

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 28 January 2022 along the Barwon-Darling River and lower Murrumbidgee River.

Where are the main areas of concern?

Low dissolved oxygen levels have occurred in the Barwon-Darling River and are likely to continue as the front of the high flows approaches Menindee Lakes.

Unless cooler temperatures continue, there is potential for fish deaths from low dissolved oxygen levels in coming weeks:

- Within Lake Wetherell as carbon loaded floodwaters arrive and top up the Lakes.
- During managed releases from Menindee Lakes to release the captured low dissolved oxygen floodwaters.
- When potentially hypoxic water returns from the inundated areas of the Lower Darling floodplains to the river channel during the flood/flow recession.

In the lower reaches of the Murrumbidgee River, dissolved oxygen levels are also declining and could worsen with return flows from the floodplains.

State and Commonwealth agencies are continuing to monitor dissolved oxygen levels in the Murray, Kolety/Edward and Lachlan rivers.

Barwon and Darling Rivers

Floodwaters from heavy rain in the Northern Murray-Darling Basin during November 2021 have peaked at Louth at around 70 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 River from Collarenebri to Brewarrina, 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**.

NSW Murray-Darling Basin dissolved oxygen



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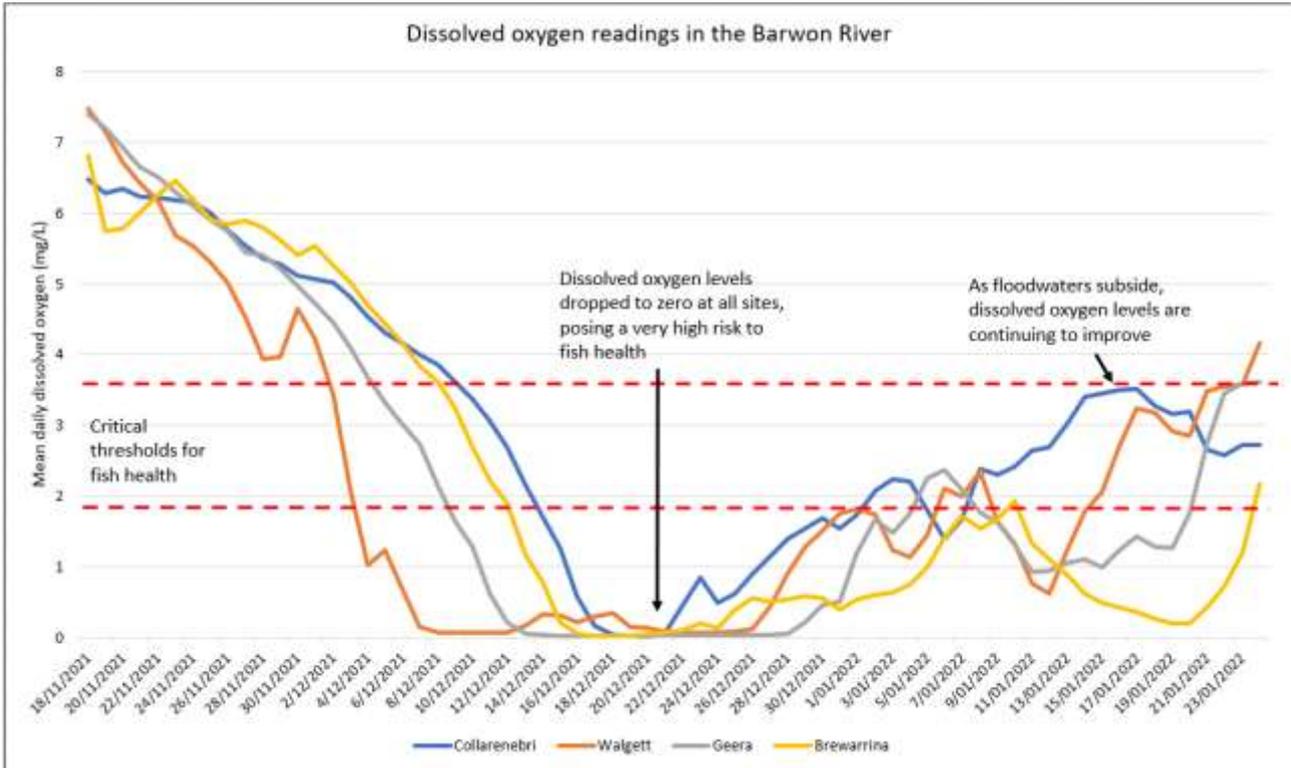


