

Multiple agencies are undertaking water quality monitoring to assess dissolved oxygen conditions across NSW and identify potential risks to ecological communities. This update provides an assessment of dissolved oxygen data collected up to 4 February 2022 along the Barwon-Darling River and in Menindee Lakes.

Blackwater and the Menindee Lakes

High flows have been occurring for some weeks along the Barwon-Darling River, resulting in high levels of organic material entering the river and resultant low dissolved oxygen (DO) levels, particularly at the front of the high flows. This is a naturally occurring response that has happened in the past and can result in fish deaths, if fish cannot move to areas of better aerated water.

There are two main risks:

- The low dissolved water being captured within Lake Wetherell as the front of the flood peak arrives.
- The low dissolved oxygen water being released and mixing with other sources of low dissolved oxygen water along the margins of the Lower Darling River and the Lower Darling floodplains.

Agencies and scientific experts are working together to continually monitor the dissolved oxygen levels throughout the river system and advise on the best operational measures to mitigate the risk to aquatic life as much as possible.

Dissolved oxygen levels - Barwon and Darling rivers

Floodwaters from heavy rain in the Northern Murray-Darling Basin during November 2021 peaked at Tilpa at around 57 gigalitres (GL)/day and are continuing to make their way down the Darling River. The peak flow is expected to reach Wilcannia and then Lake Wetherell in the second or third week of February.

Monitoring of the Barwon and upper Darling rivers from Brewarrina to Louth, shows dissolved oxygen levels have been slowly improving in recent weeks as the high flows pass and as temperatures have reduced slightly (Figure 1).

As a general guide, native fish and other large aquatic organisms require at least 2 mg/L (milligrams per litre) of dissolved oxygen to survive, but may begin to suffer at levels below 4 to 5 mg/L. Despite the very low results, no major fish deaths have been reported in this area.

If you see dead fish or fish starting to gasp at the water surface, please call the **NSW DPI Fisheries Hotline – 1800 043 536**.

