

Department of Planning and Environment

Reconnecting River Country Program

Environmental benefit and risk analysis: Hume to Yarrowonga (Murray River)



Normans Lagoon, located near Doctors Point, East Albury.

About the Reconnecting River Country Program

The Reconnecting River Country Program is about improving flow connectivity to wetlands, riparian and floodplain vegetation communities through relaxing flow constraints in the southern-connected Murray-Darling Basin including:

- Hume to Yarrowonga (Murray River)
- Yarrowonga to Wakool Junction (Murray River).

A constraint is any physical, policy or operational barrier limiting the flow of water in river systems. There are a range of flow constraints in the basin, meaning rivers connect to their floodplains less often than is needed to maintain healthy river, wetland and floodplain ecosystems. The program aims to remove or relax these constraints.

Removing or 'relaxing' constraints allows water for the environment to be periodically delivered at higher levels and at more appropriate times.

Program benefits

Improving environmental flow delivery will support the recovery of native plants and animals in our rivers, wetlands and billabongs. Importantly, the program will provide long-term generational physical, emotional, economic and wellbeing benefits associated with positive ecological outcomes. It also has the potential to provide important economic benefit to local communities in southern NSW.

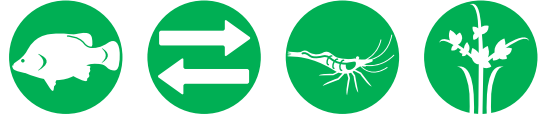
The NSW Government will collaborate with stakeholders to ensure issues are identified and a range of tools developed to mitigate potential effects before making changes to existing rules, policies or infrastructure.

About the Environmental Benefit and Risk Analysis

What we assessed

The Environmental Benefit and Risk Analysis is a major component of the flow options analysis and evaluation process being undertaken by the program. It assesses the potential environmental outcomes of the flow options being explored within the following themes:

Benefits



Native fish Lateral connectivity Ecosystem production Wetland and floodplain vegetation

Potential risks



Water quality River form Invasive weeds

For each theme, potential environmental outcomes were measured using the best-available science, scientific models and expert knowledge including:

- the best available scientific information on the types of flows native fish, waterbirds and vegetation require to complete their life cycles and be in healthy condition
- hydrological modelling representing the potential system-wide flow patterns possible using currently available volumes of water and the different flow options being investigated
- inundation mapping providing an understanding of the potential areas to be inundated under the flow options being considered.

Flow limit options being assessed¹

	Murray at Doctors Point (ML/d ²)	Murray downstream Yarrowonga Weir (ML/d)
Base case	25,000 ³	15,000
Option 1	25,000	25,000
Option 2	30,000	30,000
Option 3	40,000	40,000
Option 4	40,000	45,000

¹ Options assessed to date. A range of other flow options could be explored between the base case and Option 4

² Megalitres per day

³ It is difficult to deliver environmental flows up to 25,000 ML/d at Doctors Point due to the current constraint downstream of Yarrowonga Weir of 15,000 ML/d.

Note: 35,000 ML/d flow options were added for both Doctors Point and Yarrowonga in early 2023, to enable a more robust assessment of the change in impacts and benefits across the range of flows being investigated. Environmental benefit and risk assessments for these options will be undertaken during 2023.

About the Hume to Yarrowonga reach

The reach of the Murray River between Hume Dam and Yarrowonga Weir is characterised by a complex network of river-connected wetlands (billabongs) and creeks. However, less than 21 per cent of the wetland area can currently be reached with water for the environment. There is an almost continuous line of vegetation along the main channel consisting predominately of river red gum trees along both banks. The reach's wetlands and river red gum forests support a diverse range of native plants and animals including:

- 15 species of native fish, seven of which are listed under NSW and Australian Government threatened species legislation, including silver perch and Murray cod
- 95 water-dependant bird species, including 13 waterbird species listed as threatened or protected under international migratory bird agreements
- 10 frog species and at least two turtle species.

Two nationally listed wetlands are located within the reach and several wetlands near Howlong are some of the last remaining habitats in NSW for the critically endangered flathead galaxias (a small-bodied native fish).

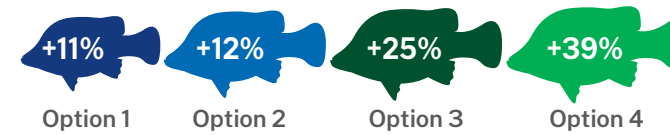
What we learned – Hume to Yarrowonga program benefits

Native fish



The study shows up to a 39 per cent increase in golden perch (yellow belly) abundance in the Hume to Yarrowonga reach.