Figure 1. Mean daily dissolved oxygen (mg/L) in the Barwon River

Dissolved oxygen at Bourke, Louth and Wilcannia dropped to very low levels, but have increased over the past few days. Water temperatures have fallen recently, which will contribute to increased dissolved oxygen levels. (Figure 2).

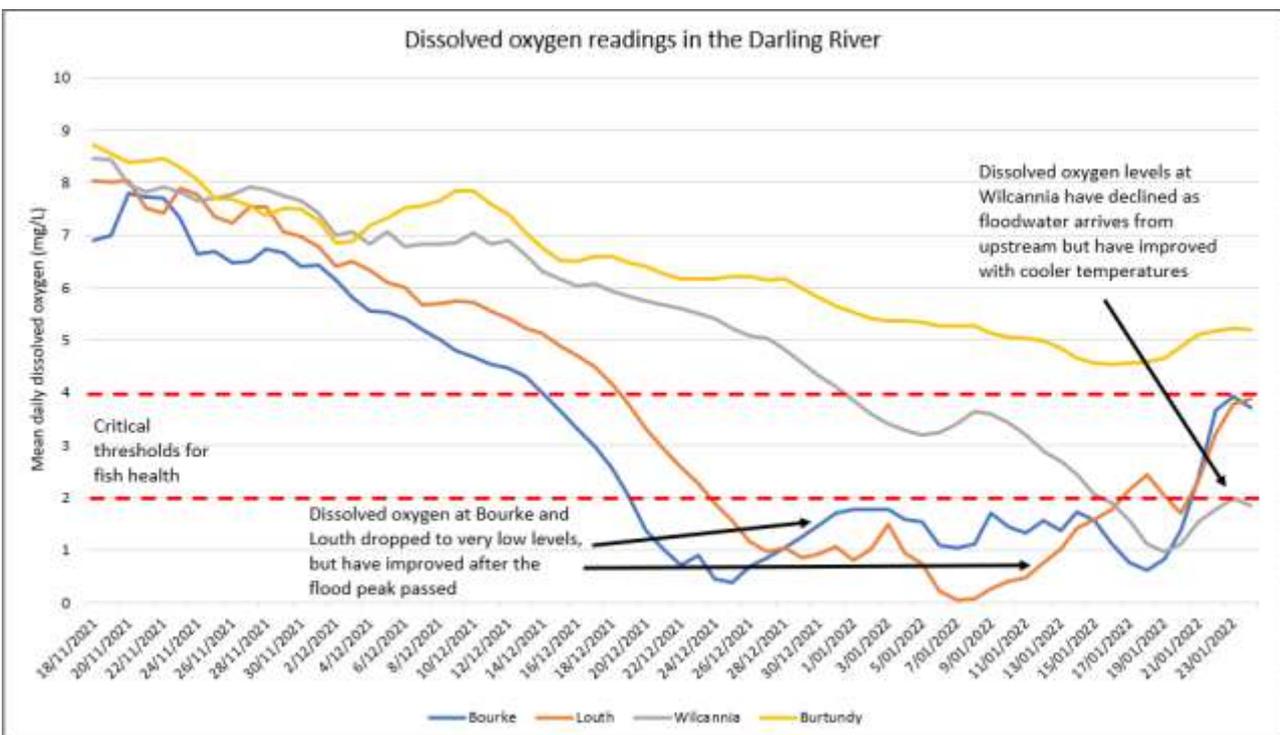


Figure 2. Mean daily dissolved oxygen (mg/L) in the Darling River

Management options to address hypoxic blackwater in the Barwon and Darling Rivers

Low dissolved oxygen extends over hundreds of kilometres of river and it will continue to progress downstream. There is little that can be done to address a hypoxic (low oxygen) blackwater event on this scale along the unregulated Barwon-Darling River.