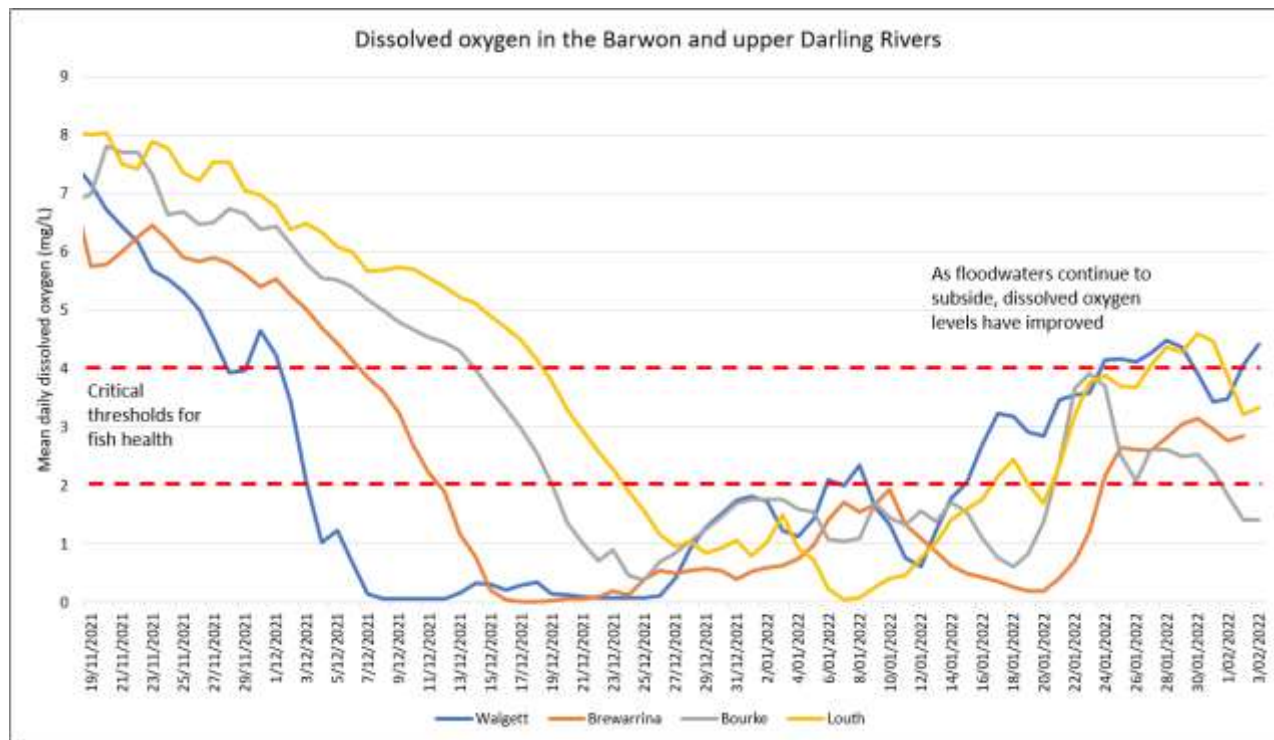


Figure 1. Mean daily dissolved oxygen (mg/L) in the Barwon and upper Darling rivers

Dissolved oxygen levels - Menindee Lakes and lower Darling Baaka

Dissolved oxygen at Wilcannia is remaining below the critical threshold of 2 mg/L. A new monitoring site, installed at the inflow to Lake Wetherell, is showing dissolved oxygen levels are declining as the hypoxic water progresses downstream.

