

Murray-Darling Basin – water quality and dissolved oxygen results

Multiple agencies are undertaking water quality monitoring to review dissolved oxygen conditions across NSW, identify potential risks to ecological communities, implement mitigating measures and respond to the mass fish death event in the Darling River. This update provides a summary of information collected up to 3 May 2023.

There remains a risk of further fish deaths in the Darling River at Menindee as fish in an already stressed condition may succumb to increased competition for depleting food resources and cooler temperatures. This is particularly the case for Bony Herring, which boomed during the recent floods, and many may now be in poor condition and more susceptible to environmental stresses like low oxygen levels and changes in water temperature. There are still large numbers of Bony Herring in the reach of river downstream of Lake Pamamaroo.

To maintain an oxygenated flow in the Darling River through Menindee township, the release of water from the Lake Pamamaroo outlet is continuing, although volumes have been reduced to preserve the water resource in the upper lakes. Releases from Lake Menindee are also being reduced to assist in the flow of water from Lake Pamamaroo past Menindee town, and to manage flow targets downstream. Monitoring is showing that the reduced releases are not having an adverse effect on dissolved oxygen levels (that is, they remain above critical levels) in the Darling River at Menindee.

Monitoring in the lower Darling River from Weir 32 down to the Wentworth weir pool at Tapio is showing that dissolved oxygen levels have improved above the critical threshold for fish health, reducing the risk of further fish deaths in this area.

To report any further incidents of dead fish, fish struggling or starting to gasp at the water surface, or crayfish exiting the water, please call the NSW 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

Dissolved oxygen levels – Darling River at Menindee

Monitoring undertaken in Menindee Lakes highlights that the water being released from Lakes Pamamaroo and Menindee is oxygenated and above the safe threshold for fish health. Releases from both Lake Pamamaroo and Lake Menindee continue to be managed to minimise the risk of further hypoxia-related fish deaths.

Figure 1 is a Google Earth image showing the location and results from the survey of dissolved oxygen levels down the Darling River on 3 May from Lake Pamamaroo, through Menindee town and down past the junction with the inflow from Lake Menindee. The results show that there was a gradual decrease in oxygen levels with distance down the Darling River, as seen in previous weeks. The lowest result was 4.31 mg/L at Menindee. 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.