Operation of Menindee Lakes and the lower Darling

High volumes of low dissolved oxygen water are expected to flow into Lake Wetherell for a number of weeks, putting fish at risk.

Readings taken in the last week in Lake Wetherell show dissolved oxygen levels below 3 mg/L at some sites, which are starting to fall below critical ecological thresholds.

Figure 3 shows the darker coloured water from upstream flowing into Lake Wetherell with dissolved oxygen levels lower at the upstream end of the lake than at Weir 32. WaterNSW will continue to monitor these sites over the coming weeks.

Figure 4 shows that this water has also started to flow into Lakes Pamamaroo and Tandure, but the dissolved oxygen level in the centre of Lake Pamamaroo is still well above critical levels.

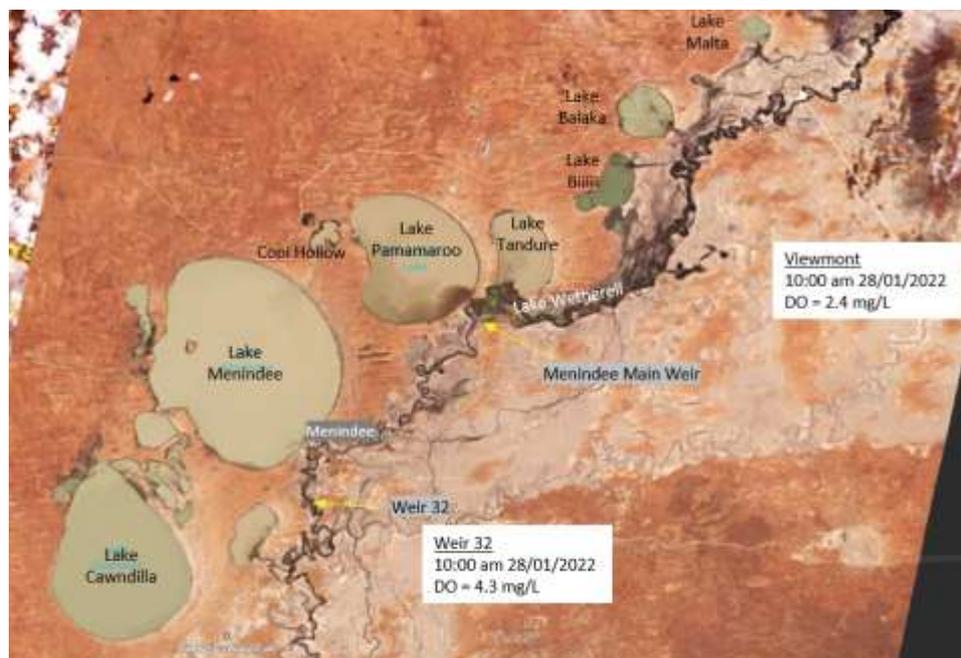


Figure 3. Satellite Image from 26 January 2022 showing all the Menindee Lakes

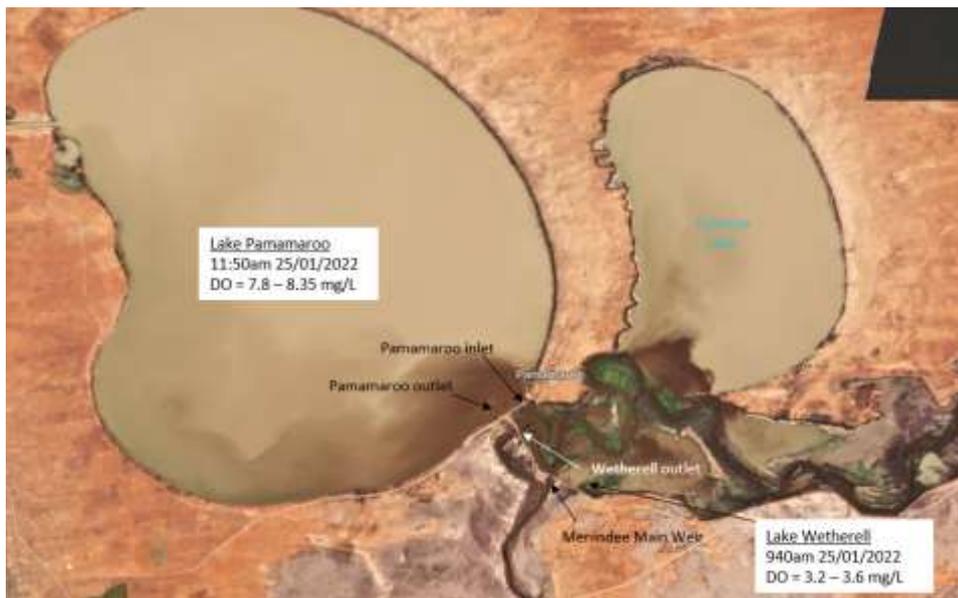


Figure 4. Satellite Image from 26 January 2022 showing the upper Lakes

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.

A further water quality concern is the risk of blue-green algal blooms in the main weir pool. This is a result of the water that has entered the system, which has high nutrient loads and low turbidity - ideal conditions suited to algal growth.

What can be done?

During flood operations WaterNSW is required to operate to the following objectives:

1. Protect the structural safety of the storage.
2. Capture water required to maintain water security. The storages, particularly the upper lakes, need to be full at the end of the flood event to ensure ongoing security of supply along the Lower Darling, which only recently emerged from a critical drought period.
3. Manage flood water that cannot be captured, to lessen potential flood damages and where possible, provide environmental, community and economic benefits.

