

# Murray-Darling Basin – water quality and dissolved oxygen results

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Multiple agencies are undertaking water quality monitoring to review dissolved oxygen conditions across NSW and identify potential risks to ecological communities. This update provides an assessment of information collected up to 16 November 2022.

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As rain continues to fall, some areas are being flooded for the first time in decades. The flooding of these areas is washing organic material such as sticks, leaves, bark, grass and crop residue into the river system. The breakdown of this organic material by bacteria uses up dissolved oxygen in the water and can release tannins into the water, turning it black in colour. This is often called a hypoxic (low oxygen) blackwater event.

Ongoing flooding and increasing air and water temperatures has led to oxygen levels decreasing to critical levels for fish health in many rivers across New South Wales. Fish and other aquatic animals have difficulty surviving under low oxygen conditions. The critical minimum level for dissolved oxygen varies between fish species, their size and physical condition. The larger the fish the more oxygen they require. As a general guide, native fish and other large aquatic organisms require at least 2 mg/L of dissolved oxygen to survive, but may begin to suffer if prolonged levels below 4 to 5 mg/L are experienced.

NSW Fisheries has received multiple reports of fish deaths, or fish struggling or dying, across a broad area in the southern Murray-Darling Basin, including in the Murray, Edward-Wakool, Murrumbidgee and Billabong Creek systems. These reports are being investigated where possible and confirmed incidents are listed in this factsheet. These recent reports are likely the result of hypoxic blackwater associated with the current widespread flooding.

To report dead fish, fish struggling or starting to gasp at the water surface, or crayfish climbing out of the water, please call the New South Wales Department of Primary Industries Fisheries, Fishers Watch Phonenumber on 1800 043 536 or fill in a fish kill protocol and report form at: [www.dpi.nsw.gov.au/fishing/habitat/threats/fish-kills-2019-2020/info-sheet](http://www.dpi.nsw.gov.au/fishing/habitat/threats/fish-kills-2019-2020/info-sheet)

When reporting, please include the name of the river/waterbody, location and date of your observation. If possible, please also record what species are affected and an estimate of number of each species observed.

NSW and Commonwealth agencies are continuing to assess the risks of poor water quality and to monitor dissolved oxygen levels to identify areas that may require further action.

## Where are the main areas of concern?

There are four main areas of concern where dissolved oxygen is at critical levels for fish health. The areas of most concern are:

- Murray River from Tocumwal downstream to the South Australian border
- Wakool River
- Kolety/Edward River
- Barwon River between Walgett and Brewarrina

In addition to these critical areas, there is low dissolved oxygen in the lower Murrumbidgee River, lower Lachlan River, Niemur River and Billabong Creek, which could impact fish health.

## Dissolved oxygen levels – mid Murray River catchment

Dissolved oxygen levels in the Murray River at Tocumwal, upstream of the Barmah/Millewa Forest, have been remaining in the safe range for fish health (Figure 1). Monitoring in the Murray River at the outflow from the forest at Barmah shows oxygen levels have dropped below 1 mg/L.

Large volumes of floodwater are continuing to inundate the Koondrook-Perricoota Forest, an extensive forest of river red gums and woodlands along the Murray River downstream of Echuca. In addition to the forests, large areas of pastures and crops in agricultural areas have been flooded. Water with low dissolved oxygen is currently flowing into the Merran, Little Merran, Thule and Barber creeks and then into the Wakool River. This has caused the dissolved oxygen levels in these waterways to decline below safe levels for fish health.

As the floodwater from all these systems makes its way downstream, the impact on dissolved oxygen is evident in the Murray River. Dissolved oxygen levels downstream of Koondrook-Perricoota Forest at Barham, where the Wakool River joins the Murray River and at Colignan, have all declined to less than 1 mg/L (Figure 1). Monitoring is showing that oxygen levels in the Murray River downstream of Wentworth have also declined below 1 mg/L. Fish may be seen gasping at the water surface when dissolved oxygen falls to this low level.