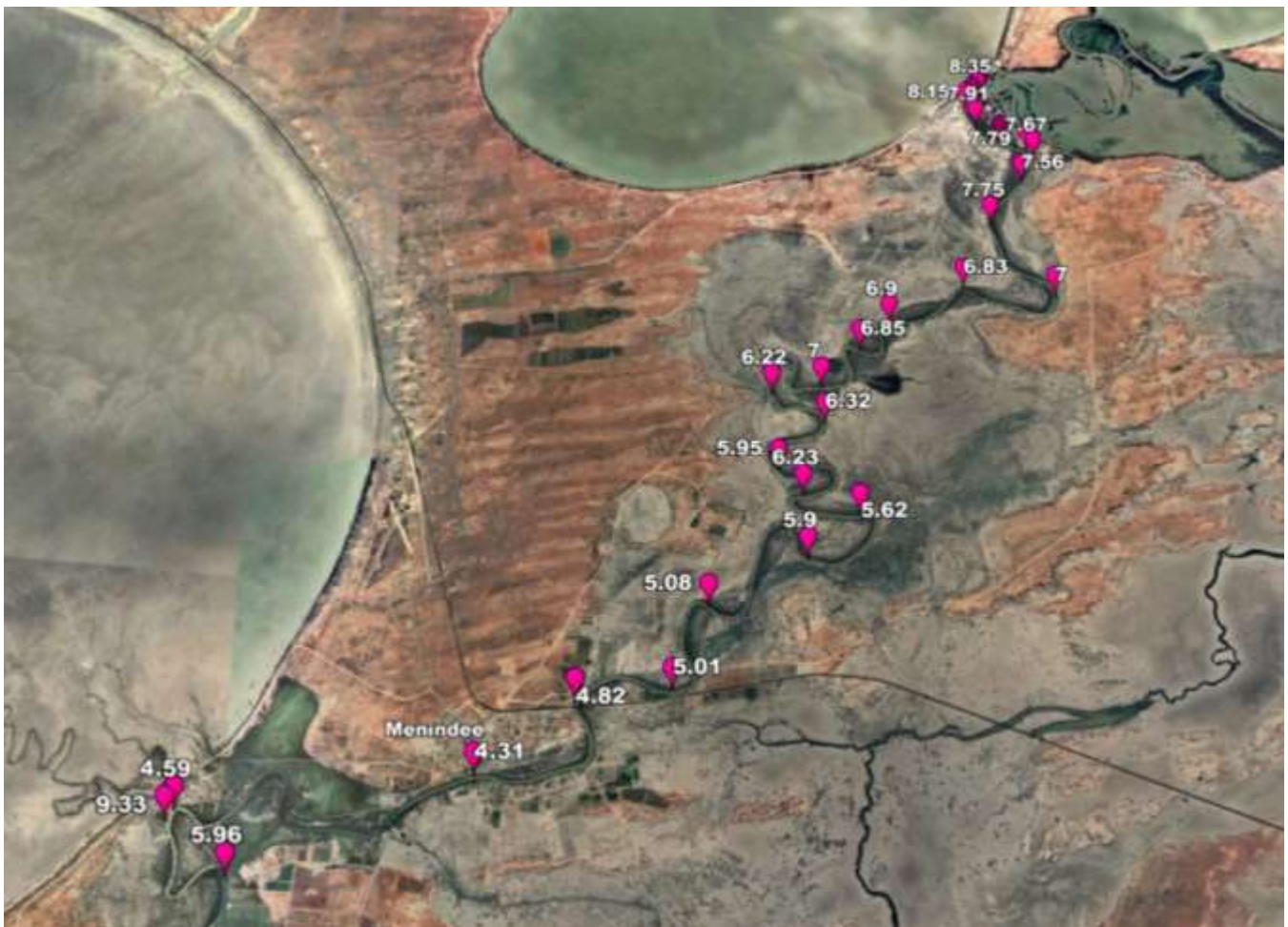


Figure 1: Google Earth image showing dissolved oxygen results (mg/L) from the Lake Pamamaroo outlet to Menindee Creek on 3 May

Frequent longitudinal surveys of dissolved oxygen have been undertaken by WaterNSW down this reach of the Darling River over recent months. Figure 2 shows that dissolved oxygen levels have improved since the initial profile undertaken on 25 March and are now remaining above the critical thresholds for fish health in response to the operational measures in place.

