

# Murray Darling Basin – water quality and dissolved oxygen results

Multiple agencies are undertaking water quality monitoring to review dissolved oxygen conditions across NSW and identify potential risks to ecological communities. This update provides a summary of information collected up to 18 January 2023.

The ongoing dry conditions across New South Wales has meant river levels have continued to fall and flooding to subside in many inland catchments. The Bureau of Meteorology has major flood warnings remaining for the Darling River at Wilcannia and Menindee.

Falling river levels are allowing water that has been sitting out on the floodplain to drain back into the main river channels. When this floodwater returns to the river it can affect fish health. As high flows recede, fish may also become stranded in disconnected waterbodies and may suffer from exposure to declining water quality and dissolved oxygen, higher air and water temperatures and predators as water depth decreases and these waterbodies eventually dry out.

Receding flood water may also result in higher levels of nutrients in the rivers which increases the risk of algal blooms.

To report dead fish, fish struggling or starting to gasp at the water surface, or crayfish exiting the water please call the New South Wales Department of Primary Industries Fisheries, Fishers Watch Phonenumber 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)

## Where are the main areas of concern?

There are four main areas of concern where dissolved oxygen is at levels that could be detrimental to fish health. These are:

- Murray River from Colignan downstream to the NSW/South Australian border
- Wakool River, including tributaries such as Merran, Little Merran, Thule and Barbers Creeks
- Niemur River
- Darling River from Bourke to Wilcannia.

The Bureau of Meteorology has forecast air temperatures will be above 30°C in these critical areas this week. As air temperature increases, so does the water temperature. The process of bacteria breaking down organic material in the water speeds up as water temperature increases, which uses up the oxygen in the water even faster. Also, the amount of dissolved oxygen the water can hold decreases with increasing temperature.

## Dissolved oxygen levels – Murray River

Flood warnings for the Murray River at Wentworth remain at a moderate level. Upstream, minor flooding is occurring at Mildura. Satellite-derived Sentinel colour infrared images show how the extent of flooding in the southern Murray Darling Basin (dark-coloured areas) has decreased from 12 December 2022 (left image) to 13 January 2023 (right image). The image on the right from 13 January also highlights there is still an area of floodplain inundated at Boundary Bend upstream of Robinvale where the flows from the Murray and Murrumbidgee Rivers merge.

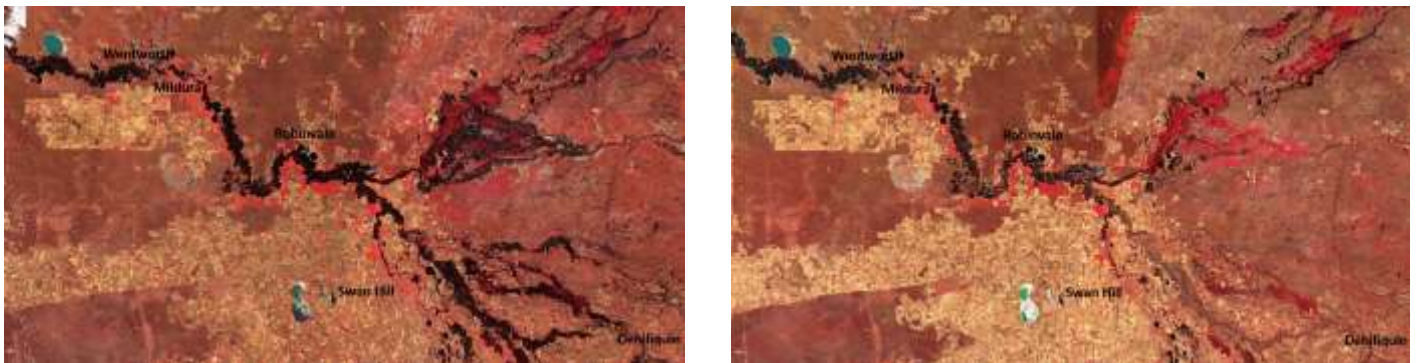


Figure 1: Satellite-derived Sentinel colour infrared image of the Murray River – 12 December 2022 (left) and 13 January 2023 (right)

Dissolved oxygen levels in the Murray River are at levels that are safe for fish health for all sites between Tocumwal and Wemen (downstream of Robinvale) (Figure 2). Dissolved oxygen levels on the Murray River at Colignan are still below 4 mg/L and remain around 4 mg/L further downstream at Wentworth. 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 levels are below 4 to 5 mg/L for prolonged periods.