Dissolved oxygen levels at a second new monitoring site, installed downstream of Menindee at Weir 32 and the existing site further downstream at Burtundy, are remaining above 4 mg/L. Water temperatures have fallen recently which is contributing to increased dissolved oxygen levels upstream and into Menindee Lakes (Figure 2).

NSW Murray-Darling Basin dissolved oxygen



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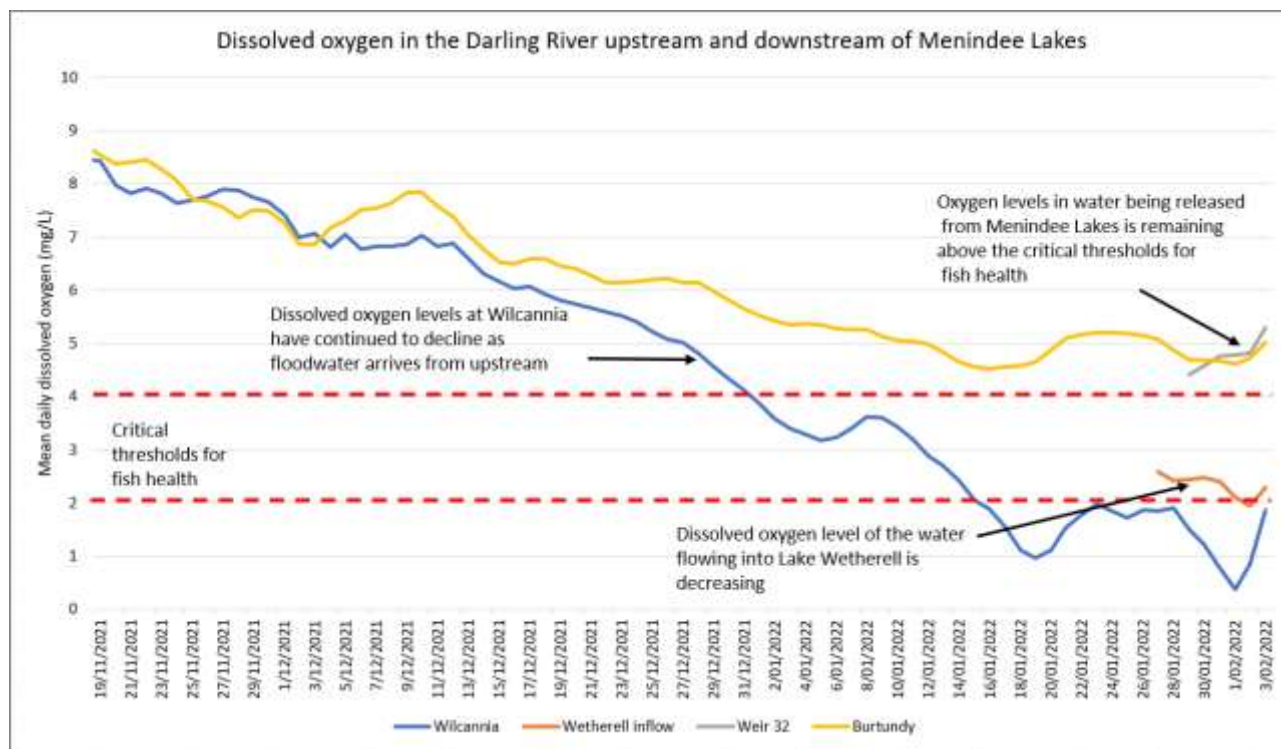