As a result of recent advice about potential flooding of properties around Menindee, WaterNSW is limited to releasing a maximum of 18,400 megalitres (ML)/day from Weir 32. In order to provide some areas of fish refuge, water will be allowed to spread out from Lake Wetherell into three associated Lakes - Tandure, Balaka, and Bijiji. These lakes, being shallow, can re-aerate through wind action.

Further, water will continue to be transferred from Lake Wetherell into lakes Pamamaroo and Menindee to mix with the current better-quality water in these lakes. Releases from lakes Pamamaroo and Menindee into the Lower Darling, in addition to the releases from Lake Wetherell, will continue.

The releases from the better-quality water from lakes Pamamaroo and Menindee will provide some refuge areas for fish, particularly around the outlets. However, the majority of water can only be released from Lake Wetherell. Figure 5 shows the inlet and outlet systems of these lakes.



Figure 5. Lake Menindee system showing inlet and outlet areas

If further rain fall occurs upstream, higher releases may be able to continue for longer, delaying when the water from the Lower Darling floodplains will re-enter the Lower Darling. If this is delayed until water temperatures are cooler, the risk of hypoxia will also reduce.

Water quality monitoring is being increased and agencies are meeting regularly to discuss ongoing management options.

Murrumbidgee catchment

Dissolved oxygen levels are declining again below Maude, Redbank and Balranald Weirs in the lower Murrumbidgee (See Figure 6). Environmental managers provided water to maintain a baseflow of 5,000 ML/day at Maude Weir in early January to improve water quality and habitat conditions for fish.

This ceased in mid-January due to higher floodplain flows from rain. The environmental releases will commence once the higher flows pass to ensure dilution of low dissolved oxygen water as it comes off the floodplain.