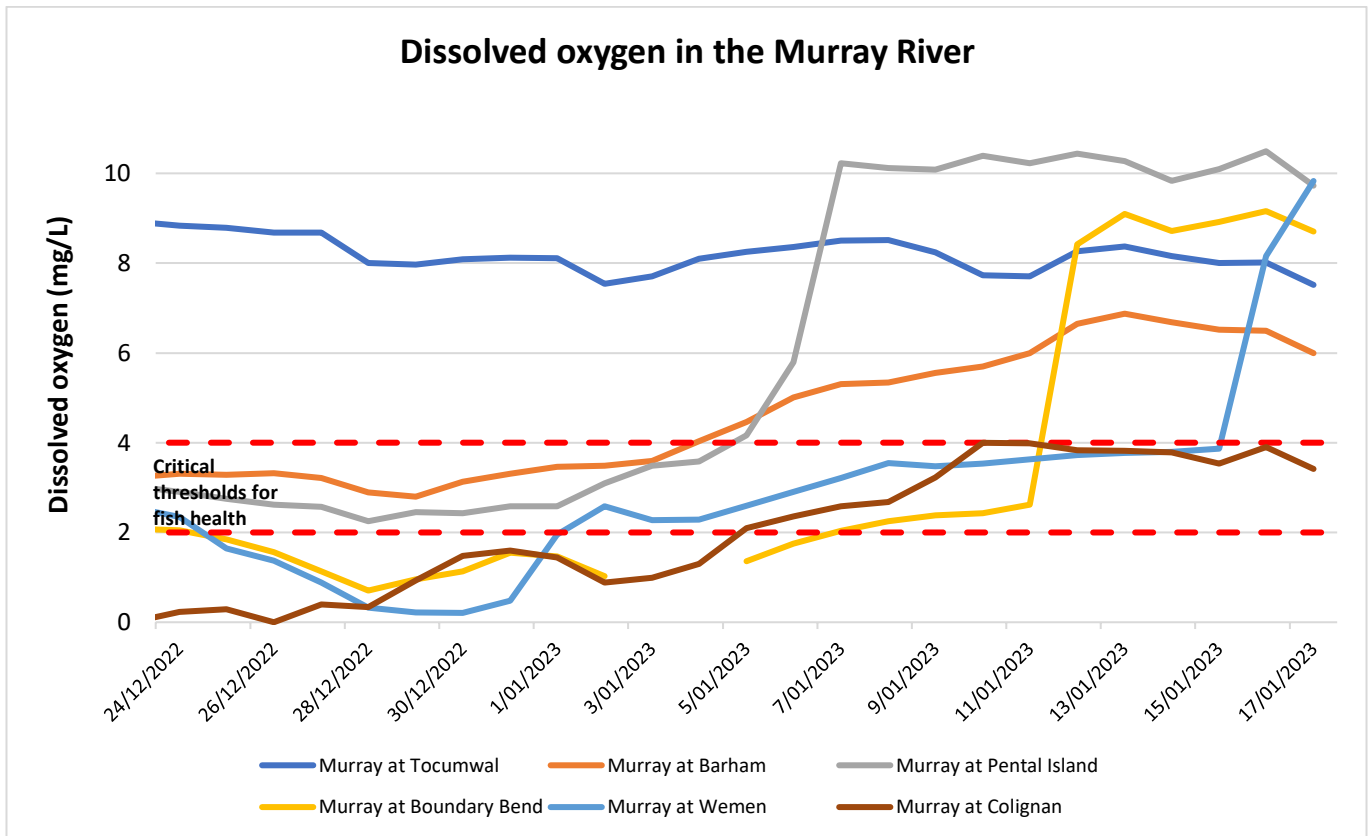


Figure 2: Mean daily dissolved oxygen (mg/L) in the Murray River at Tocumwal, Barham, Pental Island, Boundary Bend and Wemen from 24 December 2022 to 17 January 2023

### Dissolved oxygen levels – Wakool and Niemur Rivers

The dissolved oxygen levels in the Wakool River and lower Niemur River remain at critical levels for fish health (Figure 3). Waterways that feed into the Wakool River such as Merran and Little Merran have been above 4 mg/L in the past week. Thule and Barbers Creeks still have low dissolved oxygen below 2 mg/L.