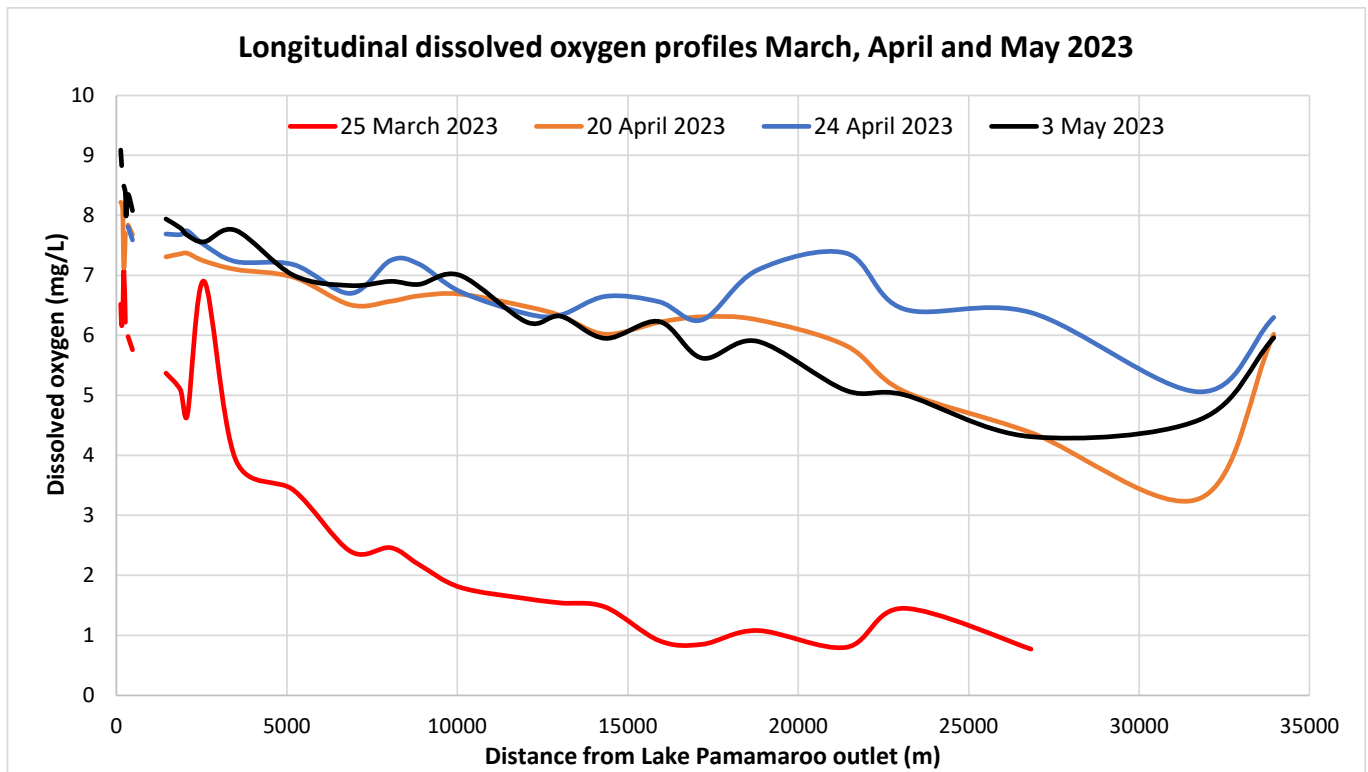


Figure 2: Comparison of dissolved oxygen results (mg/L) from the Lake Pamamaroo outlet to Menindee town on 25 March, 20 and 24 April and 3 May 2023

Data from WaterNSW dissolved oxygen sensors at the Menindee pump station, Menindee Town and further downstream at Weir 32, are shown in Figure 3. These sensors are set at various depths so may not always reflect the readings taken at the water surface. They indicate daily fluctuations in dissolved oxygen, with replenishment during the day, but decreasing overnight. Dissolved oxygen levels have been slowly decreasing at the Menindee sites over the past few days, but have stabilised again. The readings from Weir 32 show the water is oxygenated and is providing a refuge area for fish to move into.

NSW and Commonwealth agencies will continue to work together and monitor dissolved oxygen levels in this area and advise the best operational measures to mitigate risks to aquatic life as much as possible. This can involve adjusting the timing, size and location of releases from the lakes into the lower Darling River to maintain the quality of the water in the river.