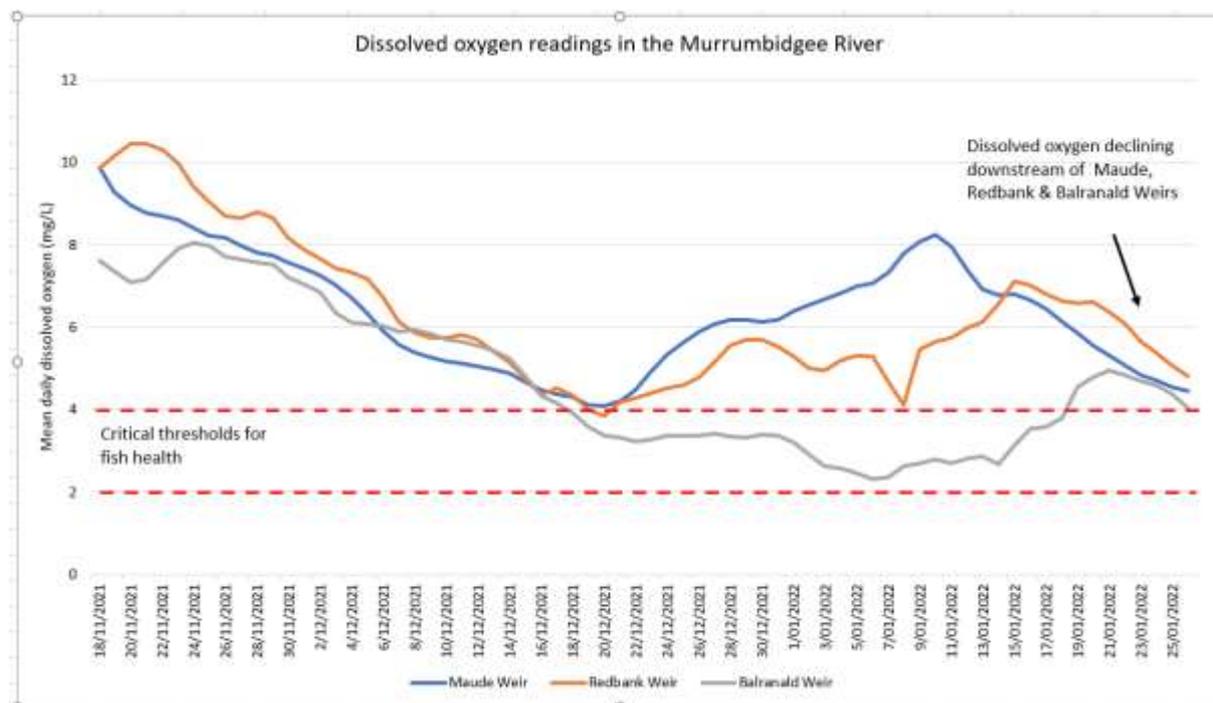


Figure 6. Mean daily dissolved oxygen (mg/L) in the Murrumbidgee River

Other areas of concern in NSW

State and Commonwealth agencies are continuing to monitor dissolved oxygen levels in the Murray, Kolety/Edward and Lachlan rivers.

The Commonwealth Environmental Water Office and Department of Planning and Environment – Environment, Energy and Science are working with WaterNSW to identify areas where water may need to be delivered to provide an oxygenated refuge to address low dissolved oxygen.

Weather forecast

The Bureau of Meteorology eight-day total rainfall forecast is shown in Figure 7. Total falls of between 5-15 mm are expected in south-west NSW, with total falls of 50-100 mm in the north-east of the state. 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 8. There is a 60% chance of exceeding median rainfall in some parts of the state.