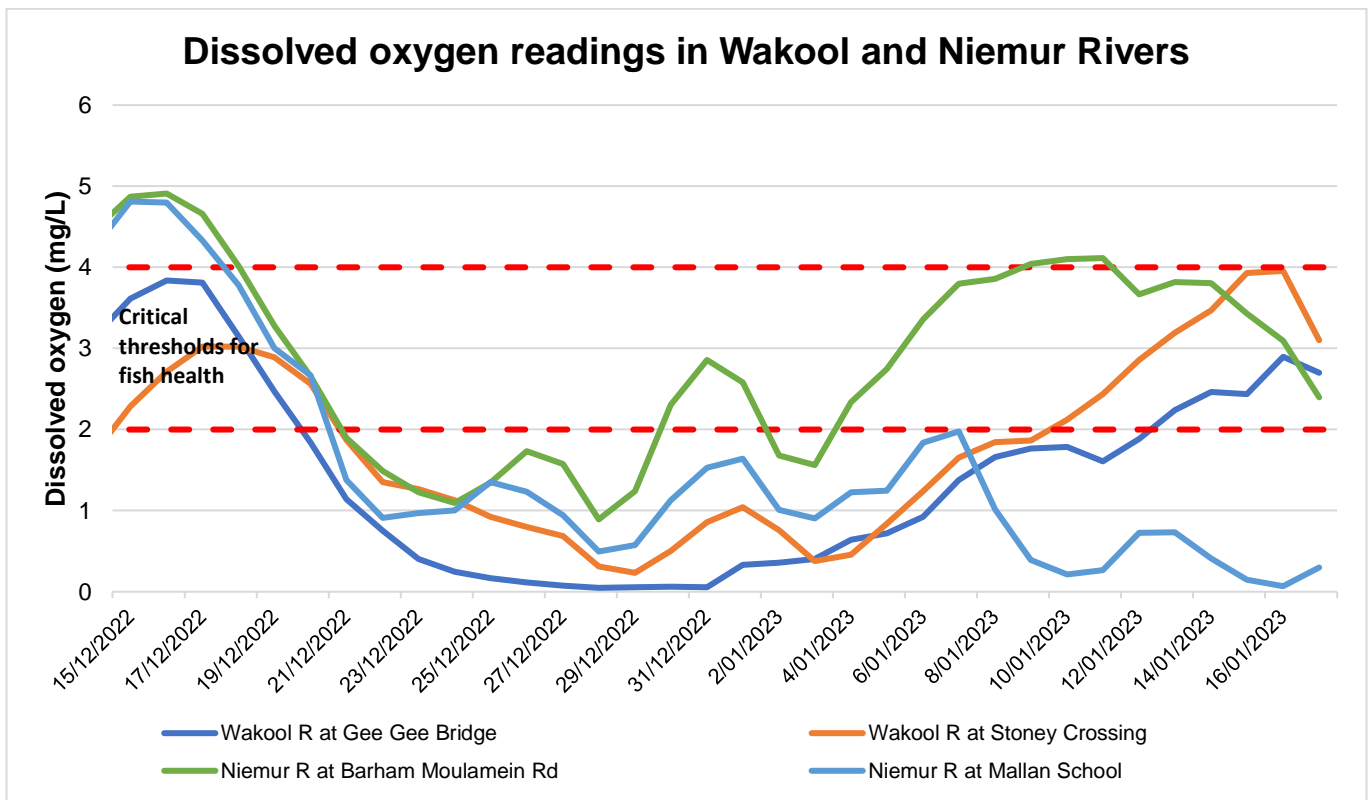


Figure 3: Mean daily dissolved oxygen (mg/L) in the Wakool River at Gee Gee Bridge and Stoney Crossing and Niemur River at Barham-Moulamein Road and Mallan School - 15 December 2022 to 17 January 2023