The Bureau of Meteorology has predicted floodwaters will peak in the Murray River at the Wakool River junction around 19 to 20 November and at Wentworth in early December.

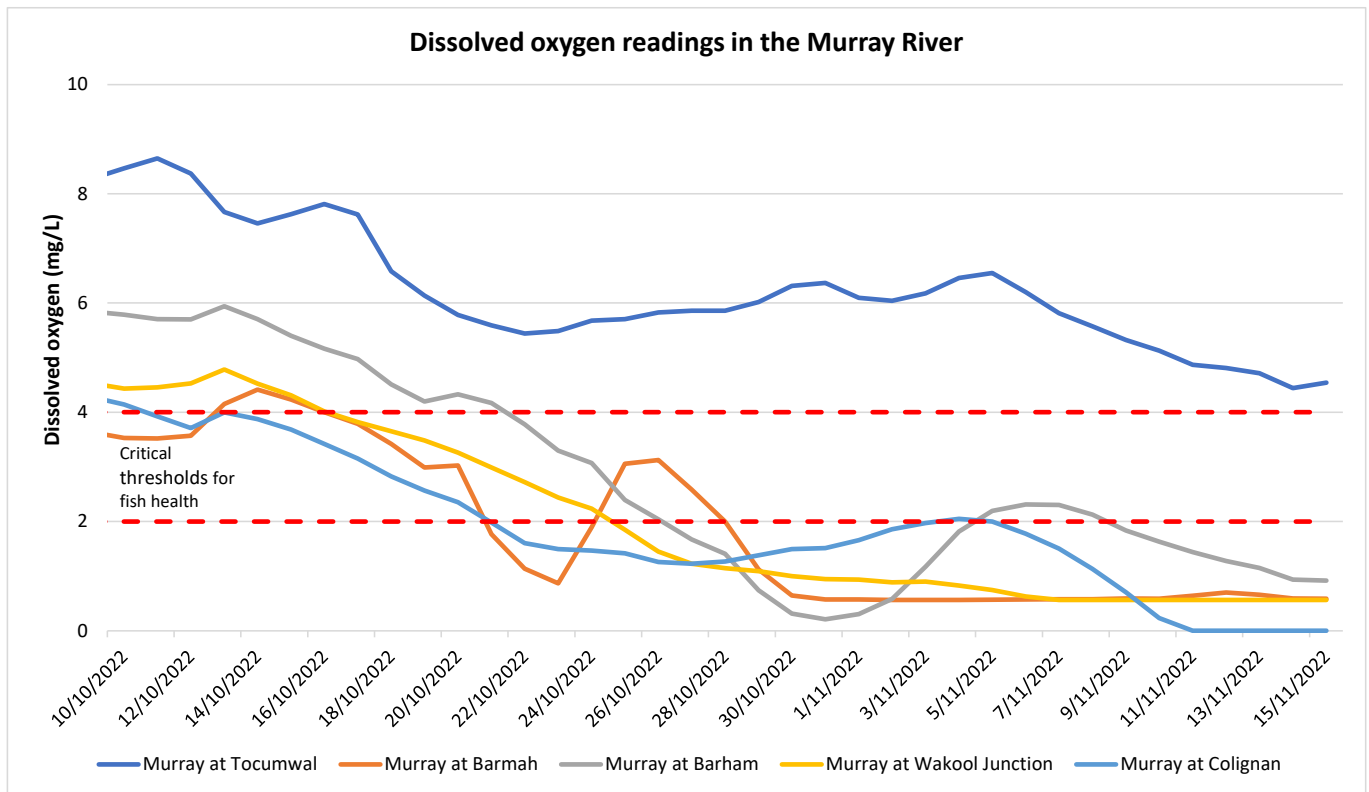


Figure 1: Dissolved oxygen (mg/L) in the Murray River at Tocumwal, Barmah, Barham, downstream of the Wakool River junction and at Colignan

### Dissolved oxygen levels – Kolety/Edward River

Dissolved oxygen has dropped to zero at the Toonalook monitoring site, which is located immediately downstream of Barmah/Millewa Forest. Dissolved oxygen at Deniliquin and Moulmein fell below the critical threshold of 2 mg/L last week and is now 0.5 mg/L (Figure 2). As hypoxic blackwater events and fish deaths have occurred in this river system in the past, agencies will continue to monitor the situation in the Kolety/Edward River.