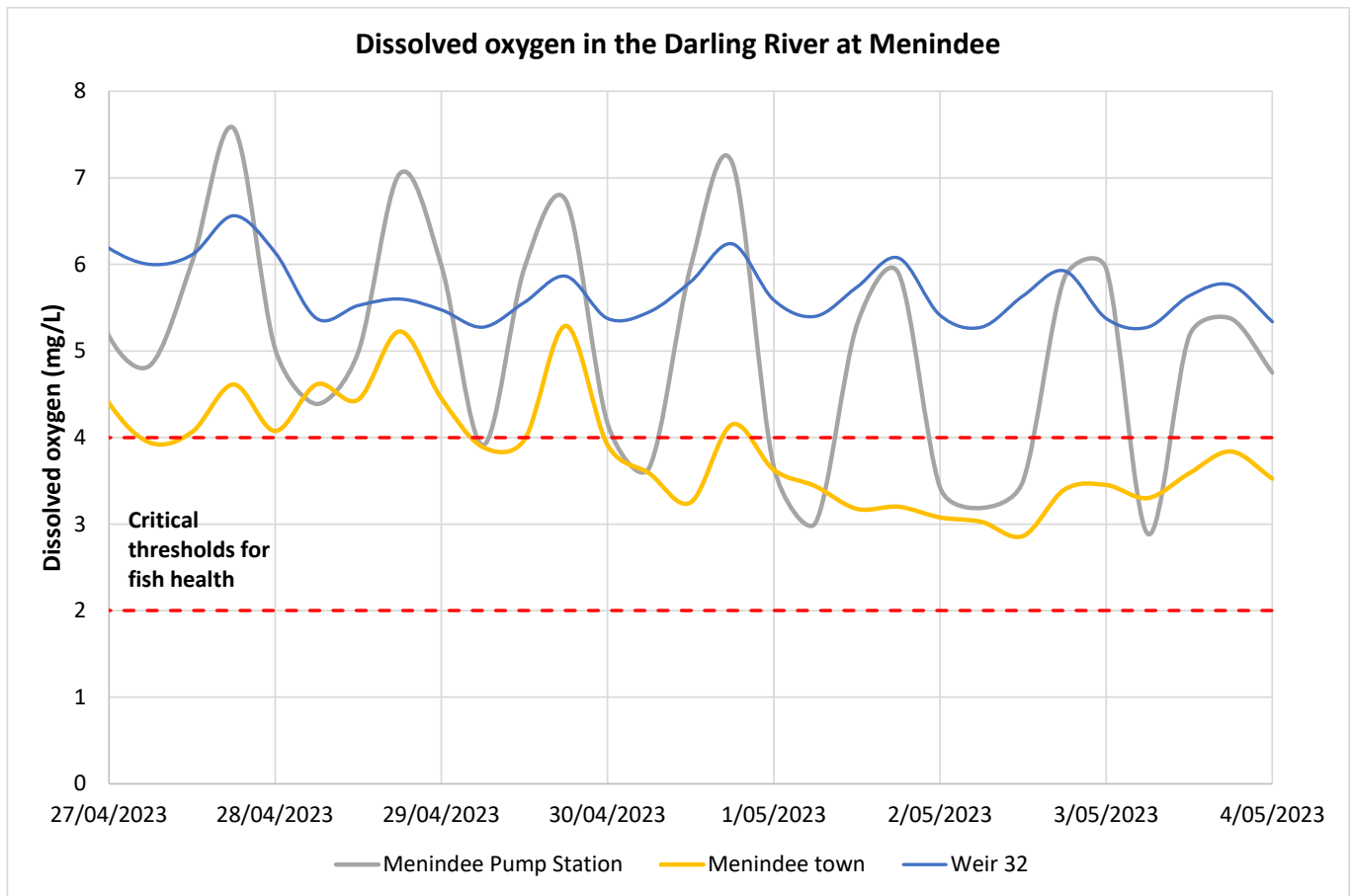


Figure 3: Dissolved oxygen (mg/L) in the Darling River at Menindee: Menindee pump station, Menindee town and Weir 32 – 27 April to 3 May 2023

Dissolved oxygen levels – lower Darling River

Downstream of the Menindee Lakes, dissolved oxygen levels in the lower Darling River were low for several weeks following the recession of floodwaters. Poor quality water from the Menindee town weir pool at the time of the mass fish deaths (mid-March) further reduced oxygen levels. Dissolved oxygen levels at monitoring sites in the lower Darling River have improved over the past few weeks. Figure 4 shows dissolved oxygen results for the Darling River at Burtundy over the last 7 days have been above the critical level for fish health of 4 mg/L.

