

Department of Planning and Environment

Reconnecting River Country Program

Environmental benefit and risk analysis: Murray River system



Murray River, Barmah-Millewa Forest and Moira Lake.

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 across the following themes:

Benefits



Native fish Lateral connectivity Waterbirds 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 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 limit options being considered.



Waterbird chicks (cormorant species) – photo by Vince Bucello

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.

What we learned – Murray River system-wide environmental benefits

Native fish



The study shows an up to 29 per cent increase in golden perch numbers in the Murray system.

This increase in native golden perch numbers will provide opportunities for increased recreational fishing and associated tourism for the local region.

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



Waterbirds



More frequent watering of wetlands at appropriate times is expected to increase waterbird numbers at study sites, including in drier years when waterbird breeding and foraging habitat would otherwise be limited:

- Barmah-Millewa Forest (up to +13 per cent in average years and +80 per cent in drier years)
- Koondrook-Perricoota-Gunbower Forests (up to +48 per cent in average years and +34 per cent in drier years).

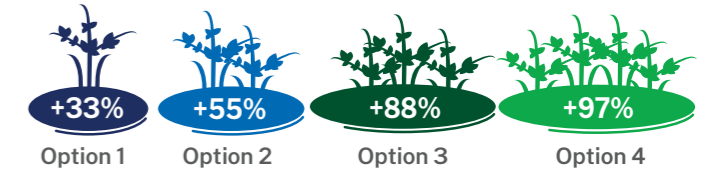
Lateral connectivity (wetland inundation)



The study shows current environmental water flows only reach 15 per cent of wetlands along the Murray River and Edward-Wakool system (Murray system).

The flow limit options currently being considered for the Murray project area could double (+97 per cent) the area being reached by environmental flows:

Estimated increase in wetlands potentially reached by higher environmental flows



This large increase provides an opportunity to halt the decline of wetlands and improve waterway and floodplain health.



KEY

- Ramsar sites
- The Living Murray icon sites

Project Areas

- Hume to Yarrowonga
- Yarrowonga to Wakool Junction
- Wakool Junction to Wentworth
Outside program being assessed for environmental outcomes
- Other project areas
Area assessed for Murrumbidgee program and environmental outcomes

0 45km

Ecosystem production



Ecosystem 'production' describes the growth and transfer of energy from plants and algae into the body mass of animals in the aquatic food web.

The study tells us increased flows can grow the availability of food and energy for native fish and other animals in the system. This increased production (up to 12 per cent) would increase the amount of food available for native fish and other aquatic animals during critical times, and will potentially support increased breeding and recruitment.

Wetland and floodplain vegetation



The study tells us relaxed flow limits would support two to four times more area of native vegetation in wetlands and on low-lying floodplains than is currently possible.

This would provide additional support for the iconic river red gum forests, black box woodlands, wetland plants and shrublands providing habitat and food for waterbirds, bush birds, fish, frogs, turtles and other native animals.

What does this mean for vegetation health?

With more frequent watering at appropriate times, the study shows an:

- up to 15 per cent increase in healthy river red gum forest and woodland over the long term; and up to 50 per cent increase during dry periods
- increase in resilience of river red gum communities, with up to 75 per cent less decline in condition during extreme drought.

The program would also mean improved soil moisture and healthier ecological communities leading to an overall increase in environmental health along the Murray River.

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

Water quality



The study finds no increased risk of adverse water quality events resulting from increased flows. In fact, benefits to water quality are likely, due to the potential to bring forward the timing of some high flow events from the warmer months (late spring/summer) to cooler months earlier in the season (winter/early spring).

River form



The study finds a low to medium risk higher flows may influence current rates of river bank erosion and other geomorphic processes influencing channel form. There are a range of water management techniques and actions as part of river works programs to reduce this risk from medium to low in most river reaches. 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, pools, wetland connections and creeks providing diverse habitats for our native plants and animals.

Invasive weeds



The weed risk assessment finds a small overall decrease in weed impact under the 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 study also shows an overall small decrease in weed hot spots.

Weed management plans may be required to address potential increases in weed distribution and impact for certain species in some 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

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