### Dissolved oxygen levels – Darling River

Major flooding in the Darling River continues at Wilcannia and Menindee. River levels at Wilcannia have peaked and are forecast to remain at the major flood level into late January. Figure 4 is a satellite-derived Sentinel colour infrared image showing the extent of floodwaters at Menindee. The image highlights floodwater spreading out across the floodplains which makes accurately measuring discharge and predicting downstream flood heights difficult.

Figure 4 also highlights some of the darker coloured flood water from Lake Wetherell is pushing into Lakes Tandure and Pamamaroo where it is mixing with the turbid water held in the lakes. As well as the mixing of floodwater with the more oxygenated water in the lakes, these large shallow lakes allow the water to be more quickly aerated and provide refuge areas for smaller fish and crustaceans to move into if dissolved oxygen conditions deteriorate in Lake Wetherell.

Dissolved oxygen in the Darling River at Bourke and Louth is less than 3 mg/L. Levels at Wilcannia had been very low but have improved above 2 mg/L. Oxygen levels in the upper reaches of Lake Wetherell and the Darling River downstream of Menindee Lakes at Weir 32 and Burtundy remain in the safe range for fish health.

NSW and Commonwealth agencies will continue to assess the risks as floodwaters make their way to Menindee and into Menindee Lakes and the lower Darling River and to monitor dissolved oxygen levels as air temperatures increase over summer.



