NSW Southern Basin dissolved oxygen update No. 6

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 from the southern valleys collected up to 23 November.

Key information

- Dissolved oxygen levels in the Lachlan River at Booligal decreased to less than 3 mg/L last week. The arrival of higher flows last Friday has seen oxygen levels improve to above 4 mg/L
- Some monitoring sites are showing a decline in dissolved oxygen over the past week in response to increasing water temperatures. Dissolved oxygen levels are remaining above critical levels for fish health. There have been no reports of fish deaths in the southern Basin
- The short-term rainfall outlook for NSW is for light showers on the southern slopes and ranges this week. Rainfall totals are not expected to result in flooding
- The Heatwave Service for Australia predicts low intensity to severe heatwave conditions for parts of NSW for Thursday through to Friday this week. Heatwave conditions increase the risk of stratification in pools and of low dissolved oxygen when pools mix if air temperature decreases rapidly.

Stages of criticality for dissolved oxygen

Continuous dissolved oxygen sensors located in the Murray, Murrumbidgee, Lachlan and lower Darling river catchments show levels at all sites are above critical ecological thresholds and pose minimal risk to aquatic ecosystems. Figures 1 and 2 highlight the Stages of Criticality at monitoring sites in the Southern Basin. All sites except for the Lachlan River at Booligal are on Criticality Stage 1. Definitions of the Stages of Criticality are below Figure 2. Continuous dissolved oxygen data is available the WaterNSW real time data web site (https://realtimedata.waternsw.com.au/water.stm).

Figure 1: Stages of criticality at continuous dissolved oxygen monitoring sites in the Murrumbidgee and lower Lachlan and Darling rivers

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Figure 2: Stages of criticality at continuous dissolved oxygen monitoring sites in the Murray catchment

Key to dissolved oxygen Stages of Criticality

Stage	Definition
Stage 1	Dissolved oxygen level above 4 mg/L at all times. Low risk to aquatic ecosystems
Stage 2	Daily dissolved oxygen level dropping below 4 mg/L at night/early morning, then increasing to above 4 mg/L during the day. Will impact on fish health, but may not result in deaths
Stage 3	Dissolved oxygen level dropping below 2 mg/L at night/early morning. High risk to aquatic ecosystems. Fish deaths may occur
Stage 4	Dissolved oxygen level remaining below 2 mg/L. Very high risk to aquatic ecosystems. Fish deaths will, or have already occurred

Continuous dissolved oxygen monitoring

In the Lachlan catchment, dissolved oxygen at Booligal was dropping below 3 mg/L last week (Figure 3). At the time the flow rate was less than 50 ML/day. The arrival of higher flows last Friday has increased the discharge to over 950 ML/day (Figure 4). The arrival of the head of the flow did not result in a distinct drop in dissolved oxygen, rather stabilising the readings above 4.5 mg/L. Oxygen levels at sites upstream of Booligal (Willandra Weir and Hillston) are above 6 mg/L, indicating that there is oxygenated water progressing downstream. All sites in the Lachlan valley are remaining above the 2 mg/L critical threshold for fish health, however; Booligal remains on Stage 2 as a precautionary measure.

