

Managing resumption of flows in the Lower Darling River

How environmental benefits and water quality risks are considered when resuming flows in the Lower Darling River

Key points

- Releasing water to the Lower Darling when the Menindee Lakes receives inflows maximises benefits to native fish populations. These flows dilute water that is often saline, contains algal blooms and may be dangerously low in dissolved oxygen. The flows also provide nutrients critical for native fish survival and breeding.
- Using small, slow moving releases to resume flows can cause poor water quality leading to fish kills.
- Higher volume resumption flows are more likely to quickly break-up harmful algal blooms, replenish low oxygen pools and dilute highly saline water in isolated pools than smaller, slow moving flows.
- Reducing the time fish experience additional stress caused by poor water quality reduces the risk of fish kills during a resumption flow event. Deeper, fast moving flows can also provide an opportunity for fish to move to locations with more favourable conditions.
- Even with relatively high pulse flows, there are still some temporary risks to fish as the reconnection of pools may result in the mixing or turn-over of lower quality water through the water column.

Why are resumption flows important?

Some rivers in the Murray-Darling Basin occasionally stop flowing during the warmer and drier seasons. Water extraction and diversion into storages has extended the time between flow events, especially during drought. When surface flows stop, rivers retreat to a series of isolated pools that play a critical role as wildlife refuges and water supply for local communities.

The first flow of water after a dry period has important social, cultural and environmental benefits. After a drought the first flow provides critical relief, but after a particularly long and dry period may pose environmental risks. Water quality in isolated refuge pools can deteriorate, with thermal stratification, oxygen depletion, algal blooms and concentration of salts.

The size and timing of flows is particularly important in the Lower Darling River where resumption flows rely on managed releases from the Menindee Lakes. The key environmental issues for the Lower Darling River are minimising water quality risks and supporting native fish populations.

Managing water quality risks from resumption flows

The release of water from Menindee Lakes into the Lower Darling River could result in water quality impacts downstream as the river is 'restarted'. Resuming flow may flush high salt loads down the river and into the Lock 10 weir pool at Wentworth. It can also mobilise large amounts of organic material as the head of the flow progresses downstream. This can result in short term hypoxia (low dissolved oxygen). There is also a risk restarting the river will de-stratify isolated refuge pools, increasing the risk of low dissolved oxygen water from the bottom of pools mixing through the water column causing fish kills. Many of these risks can be mitigated.

In February 2004, water was released after an extended drought to restart and reconnect pools in the Lower Darling River. Small volumes were initially released and gradually increased to approximately 300 megalitres (ML)/d. The flows were large enough to de-stratify pools, creating hypoxic conditions, but were not large enough to dilute and refresh the pools. As a result, significant fish kills occurred. A subsequent much higher flow of 6,500 ML/d was then released to flush poor quality water from the pools and reduce the impact.

Between 2004 and 2016 the river dried on several occasions and flows of between 1,750 and 4,500 ML/d were successful in managing harmful algal blooms, replenishing low oxygen pools and reducing pool salinity. The flow volume water managers used for each event depended on the season. Only minor fish kills were linked to these flows.

Supporting native fish recruitment with resumption flows

The Lower Darling River extends over 500 km and is home to over a dozen native fish species including golden perch, silver perch and Murray cod. These large iconic species will spawn and migrate in response to large flow events, but research suggests that spawning is most successful when flowing waters are rich in nutrients. When flow events in the Barwon-Darling are large enough to recharge the Menindee Lakes, the water is extremely rich in nutrients and aquatic life.

In 2014, a flow of 150 and 200 ML/d over several weeks was released to top up two temporary block banks in the Lower Darling. Monitoring detected small numbers of Murray cod larvae during this period.

In spring 2016, after significant flows into the Menindee Lakes, a flow pulse reaching 6,000 ML/d was released into the Lower Darling River. This was followed by a base flow to maintain connectivity to stimulate fish spawning and movement. Following this event, very high numbers of Murray cod larvae were detected indicating strong breeding in the Lower Darling. The flow also allowed large numbers of golden perch juveniles to disperse into the Lower Darling and Murray rivers. These juveniles had colonised the Menindee Lakes following flood spawning in the Northern Basin.

Native fish were also found to move from the River Murray into the Darling and from the Darling into the Murray. This shows a critical breeding pathway for native species and demonstrates the importance of connectivity within and between different rivers for native fish populations.

Timing and size of current releases

Releases from Lake Wetherell to the Lower Darling will increase from today - Thursday 26 March - commencing at 500 ML/day and ramping up to a peak of 3,000 ML/day. Releases will be held at 3,000 ML/day for 7 days and then reduced by 250 ML/day back to a flow of 300 ML/day. This will create the pulse flow necessary to manage water quality and associated fish risks.

Want to know more?

MDBA 2019, *Independent assessment of the 2018-2019 fish deaths in the Lower Darling*. Available [here](#).

NSW Department of Industry – Lands and Water 2019. *Better Management of Environmental Water: interim solutions package*. Available [here](#).

NSW Department of Planning, Industry and Environment 2020. *Murray-Lower Darling Long Term Water Plan Part A: Murray-Lower Darling Catchment*. Available [here](#).

Sharpe, C and Stuart, I (2018). *Environmental flows in the Darling River to support native fish populations. CPS Enviro report to The Commonwealth Environmental Water Office*. Available [here](#).

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