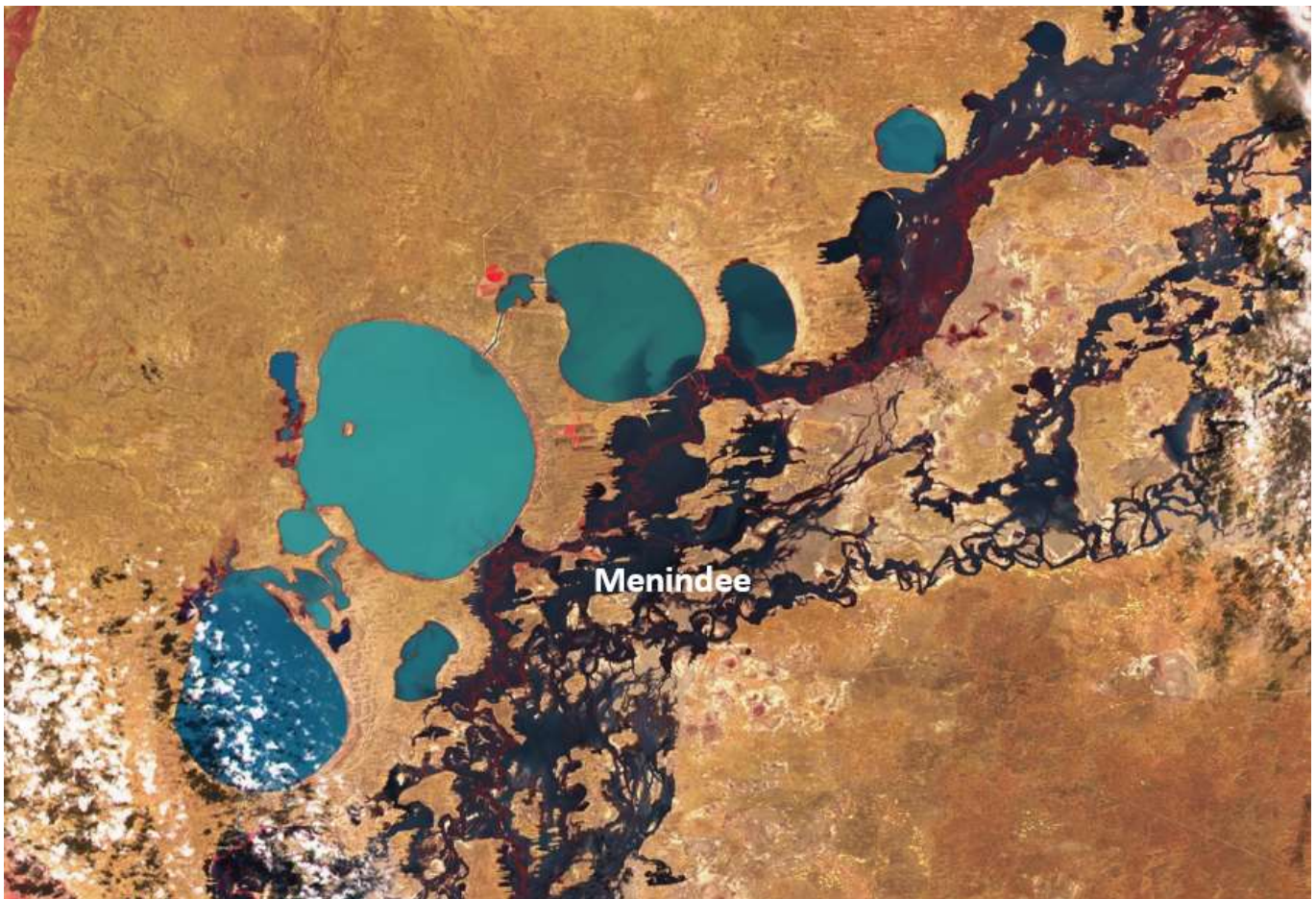


Figure 4: Satellite-derived Sentinel colour infrared image of the Darling River and Menindee Lakes – 13 January 2023

## Hypoxic blackwater fish death summary

In recent months NSW DPI Fisheries has received reports of fish deaths, fish struggling and crustaceans leaving the water across a broad area in the Murray-Darling Basin, including in the Murray, Kolety/Edward, Wakool, Murrumbidgee, Lachlan and Gwydir rivers and Yanco-Billabong Creek system. High air temperatures over Summer increases the risk of further reductions in dissolved oxygen in some areas and the potential for further fish death events.

There may be fish death incidents that have not yet been reported directly to NSW Department of Primary Industries Fisheries.

Programs to benefit native fish such as improving fish passage and habitat restoration to provide conditions conducive to fish breeding and population growth are ongoing. These works are vital and provide an environment where fish populations can bounce back from hypoxic blackwater events.

## What is being done?

The Bureau of Meteorology has forecast median maximum air temperatures will remain close to average for February with a high chance of exceeding the median maximum temperature for March to May. The forecast is that rainfall figures for February through to March will be similar to historic

averages for the majority of New South Wales. Refer to the [Bureau of Meteorology website](#) for the latest forecasts.

The Commonwealth Environmental Water Office (CEWO), in collaboration with the NSW DPE Environment and Heritage Group, Murray Irrigation, and the CEWOs community reference group, are continuing to divert small volumes of environmental water to the Wakool, Kolety/Edward and Niemur rivers and Thule, Murrain-Yarrein, Cockrans and Jimaringle creeks to provide a refuge from declining water quality. Scientists from Charles Sturt University are continuing to monitor the water quality in the Niemur River. They have found that the delivery of Commonwealth environmental water from the Niemur escape is creating a refuge in the Niemur River that has higher dissolved oxygen concentrations than the sites in the Niemur River that are upstream of the escape. The environmental watering action has reduced the length of time that DO is below critical levels in the refuge area.

You can find out more about the Commonwealth's current environmental water releases in the mid-Murray at: [Latest water use - Mid-Murray - DCCEE](#)

As floodwater continue to recede, NSW and Commonwealth agencies will assess the risks of poor water quality and 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 NSW Department of Planning and Environment – Water of potential blackwater events email: [waterqualitydata@dpie.nsw.gov.au](mailto:waterqualitydata@dpie.nsw.gov.au)

To report dead fish, fish struggling or gasping at the water surface, or crayfish leaving the water please call the NSW DPI Fisheries Phoneline 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 DPE 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 Murray-Darling Basin Authority 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 Environment Protection Authority 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)

To report suspected algal blooms see the [WaterNSW website](#).