Figure 2. Mean daily dissolved oxygen (mg/L) in the Darling River upstream and downstream of Menindee Lakes

Dissolved oxygen readings taken last week show levels are around 2.95 mg/L in Lake Wetherell and 3.3 mg/L at the inlet where blackwater is pushing into Lake Pamamaroo (Figure 3). Away from the inlet, dissolved oxygen in Lake Pamamaroo is 6.7 mg/L, which provides a refuge for native fish. Monitoring of oxygen levels in the lakes will continue as floodwater arrives from upstream.

Dissolved oxygen in the main channel of the Lower Darling is currently at acceptable levels. However, water out on the floodplain has very low dissolved oxygen levels. This will flow back into the river when the releases from Menindee Lakes are reduced.

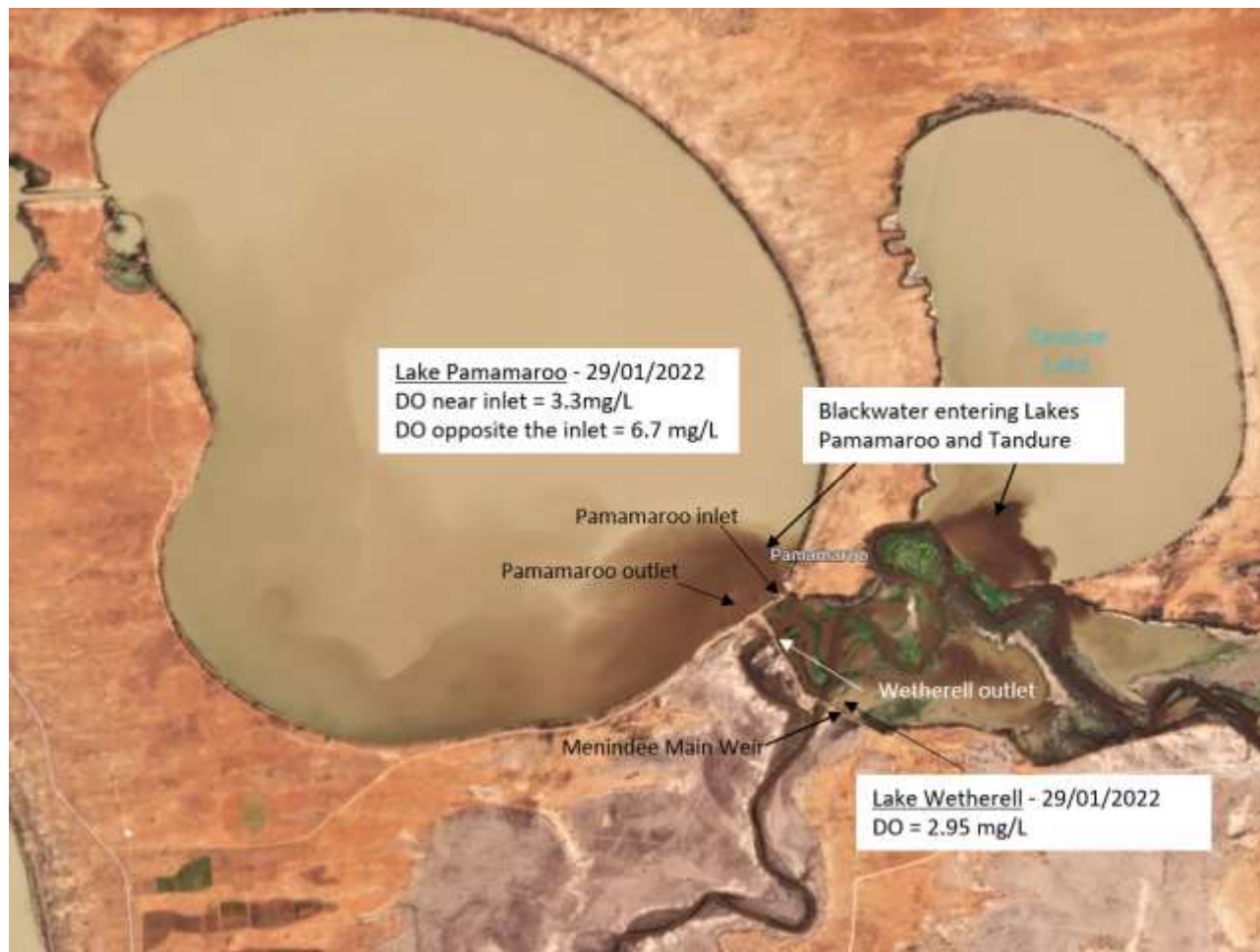


Figure 3. Satellite Image from 26 January 2022 showing the blackwater entering the upper Lakes and recent dissolved oxygen results

What is being done?

All factors are being considered in determining the best operational management of the Lakes and releases. These include:

- The need for the Lakes to be at full supply level at the end of the inflows.
- The need to not exceed releases of 18,000 megalitres (ML)/day at Weir 32 to prevent flooding of homes.
- The ability to mix the flows with better quality water and to provide areas of refuge for fish and other aquatic species while the low dissolved oxygen water passes through the system.

Once Lake Wetherell is full, water will spill out into the associated floodplains and lakes, including Lake Tandure. Initial modelling has indicated that the floodplain and smaller lakes, being shallower, should allow the water to be more quickly aerated and provide refuge areas for smaller fish and crustaceans.

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The modelling indicates that Lake Tandure will remain as a refuge area that fish can move into if/when conditions become hypoxic in Lake Wetherell.

Some of the poorer quality water in Lake Wetherell will be passed into Lake Pamamaroo where it can mix with the existing better quality water.

To assist with managing water quality in the Lower Darling, it has been proposed that releases from Weir 32 start to be slowly reduced from around 8 February. Scientific advice and assessment of carbon levels suggests that this recession will enable the water from the Lower Darling floodplains to return to the river and mix with the better quality water currently in-channel.

The low dissolved oxygen floodplain return water can then be diluted and move downstream before the peak of the low dissolved oxygen front enters Lake Wetherell and makes up the bulk of the releases.

The management of inflows into the Lakes, and their release, is a careful balancing act which will be continually monitored and adjusted as needed. If further rainfall occurs upstream or water temperatures stay cool, then the risks are reduced. However, if water temperatures rise significantly, dissolved oxygen levels will quickly reduce. Under these latter circumstances, in particular, fish deaths may occur.

Releases from the better-quality water from lakes Pamamaroo and Menindee will be maintained to also provide some refuge areas for fish, particularly around the outlets. However, the majority of water can only be released from Lake Wetherell. Figure 4 shows the inlet and outlet systems of these lakes.