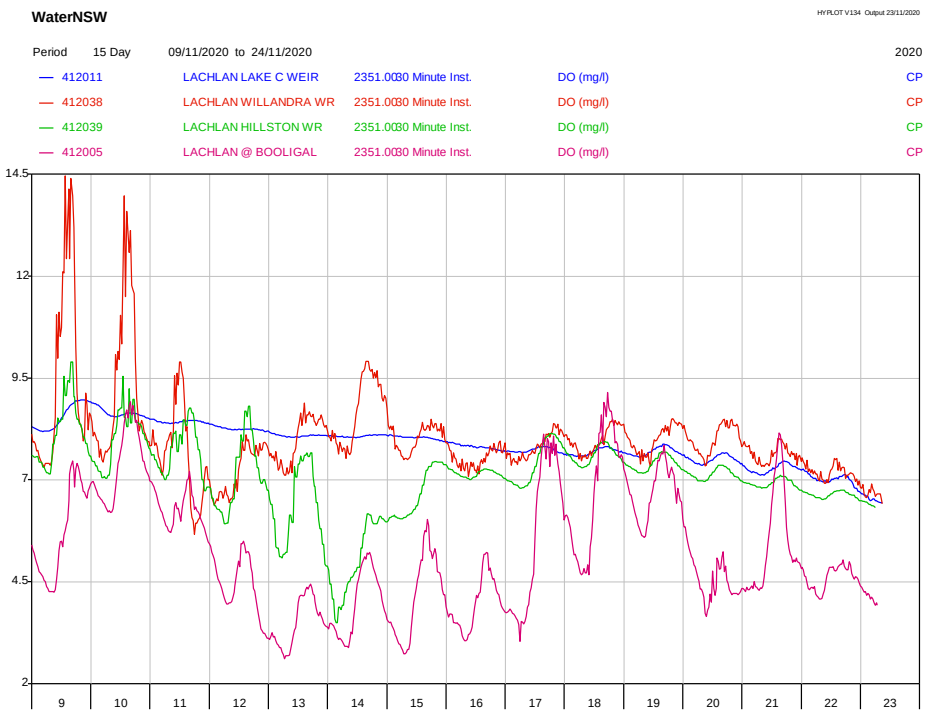

Figure 3: Continuous dissolved oxygen (mg/L) for the Lachlan River

Figure 4: Discharge (ML/day), water temperature (°C) and dissolved oxygen (mg/L) in the Lachlan River at Condobolin

Dissolved oxygen levels at the monitoring sites in the Murrumbidgee River downstream of Maude and Redbank weirs has been slowly declining over the past two weeks (Figure 5). The drop in dissolved oxygen coincides with reduced discharge and increasing water temperature. Oxygen levels remain above critical levels for fish health.

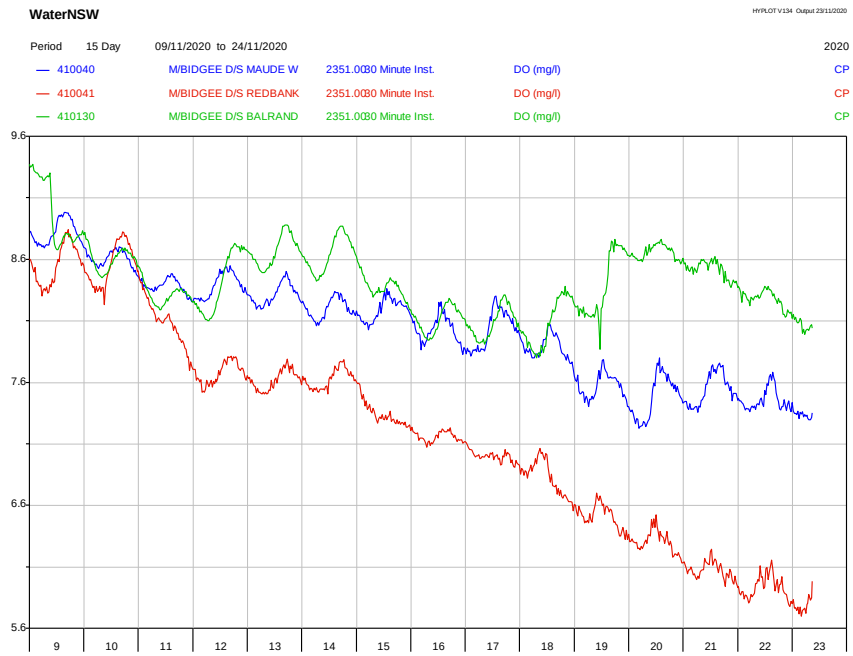

Figure 5: Continuous dissolved oxygen (mg/L) for the Murrumbidgee River

Figure 6 illustrates the dissolved oxygen levels at monitoring locations in the Murray and Edward/Kolety rivers for the past two weeks. Dissolved oxygen in the Edward River/Kolety at both Toonalook and Deniliquin have decreased to around 5 mg/L this week, possibly in response to increasing water temperatures. The lower oxygen levels do not appear to be extending down the Edward River/Kolety to Moulamein.