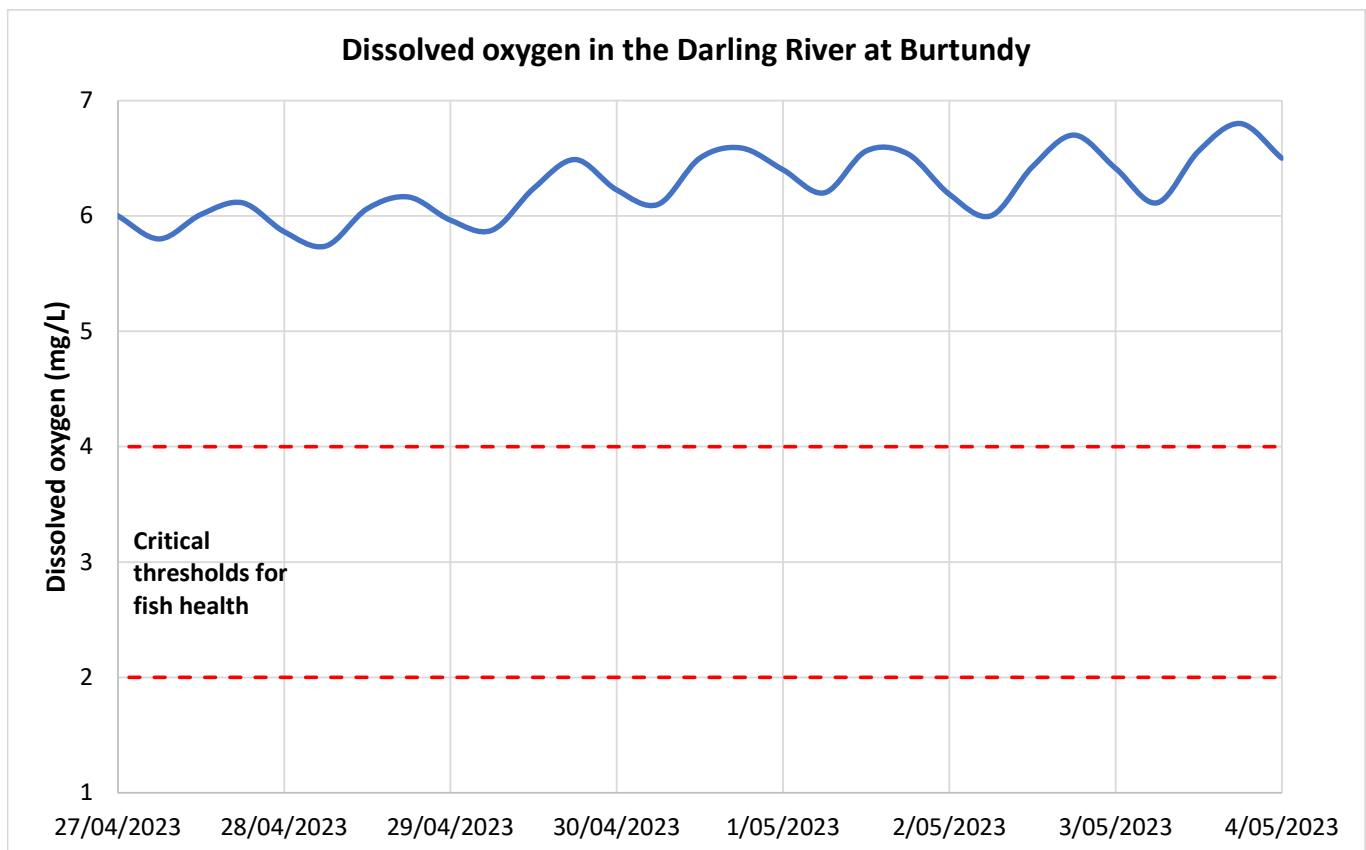


Figure 4: Dissolved oxygen (mg/L) in the Darling River at Burtundy – 27 April to 3 May 2023

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, Gwydir, Darling, Barwon, Namoi and Macquarie rivers and Yanco-Billabong Creek system.

There have not been any new reports of fish deaths in the Darling River near Menindee during the past week to 3 May. Following the mass fish deaths in the Darling River in March and a smaller fish death incident on 18 April, there were observations on 26 April of small numbers of dead Bony Herring (tens to hundreds) in the Darling River downstream from the Lake Pamamaroo outlet. The dissolved oxygen levels in this reach had improved and were above the critical levels for fish health. Therefore, it is likely these fish were in poor condition from earlier low oxygen conditions and then died because of a lack of food resources and competition with Carp.

There remains a significant risk of further fish deaths in this area as fish may be in poor condition from previous low oxygen conditions, and hence may be more susceptible as temperatures decrease and flow rates recede.

What is being done?

Emergency releases of well oxygenated water are being made from the Menindee Lakes to maintain flow between Lake Pamamaroo outlet and Weir 32 with the aim of reducing the risk of further fish

deaths. These releases are gradually being reduced to preserve the water resource in the upper lakes. This water is being debited from environmental water accounts. Ongoing dissolved oxygen monitoring will identify if the operations achieve the desired results and will be used to inform future operational decisions.

To reduce the future risks to native fish that are already in poor condition, a commercial fishing contractor was engaged to harvest live Carp from 24 to 28 April to reduce competition for resources. Carp removal was conducted in a discrete section of the Darling River. Primarily below Lake Pamamaroo outlet, where Carp have accumulated and are competing with native fish for food and oxygen. Carp removal would not have prevented the mass fish death incident in March 2023 (as that was caused by the return of large volumes of organic-rich floodwater from floodplains using up dissolved oxygen), however; it offers an opportunity to support the remaining native fish population in the impacted area.

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 low oxygen events.

Blue-green algae

WaterNSW undertake routine blue green algae monitoring in Menindee Lakes and in the Darling River. Alert warnings are declared where algal cell numbers exceed the triggers identified in the Guidelines for Managing Risk in Recreational Waters (2008).

The most recent results indicate algal numbers in the Menindee Lakes area remain in the amber alert range for recreational use at numerous sites ([Algae Alerts NSW map - WaterNSW](#)). At amber alert warning levels, blue-green algae may be multiplying in numbers. The water may have a green tinge and musty or organic odour.

The water should be considered as unsuitable for potable use and alternative supplies or prior treatment of raw water for domestic purposes should be considered. The water may also be unsuitable for stock watering. The water remains suitable for recreational use, however; algal concentrations can change rapidly. Water users should use caution and avoid water where signs of blue-green algae are present.

Weather outlook

Refer to the [Bureau of Meteorology website](#) for the latest forecasts.

Additional information

To notify the NSW Department of Planning and Environment – Water of potential blackwater events email: 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

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

Additional information is also available on the Murray-Darling Basin Authority website at: 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

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