Estimated increase in golden perch (yellow belly) numbers with higher environmental flows



Relaxing flow constraints can potentially buffer natural population declines during drier periods and boost population increases during average and wetter climate conditions to build greater resilience.

Relaxed flow constraints would also likely support population recovery of the small native fish relying on regular access to wetlands to breed and complete their life cycles.

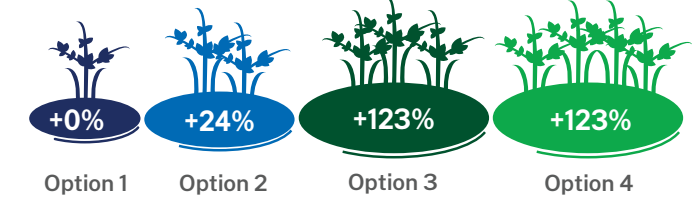
The critically endangered flathead galaxias is an example of such 'floodplain specialist' native fish. These fish were once abundant in the Hume to Yarrowonga reach, but have largely disappeared due to altered river flows and declining wetland health.

Lateral connectivity (wetland inundation)

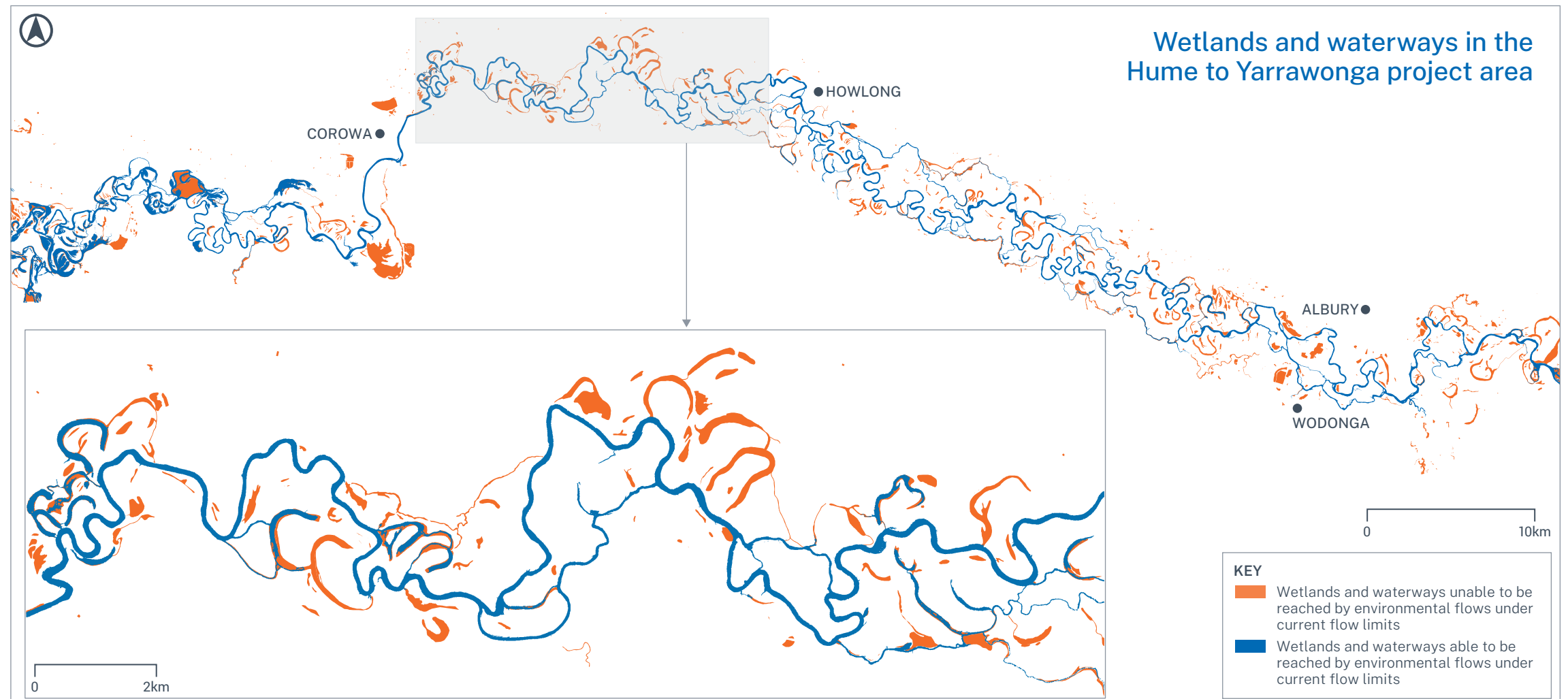


The proportion of wetlands able to be reached between Hume Dam and Yarrowonga more than doubles from 21 to 47 per cent with the highest flow options.

