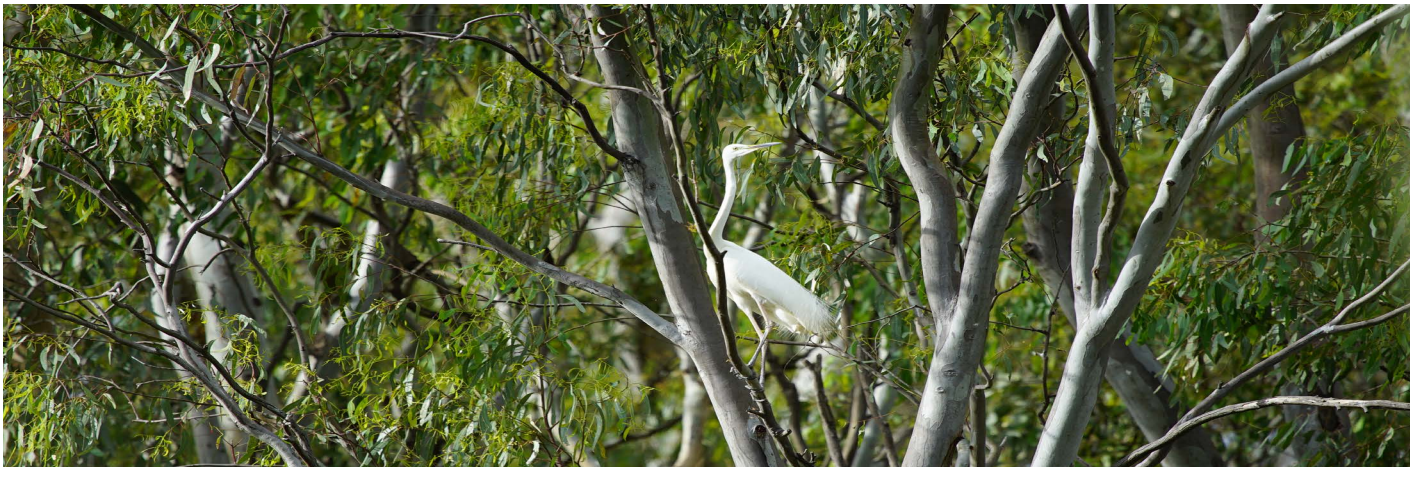


Image courtesy of Vince Bucello. Egret overlooking a river.

What are we planning?

More flexibility

Greater efficiency

Healthier rivers

More resilient wildlife populations

Flexibility to manage water for the environment at higher levels provides a range of benefits for native fish, waterbirds, turtles, frogs and other wildlife. Healthier habitat means more food to support our native wildlife, while improved flow patterns restoring some of the natural cues provide more opportunities for plants and animals to reproduce.

What are you likely to see?

The Department of Planning and Environment has assessed the potential benefits likely to occur from greater flexibility in the delivery of water for the environment.

Among the likely outcomes are:

- the ability to deliver water to more habitat sites and to expand the inundation within floodplain habitats
- healthier habitat to support wildlife populations
- more opportunities for native fish and waterbirds to breed
- improved productivity to support the aquatic food web.

Researchers have used a variety of methods to determine the likely benefits including:

- inundation analysis – looking at the area of inundation identified by flow models
- applying the findings of Long Term Water Plans
- applying knowledge of flow ecology relationships. For example, we know enhancing instream flows at the right time will lead to more spawning events for golden perch. We also understand the role of more frequent flows in increasing productivity especially where river red gum forests provide a more regular release of nutrients from the floodplain floor into the river system.

The Reconnecting River Country Program is also assessing potential outcomes of managing water for the environment to higher levels for water quality, invasive weed distribution and geomorphic processes. The program will assess both potential risks/impacts and benefits for these themes.