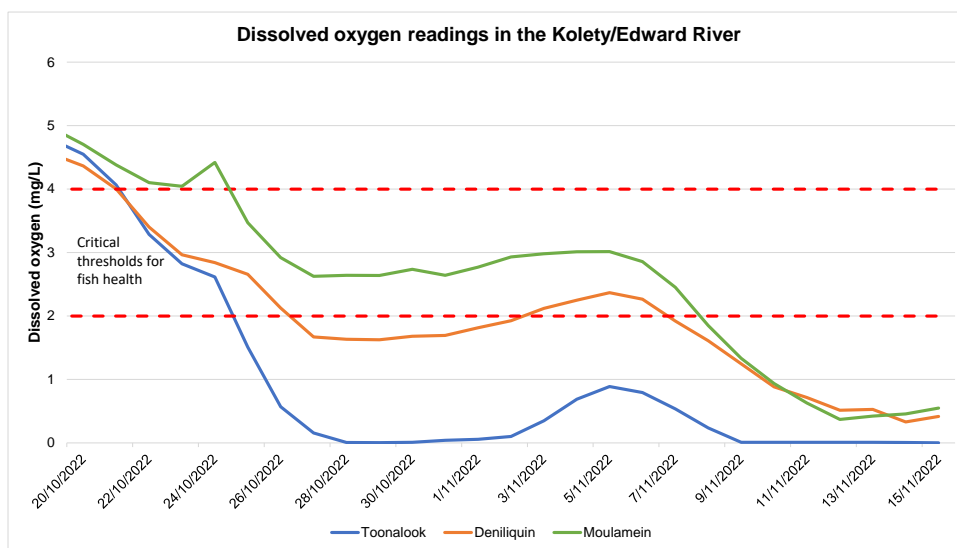


Figure 2: Dissolved oxygen (mg/L) in the Kolety/Edward River at Toonalook, Deniliquin and Moulmein

## Dissolved oxygen levels – Wakool River

In a similar situation to the Kolety/Edward River, dissolved oxygen levels in the Wakool River have been continuing to decline as river level and water temperatures increase. Dissolved oxygen in the Wakool River at Gee Gee Bridge has showed some minor improvement with the cooler temperatures this week (Figure 3). As for the Kolety/Edward River, fish deaths have occurred in the Wakool River during previous hypoxic blackwater events.

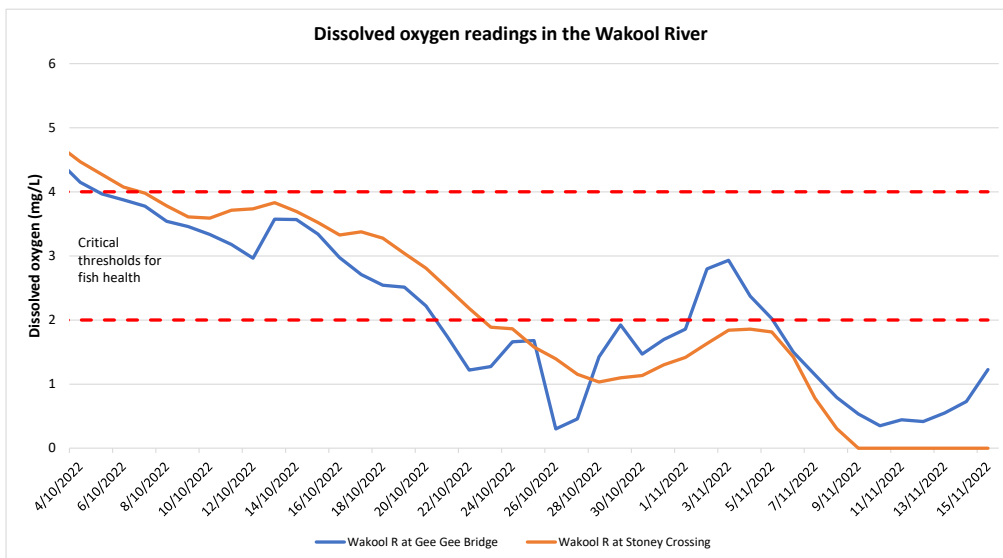


Figure 3: Dissolved oxygen (mg/L) in the Wakool River at Gee Gee Bridge and Stoney Crossing

