

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 an assessment of information collected up to 17 October 2022.

Major dams are full to overflowing, catchment areas are saturated from continuing rain and rivers and creeks are flooding. The Bureau of Meteorology are predicting the high chance of above average rainfall for northern and eastern Australia will continue during this spring and summer.

With a high chance of ongoing flooding across the Murray-Darling Basin, NSW and Commonwealth water agencies are monitoring dissolved oxygen conditions as summer approaches, due to the increased risk of a hypoxic blackwater event occurring.

Hypoxic, or low oxygen blackwater is a feature of Australian lowland river systems and occurs when organic material, such as sticks, leaves, bark, grass or crops are broken down in floodwater or washed off the floodplain into the river. Organic carbon can also be released from inundated soil. The breakdown of this material by bacteria can rapidly use up all the oxygen in the water. Fish and other aquatic animals have difficulty surviving under low oxygen conditions.

Where are the main areas of concern?

Dissolved oxygen levels in most rivers and streams across the Murray-Darling Basin are safe for fish and other aquatic life. However, there are some areas where oxygen levels have been declining as large areas of floodplain are being inundated by floodwater.

Current areas of concern are:

- Barwon River between Walgett and Brewarrina
- Murrumbidgee River at Balranald
- Wakool River
- Mid Murray River catchment.

Dissolved oxygen levels – Barwon River

Heavy rainfall and flooding in the Namoi and Macquarie catchments has inundated large areas resulting in water with low dissolved oxygen flowing into the Barwon River. Dissolved oxygen levels in the Barwon River have decreased below the critical threshold for fish health of 2 mg/L, but have been slowly recovering as the flood flows move downstream. Despite the recovery, dissolved oxygen is still low and in the range where it can impact fish health. There have been no reports of fish deaths or of fish gasping at the water surface in the Barwon River. These flows will impact

dissolved oxygen levels in the Darling River downstream at Bourke and Wilcannia over the coming weeks.

Satellite-derived Sentinel colour infrared images show the inundation of large areas in the Namoi, Macquarie and Bogan rivers (Figure 1). The blue coloured areas (Namoi and Barwon Rivers) indicate more turbid floodwater, whereas the black areas (Macquarie River) are clearer water, which can indicate the presence of hypoxic blackwater conditions.

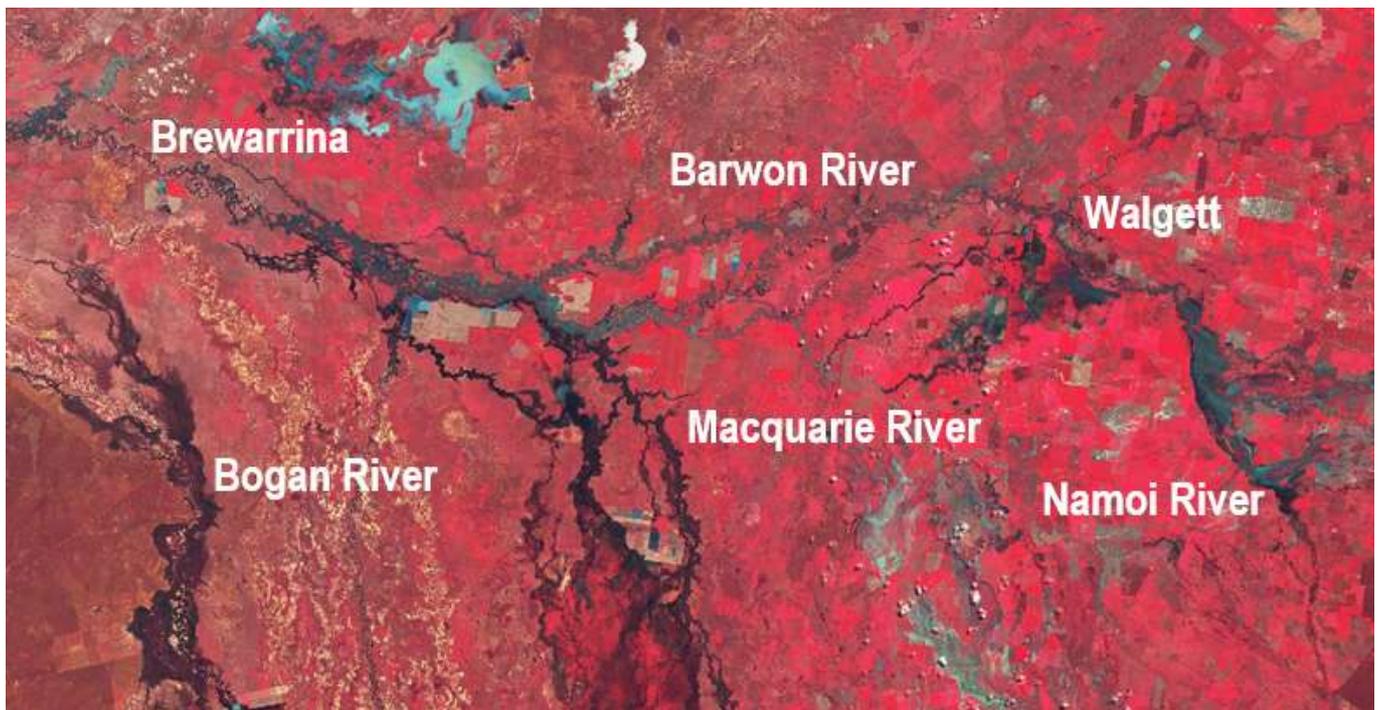


Figure 1. Satellite derived Sentinel colour infrared image (17 October) showing flooding in the Namoi, Macquarie, Bogan and Barwon rivers