- Water quality assessment considers potential changes to the occurrence and severity of hypoxic blackwater events, salinity, blue green algal blooms, eutrophication, weir pool stratification and acid sulphate soils.
- Geomorphic assessment considers potential changes to the occurrence of bank erosion and other issues of concern to the community (e.g. reduced channel capacity).
- Invasive weeds assessment considers potential outcomes on farm, in waterways, wetlands, riparian areas and recreational areas.

More information about expected environmental outcomes in individual program areas can be found in Environmental benefits and risks fact sheets for the:

- Murray River system
- Hume to Yarrawonga (Murray River)
- Yarrawonga to Wakool Junction (Murray River)
- Murrumbidgee River.

Image courtesy of Vince Bucello. Yanga Creek, Balranald.

Native fish outcomes

The golden perch is a key recreational fishing species.

To survive and thrive they need in channel flow triggers for spawning and movement, access to habitat where they can hide among the snags, feed, and release their young. Wetlands are ideal nursery habitat as they provide slower moving water, food, shelter and safety for young fish. When flows connect these wetlands back to the river, those fat, happy fish can repopulate the river system.

Recreational fishing is a billion-dollar industry in New South Wales. For inland fishers, golden perch and Murray cod are the top target species.

If we can improve their numbers, it will mean better fishing and increased interest in the sport. With more interest comes greater investment in local towns.

Research by Deloitte Access Economics found a 10 per cent increase in native fish numbers would lead to a 5 per cent increase in recreational fishing expenditure. This equates to an additional spend of approximately $11 million in the Murray catchment and $4 million in the Murrumbidgee catchment each year.

Our research indicates a potential 10 to 30 per cent increase in golden perch populations across the Murray and Murrumbidgee catchments.

As well as the economic benefits, recreational fishing is well known for its positive health and wellbeing effects.

By relaxing constraints to the delivery of water for the environment we can:

- increase the area of native fish habitat
- boost river productivity to provide more food for fish
- provide the right conditions more often to encourage native fish to breed.

The Reconnecting River Country Program is an opportunity to negotiate more flexible river flow limits for the delivery of water for the environment and manage this water more efficiently to support native fish and the recreational fishing industry.

Depending on the flow limits negotiated with communities, water managers are aiming to increase the area of habitat available to native fish by:

- giving native fish regular opportunities to move into off-channel wetlands and low-lying floodplains for breeding and feeding. These environments provide important nursery habitat for juvenile fish, with warmer water temperatures, plenty of food and protection from predators. Many species rely on regular access to off-channel habitats to complete their life cycles
- increasing the length of rivers and creeks where larger freshes (flow pulses) can be delivered to provide spawning and movement opportunities for native fish like golden perch. Current flow constraints mean that many streams only receive baseflow and small fresh sized managed flows. These flows do not provide the flow cues or flowing habitat conditions required to attract and support these fish species.

Image courtesy of Gunther Schmida. Golden perch.

Waterbird outcomes

Waterbirds need access to suitable habitat to forage and feed, build their nests and raise their young.

By addressing the constraints that currently limit delivery of water for the environment, we can deliver water when and where it is needed more often to provide this essential habitat.

Based on outcomes observed during waterbird monitoring, the larger area of inundated habitat under relaxed constraints is likely to support greater waterbird abundance and waterbird breeding compared with current arrangements.

The key expected outcomes for waterbirds in the Murray and Murrumbidgee wetland regions are:

- improved breeding outcomes from increased areas of floodplain wetland habitat (including breeding and foraging habitat)
- greater food resources available for waterbirds from increased extent and duration of inundation of foraging areas
- improved condition of colonial waterbird breeding sites so that they are in event-ready condition
- increased opportunities to initiate small to medium scale colonial waterbird breeding events
- increased opportunities for non-colonial waterbirds to breed.

Image courtesy of Vince Bucello. Egret chick at Millewa.

Image courtesy of Vince Bucello. Tori Swamp.