Estimated increase in wetlands potentially reached by higher environmental flows



Golden perch – photo by Gunther Schmida



Wetland and floodplain vegetation

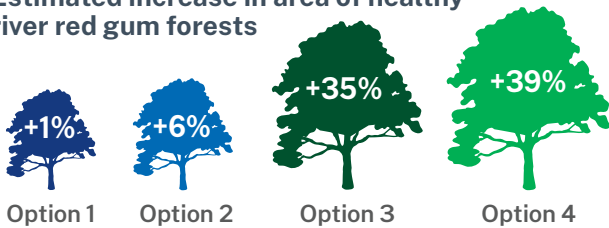


The study tells us relaxed flow constrains would support two to three times more native vegetation along the Murray River between Hume Dam and Yarrowonga than what is currently possible.

More frequent watering at appropriate times means we can maintain and improve the health of our iconic river red gum forests and a diverse range of wetland plants.

The analysis shows up to a 39 per cent increase in healthy river red gum forests in the Hume to Yarrowonga reach under relaxed flow limits compared to the base case, and up to a 43 per cent increase during dry periods.

Estimated increase in area of healthy river red gum forests



During relatively dry periods, environmental flows under higher flow options provide an opportunity to break long dry spells for wetland and floodplain vegetation and achieve reductions in vegetation condition decline. This means local habitat is protected during these dry spells.

Water quality



The study shows raised flow limits won't increase the risk of negative water quality outcomes in the Hume to Yarrowonga reach. Raised flow limits will likely benefit water quality outcomes with increased overall benefit ratings from 'moderate' to 'high'. The increased benefit rating is primarily due to the potential to shift flows from the higher risk summer period to winter.

More information

The program is being led by the Department of Planning and Environment's Water Infrastructure NSW in partnership with the department's Environment and Heritage Group, the Department of Regional NSW's Local Land Services and the Department of Primary Industries, Fisheries.

The program is currently identifying and evaluating flow and impact mitigation options for further investigation in the next stage of the program. Options analysis is part of the requirements under the **NSW Government Business Case Guidelines**, as well as under the **Infrastructure NSW Infrastructure Investor Assurance Framework**.

Scientific, technical and operational analysis is being undertaken to support options evaluation. Options

River form



The study finds a medium risk higher flows may influence current rates of riverbank erosion and other geomorphic process in the Hume to Yarrowonga reach. A medium risk rating in the reach indicates the consequences of potential changes are 'moderate', however the study finds the likelihood of change 'unlikely'. There are a range of water management techniques and actions as part of river works programs to reduce this risk from medium to low. For example, we can manage environmental flows to slow the rate of fall in river levels following a high flow event.

A key benefit of more frequent higher flows includes the maintenance of river features like benches, deep pools and wetland connections providing diverse habitats for our native plants and animals. Improved nutrient and carbon transfer into the areas adjacent to the river and wetlands is also expected.

Weeds



The weed risk assessment finds a small overall decrease in likely weed impact under relaxed flow options compared to the base case. The study predicts a reduction in suitable habitat for some water-based weeds and an increase in habitat for some land-based weeds. These increases and decreases for different species balance out, with a slight net benefit (reduced weed impact) overall.

The assessment also shows an overall small decrease in weed hot spots (locations where four or more priority weed species are found) under the relaxed flow options.

Although the net outcome of relaxing constraints is likely to be neutral to slightly positive across the Murray catchment, weed management plans may be required to address potential increases in weed distribution and impact for certain species and locations.

evaluation will also incorporate local knowledge and expertise through collaboration with landholders and other stakeholders.

To find out more about upcoming consultation opportunities please contact us or get in touch with your local engagement officer.

Acknowledgement

The Department of Planning and Environment and the Department of Regional NSW's Local Land Services acknowledge we stand on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging.

Contact us

Phone: 1300 081 047

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

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

© State of New South Wales through Department of Planning and Environment 2022. Information contained in this publication is based on knowledge and understanding at the time of writing, July 2022, and is subject to change. For more information, please visit dpie.nsw.gov.au/copyright PUB23/379