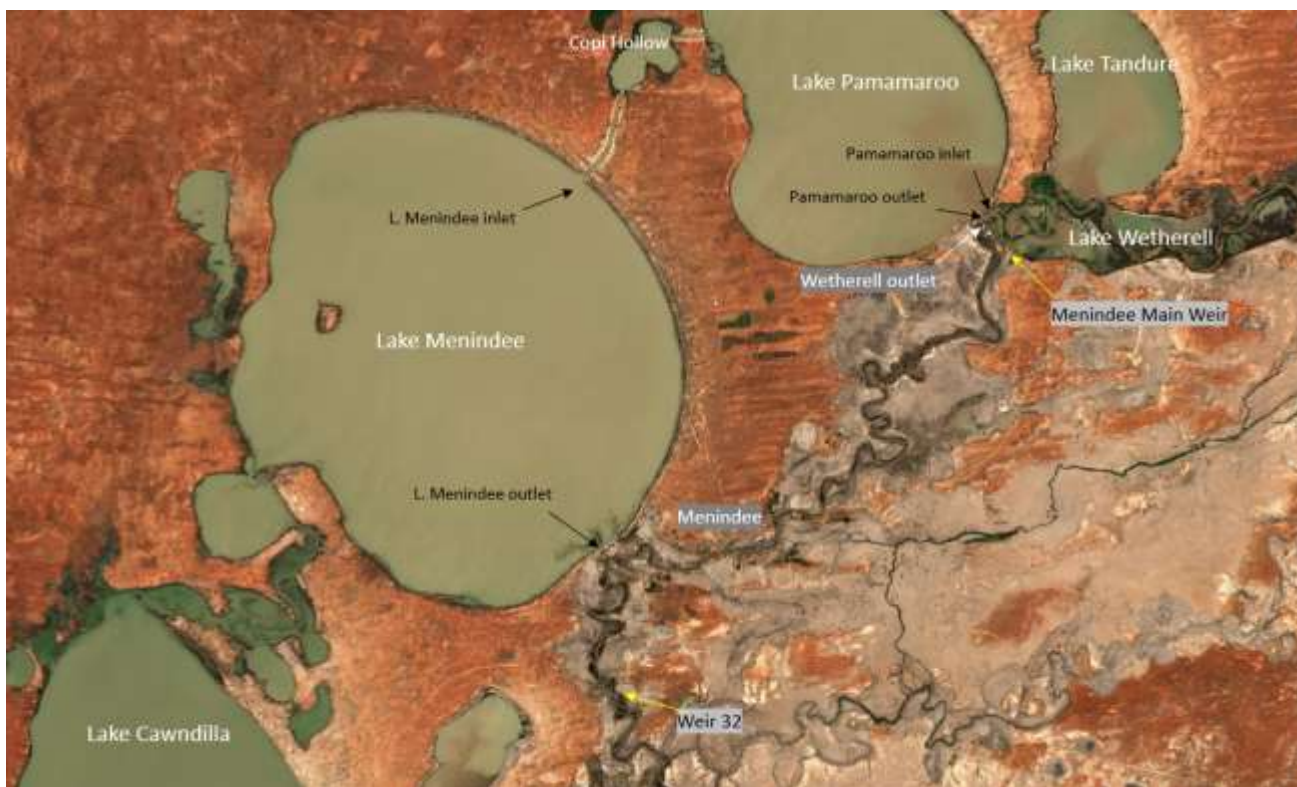


Figure 4. Lake Menindee system showing inlet and outlet areas

Weather forecast

The Bureau of Meteorology eight-day total rainfall forecast is shown in Figure 4. Total falls of up to 5 mm are expected in south-west NSW. The predicted totals are unlikely to result in major flooding, however; isolated thunderstorms may result in localised flooding. The long-term rainfall outlook for February is shown in Figure 5. There is a high chance of exceeding median rainfall on the coast, which decreases further west (Figure 6).

Bureau of Meteorology rainfall maps are available at: www.bom.gov.au/jsp/watl/rainfall/pme.jsp