Connectivity outcomes

Rivers are superhighways for native fish. Throughout their lifetime, native fish can travel hundreds (even thousands) of kilometres in search of food and habitat. After fish kills or drought, flowing rivers allow native fish to travel upstream and down to repopulate the system.

Rivers carry carbon and nutrients released from the floodplain floor. Relaxing constraints to the delivery of water for the environment will allow for more regular releases of carbon and nutrients from floodplains, fuelling food webs beginning with aquatic consumers like fungi and bacteria. Wetland plants will also benefit, providing food resources for larger animals including native fish, frogs, turtles and waterbirds.

An improved food supply will support the health of these water-dependant animal populations in the Murray and Murrumbidgee valleys. Rivers also carry plant seed that helps to restore the vegetation providing habitat for wildlife in floodplain creeks and wetlands.

The Reconnecting River Country Program will allow water managers to reinstate some of the flows connecting our landscape and restoring access for wildlife, particularly native fish, which use wetlands and creeks for breeding, and as nursery sites for young fish.

Vegetation outcomes

Image courtesy of Carmen Amos. Vegetation at Steam Engine.

At present, river operating rules mean environmental flows can reach only 21 per cent of floodplain wetlands in the **Hume to Yarrawonga** area. With a modest increase in flow limits, this area can be expanded to between 26 and 47 per cent.

This represents up to a two-fold increase in the area of floodplain wetlands that can be supported by water for the environment.

In the **Yarrawonga to Wakool Junction** area, up to 20 per cent of floodplain wetlands could be reached by environmental flows with the relaxation of constraints and the delivery of water for the environment. This is a significant improvement from the 9 per cent that can be reached under current conditions.

This area includes wetlands, billabongs, lakes and ephemeral creeks and anabranches in Millewa, Koondrook-Perricoota and Werai forests, and along the River Murray corridor and Edward-Wakool system.

Relaxing flow constraints would also increase the area of river red gum forests that can be supported with water for the environment up to four-fold.

In the **Murrumbidgee** catchment relaxed constraints are expected to support up to 65 per cent of floodplain wetlands, an increase from 44 per cent under current flow limits.

Under the range of proposed flow options, higher environmental flows are expected to improve the health and support recovery of water-vegetation communities including river red gum forests and woodlands, lignum shrubland, wetland plants and floodplain understorey plants. Many of these vegetation communities are currently in poor condition due to reduced inundation frequency.

The area of benefit is likely to extend beyond the immediate inundation zone. Trees and shrubs with access to recharged groundwater reserves will also likely benefit, providing a corridor of healthy habitat to support native wildlife.

Higher flows and the associated inundation of low-lying floodplains and wetlands are critical for flushing salt from the root zones of trees, stimulating growth, flowering and seed set. This is important for the survival of saplings and seedlings and recharging shallow groundwater aquifers needed by mature trees during drier times.

When you water river red gums you provide food, shelter and breeding opportunities for a huge range of native wildlife.

What's next?

This is a unique opportunity to rethink the way our rivers operate and make decisions to support a healthier river system benefiting all river users – plants, animals and people.

We are talking to communities and working closely with landholders whose properties may be affected by flows.

New flow models and inundation maps will help inform the process and identify affected properties.

Initial work will focus on development of a business case including the feedback from communities. This stage of the program will identify and evaluate flow and impact mitigation options for the delivery of the program. Scientific, technical and operational information is being developed to support options evaluation, which will also incorporate local knowledge and expertise via our collaboration with landholders and other stakeholders. The program team will develop a report, including recommended options, that will allow governments to make a decision on the parameters of the program in its next stage of delivery.

Have your say

What's your vision for rivers?

Website: dpie.nsw.gov.au/reconnecting-river country

Phone: 1300 081 047

Email: admin.rrcp@dpie.nsw.gov.au

Image courtesy of David Finnegan, Department of Planning and Environment.
Men fishing, Gulpa Creek, Murray Valley National Park.

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