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

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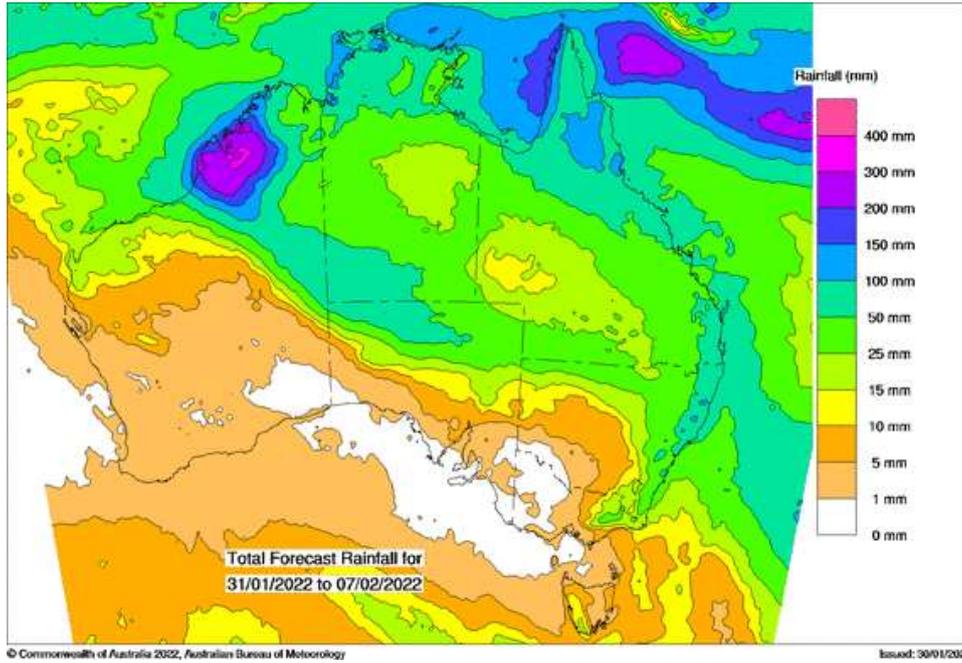


Figure 7. Eight day total rainfall forecast for 31 January to 7 February

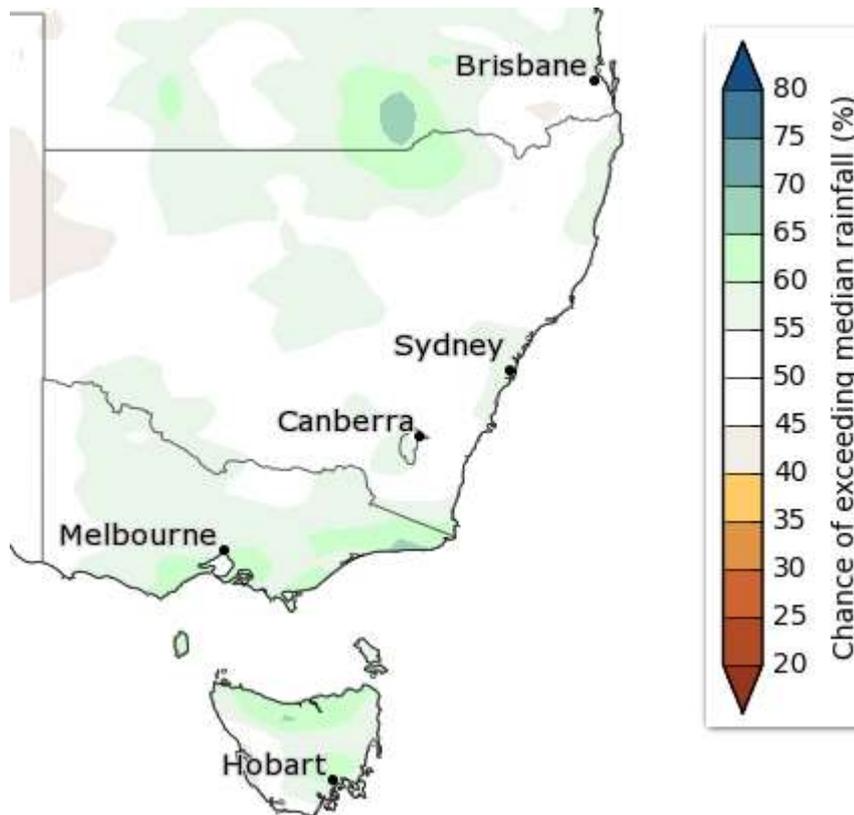


Figure 8. Chance of exceeding median rainfall for February in South-Eastern Australia

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 at the Department of Planning and Environment website: www.industry.nsw.gov.au/water/allocations-availability/droughts-floods/drought-update/managing-drought-recovery/blackwater

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

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