## Dissolved oxygen levels – Barwon River

The inflow of floodwater from the Northern Murray-Darling Basin catchments into the Barwon River has caused dissolved oxygen levels at Walgett (Namoi River junction) and Geera (Macquarie River junction) to drop to almost zero. Levels at Brewarrina are remaining around the 2 mg/L critical threshold for fish health (Figure 4). There have not been any reports of fish deaths or of fish gasping at the water surface in the Barwon River.

Oxygen levels in the Darling River at Bourke have declining below 4 mg/L and are expected to decrease further as the low oxygen water arrives from upstream. These flood flows will continue to impact dissolved oxygen levels further downstream at Wilcannia and Menindee Lakes over the coming months.

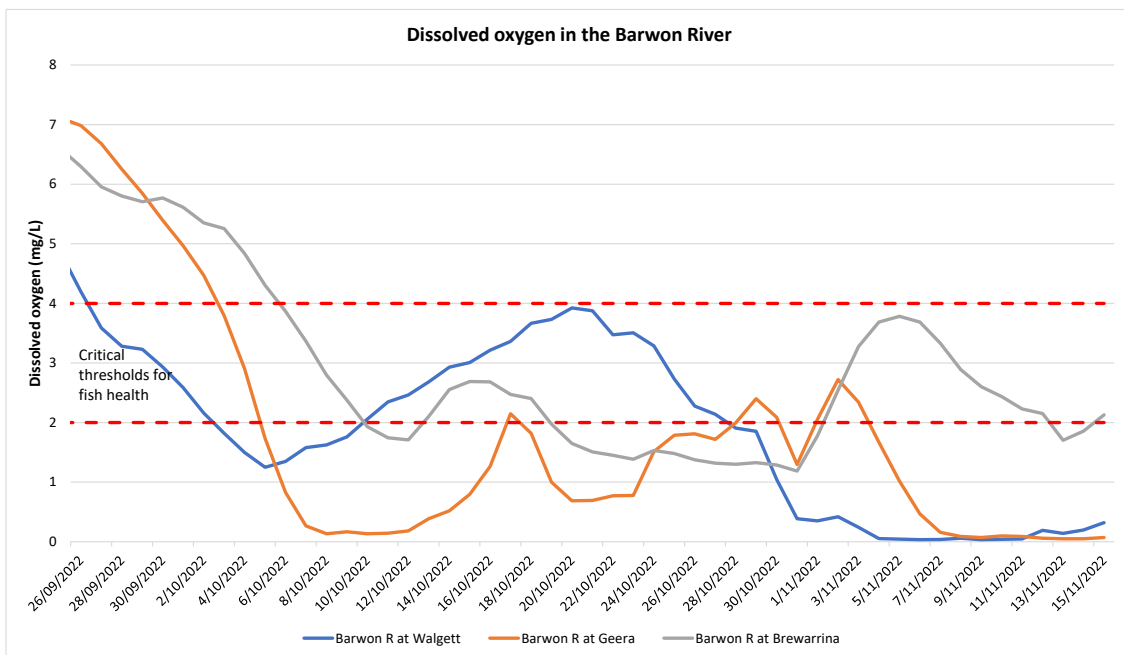


Figure 4: Dissolved oxygen (mg/L) in the Barwon River at Walgett, Geera and Brewarrina

## Hypoxic blackwater fish death summary

NSW Fisheries is receiving multiple reports of fish deaths or fish struggling across a broad area in the southern Murray-Darling Basin, including in the Murray, Edward-Wakool, Murrumbidgee and Billabong Creek systems.