Dissolved oxygen levels – Murrumbidgee River

Dissolved oxygen levels have been slowly declining in the Murrumbidgee River at Balranald since the start of September. As heavy rain and flooding continues, more of the lower Murrumbidgee floodplain will be inundated. As air and water temperatures increase and accumulated organic material from the floodplain is transported back into rivers, the risk of a hypoxic blackwater event occurring increases. Figure 2 is a satellite derived Sentinel colour infrared image. It highlights that the floodwaters have broken the banks of the Murrumbidgee River and are spreading out across a large portion of the floodplain (dark and blue areas).

Dissolved oxygen at Balranald is fluctuating around 4 mg/L. River levels are continuing to rise with more water on the way. Dissolved oxygen could decrease when the flood peak passes and the water sitting out on the floodplain is able to flow back into the main river channel. NSW and Commonwealth agencies will continue to monitor dissolved oxygen levels and may release environmental water to maintain the discharge in the Murrumbidgee River to provide an oxygenated refuge for fish if hypoxic floodwater is returning to the main channel from the floodplain.



Figure 2. Satellite derived Sentinel colour infrared image (17 October) showing flooding on the lower Murrumbidgee floodplain

Dissolved oxygen levels – mid-Murray catchment

Dissolved oxygen levels have been continuing to decline in the Wakool River as river levels rise and larger areas are inundated by water. The dissolved oxygen level has dropped below the critical threshold of 4 mg/L. Depending on their size and health, some fish may begin to suffer when oxygen levels drop below this level.

In the Kolety/Edward River, oxygen levels have been declining but remain above critical thresholds for fish health. Agencies will continue to monitor oxygen levels in the Kolety/Edward River as hypoxic blackwater events have occurred in this area in the past.

The Koondrook-Perricoota Forest is an extensive forest of river red gums and woodlands along the Murray River. When inundated, the breakdown of the organic material on the forest floor can result in hypoxic blackwater events. In addition to the forests, large areas of pastures and crops in agricultural areas are also being flooded. The breakdown of all this material in the floodwater by bacteria will be using up oxygen. Water with low dissolved oxygen is currently flowing into Little Merran, Thule and Barber creeks. This has caused the dissolved oxygen levels in these waterways to decline below safe ecological thresholds.

As the floodwater from all these systems makes its way into the lower Murray River, the impact on dissolved oxygen is starting to show. Dissolved oxygen levels downstream of where the Wakool and Murrumbidgee Rivers join the Murray River is now also declining. In addition, the major flooding in the Goulburn and Campaspe River in Victoria could affect oxygen levels in the Murray River in coming weeks.

What is being done?

With the sheer volume of floodwater currently moving across floodplains in all catchments in the Murray-Darling Basin, complete mitigation of hypoxic blackwater by intervention measures is not possible.

Small, oxygenated refuge areas for fish can be provided by delivering environmental water to areas of poor water quality. The Commonwealth Environmental Water Office are delivering small volumes of environmental water to the Wakool, Kolety/Edward and Neimur rivers and Whymoul, Thule, Murrain-Yarrein and Cockrans 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](#)

The use of aerators to try and increase oxygen levels in critical areas is not feasible, due to the volume of water in the rivers. During the severe drought in 2018-2019 aerators were used in the lower Darling River to provide some improvements to dissolved oxygen levels in small, isolated refuge pools. Aerators are not a viable option during these flood events as any benefits would be continuously overwhelmed by the volume of floodwater coming down the river systems from upstream.

Although hypoxic blackwater events may result in the loss of fish and other aquatic life, the impacts of these events on the environment are usually short-term as the river water re-oxygenates again as the flooding subsides. Naturally occurring events such as these underpin the broad health of rivers. They provide nutrients that drive the overall production of our river and wetland systems. In the longer term, native fish, water birds and other organisms benefit from the increased production in the river, boosting food supplies and supporting breeding cycles.

NSW and Commonwealth agencies will continue to assess the risks of poor water quality and to monitor dissolved oxygen levels over the summer months to identify areas that may require further action.

Additional information

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 or fill in a fish kill protocol and report form:

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](#)

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

Additional information is also available on the MDBA website at:

www.mdba.gov.au/publications/mdba-reports/water-management-101-factsheets

Algal alerts can be found at: www.waternsw.com.au/water-quality/algae

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