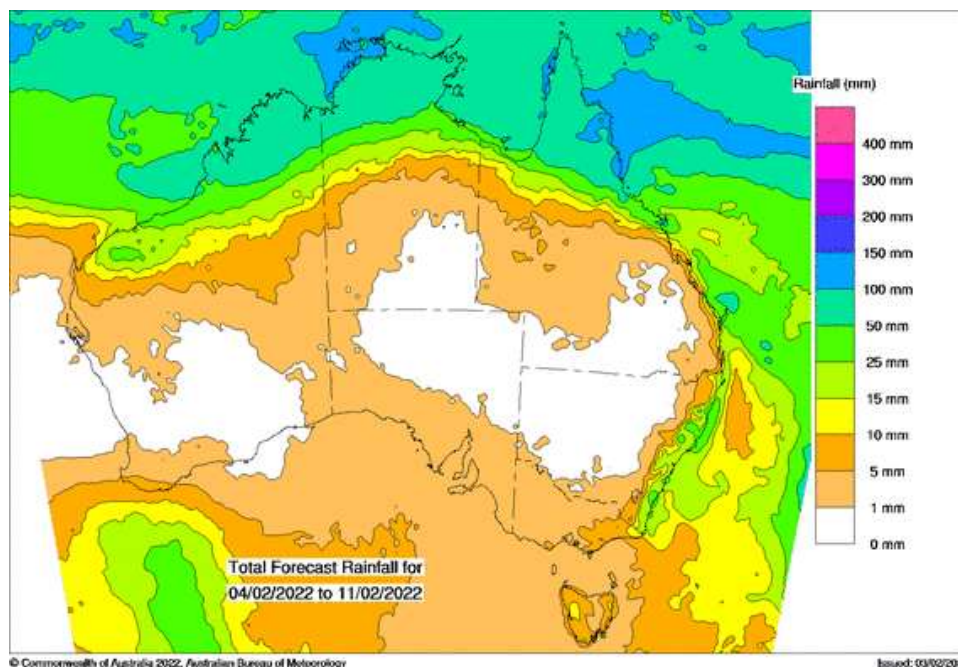


Figure 5. Eight day total rainfall forecast for 4 February to 11 February

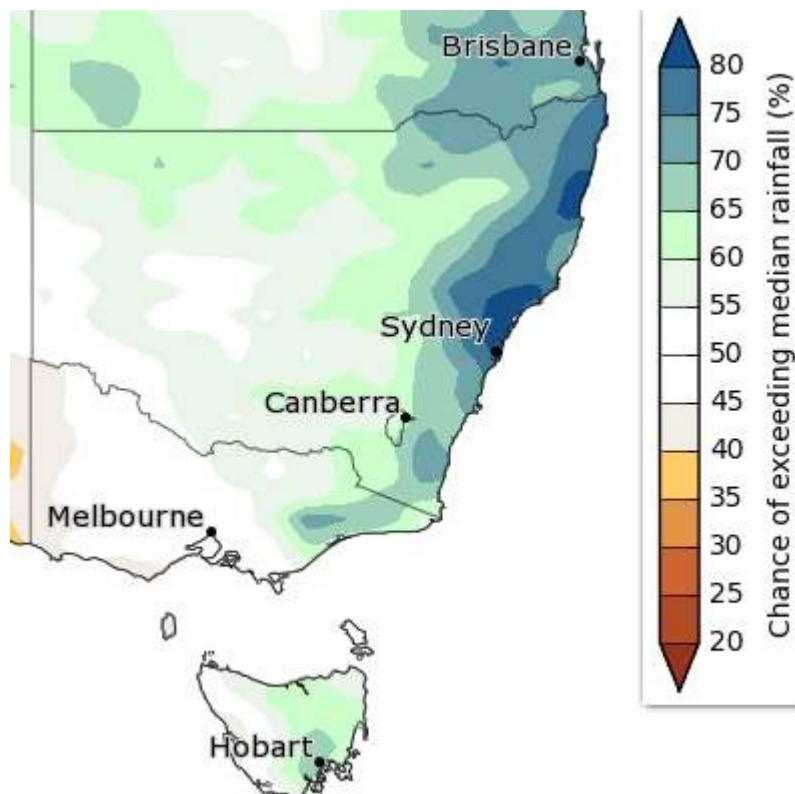


Figure 6. Chance of exceeding median rainfall for February in South-Eastern Australia

Additional information

NSW and Commonwealth agencies will continue to monitor weather and river conditions in all valleys over summer.

To notify the department of potential blackwater events email: waterqualitydata@dpie.nsw.gov.au

To report dead fish or fish starting to gasp at the water surface, call the NSW DPI Fisheries Hotline 1800 043 536. Information on recent fish deaths is available at: www.dpi.nsw.gov.au/fishing/habitat/threats/fish-kills

Further information on blackwater events can be found on the department's website at: www.industry.nsw.gov.au/water/allocations-availability/droughts-floods/drought-update/managing-drought-recovery/blackwater

As well as the Murray-Darling Basin Authority's website at: www.mdba.gov.au/publications/mdba-reports/water-management-101-factsheets

Operational updates for Menindee Lakes are available from WaterNSW at: waterinsights.waternsw.com.au/12104-lower-darling-regulated-river/updates