Below is a list of confirmed fish deaths in the last week (as of 16 November 2022) that were very likely the result of hypoxic blackwater associated with the current widespread flooding:

- Murray River at Pental Island, upstream Swan Hill (8 November 2022). Approximately 50 dead adult Murray Cod. Limited extent.
- Murray River, Murray Downs Marina area near Swan Hill (12 November 2022). 50 to 100 adult Murray Cod. Limited extent.
- Edward River upstream Deniliquin (12 November 2022). Approximately 20 dead Murray Cod, approximately 60 to 80 cm. Limited extent.
- Murray River (Murray / Edward-Wakool floodplain) near Goodnight, upstream of Wakool Junction (13 November 2022). Many dead Murray Cod, possibly hundreds of fish and possibly also Golden Perch and Silver Perch. Locally widespread.
- Billabong Creek (upstream from Moulamein) (13 November 2022). 12 Murray cod. Limited extent.
- Murray River at Mildura Marina (15 to 16 November 2022). Two dead Murray cod, one dead Golden perch and one dead Bony bream. Limited extent.

## What is being done?

The Bureau of Meteorology has forecast air temperatures at Echuca and Mildura will increase up to a maximum of 26 to 27°C over the weekend, before the next cool change brings temperatures back

down again. Lower air temperatures are predicted for early next week and will slow down the breakdown of organic material by bacteria, which may provide an opportunity for oxygen levels to recover slightly.

The magnitude of flooding means that the prevention of a hypoxic blackwater event is not possible and mitigation methods to get more oxygen back into the water are extremely limited. Small, oxygenated refuge areas for fish can be provided by diverting environmental water to areas of poor water quality.

The Commonwealth Environmental Water Office is continuing to divert small volumes of environmental water to the Wakool, Kolety/Edward and Niemur rivers and Thule, Murrain-Yarrein and Cockrans-Jimaringal creeks, to provide a refuge from declining water quality. You can find out more about the Commonwealth's current environmental water releases in the mid-Murray at: [Latest water use - Mid-Murray - DCCEEW](#)

NSW and Commonwealth agencies will continue to assess the risks of poor water quality and to monitor dissolved oxygen levels to identify areas that may require further action. Updates are being provided to the media and posted on agency web pages to ensure the community is informed of high risk areas.

## Additional information

To notify the department of potential blackwater events email: [waterqualitydata@dpi.nsw.gov.au](mailto:waterqualitydata@dpi.nsw.gov.au)

To report dead fish, fish struggling or starting to gasp at the water surface, or crayfish climbing out of the water please call the NSW DPI Fisheries Phonenumber at 1800 043 536 or fill in a fish kill protocol and report form at: [www.dpi.nsw.gov.au/fishing/habitat/threats/fish-kills-2019-2020/info-sheet](http://www.dpi.nsw.gov.au/fishing/habitat/threats/fish-kills-2019-2020/info-sheet)

Information on recent fish deaths is available at: [Fish kills in NSW](#).

When reporting, please include the name of the river/waterbody, location and date of your observation. If possible, please also record what species are affected and an estimate of number of each species observed.

Further information on blackwater events can be found at the DPIE Water website at: [www.industry.nsw.gov.au/water/allocations-availability/droughts-floods/drought-update/managing-drought-recovery/blackwater](http://www.industry.nsw.gov.au/water/allocations-availability/droughts-floods/drought-update/managing-drought-recovery/blackwater)

Additional information is also available on the MDBA website at: [www.mdba.gov.au/publications/mdba-reports/water-management-101-factsheets](http://www.mdba.gov.au/publications/mdba-reports/water-management-101-factsheets)

Operational updates are available at: [WaterInsights - WaterNSW](#)

Flood updates can be found on the EPA's Web page at: [www.epa.nsw.gov.au/news/news/2022/nsw-storm-and-flood-updates-2022](http://www.epa.nsw.gov.au/news/news/2022/nsw-storm-and-flood-updates-2022)