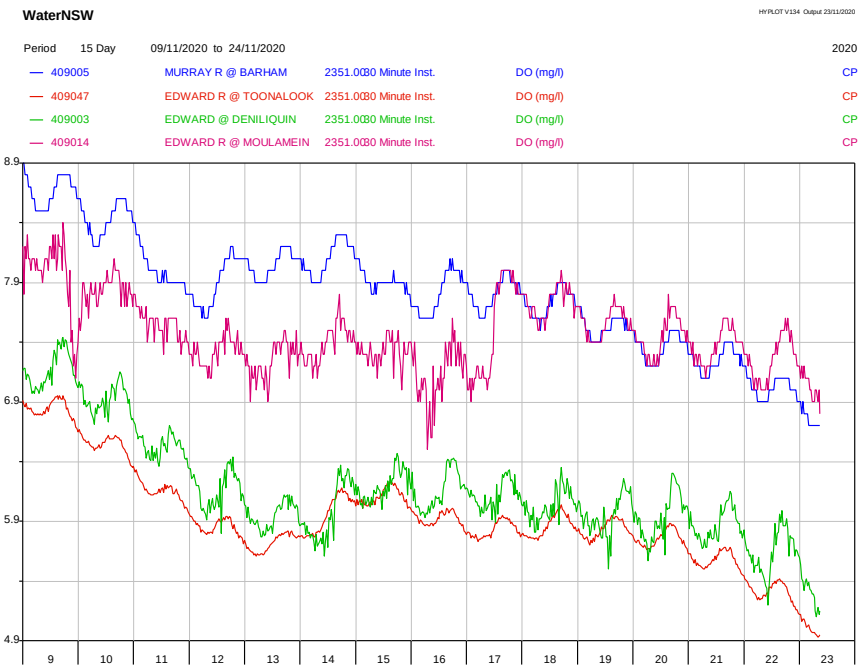

Figure 6: Continuous dissolved oxygen (mg/L) for sites in the Murray and Edward / Kolety rivers

Oxygen levels in the Wakool and Niemur rivers and Merran Creek are remaining above 6 mg/L (Figure 7). Barber Creek at Sandy Bridge Road dropped below 2 mg/L over the weekend but has recovered quickly back up to above 4 mg/L. Wakool River at Stoney Crossing and Barber Creek are not showing a stable daily fluctuation in dissolved oxygen. The Darling River at Burtundy decreased to 4 mg/L in response to increasing water temperatures. All sites in the Murray Valley are above ecological thresholds (Criticality Stage 1).

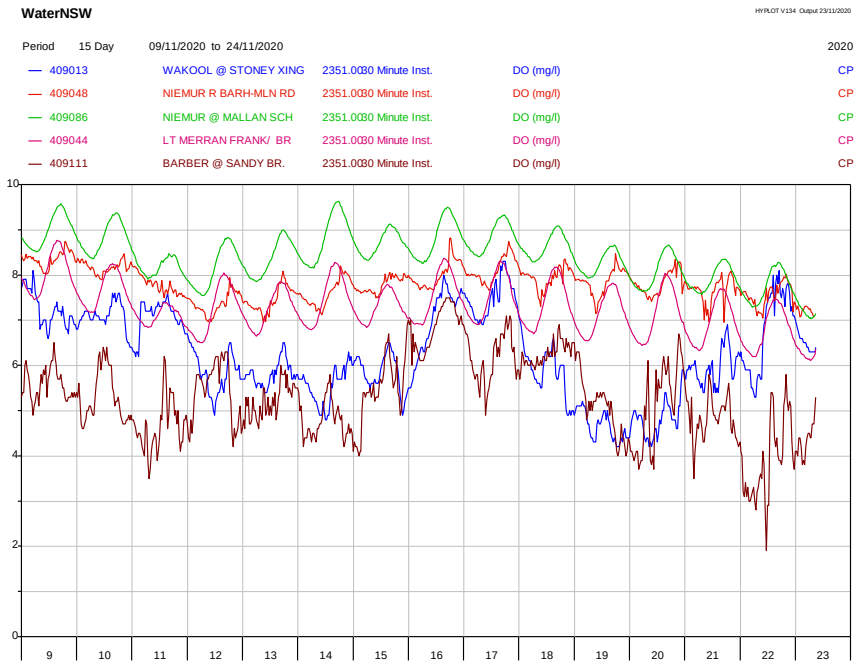

Figure 7: Continuous dissolved oxygen (mg/L) for distributary channels in the Murray catchment

Weather forecast

The Bureau of Meteorology total rainfall forecast (Figure 8) indicates light rainfall across southern NSW. The highest falls are predicted for the southern slopes and ranges over the next four days. Rainfall totals are not expected to result in flooding. The rainfall outlook for December indicates a high chance of wetter than average conditions for most of NSW (Figure 8). La Niña is continuing, indicating above average rainfall for November 2020 through to January 2021. Climate models are suggesting La Niña is likely to peak in December or January. Above average rainfall increases the risk of flooding and the potential for hypoxic, or low oxygen, blackwater events in the southern valleys. Bureau of Meteorology rainfall maps are available at: www.bom.gov.au/jsp/watl/rainfall/pme.jsp

The Heatwave Service for Australia predicts low intensity to severe heatwave conditions for parts of NSW for Thursday through to Friday (Figure 9). Heatwave conditions increase the risk of stratification in pools and of low dissolved oxygen when stratified pools mix if air temperature decreases rapidly. Updates from the Heatwave Service and additional information is available at: www.bom.gov.au/australia/heatwave/

The four-day synoptic forecast (Figure 10) shows a trough will cross NSW at the start of the week, bringing possible showers. An approaching high pressure system will bring dry, settled conditions to NSW for the rest of the week. The predicted rainfall totals for NSW are low, reducing the risk of major flooding triggering a hypoxic blackwater event. Synoptic charts are available from the Bureau of Meteorology web site at: www.bom.gov.au/watl/pressure/index.shtml

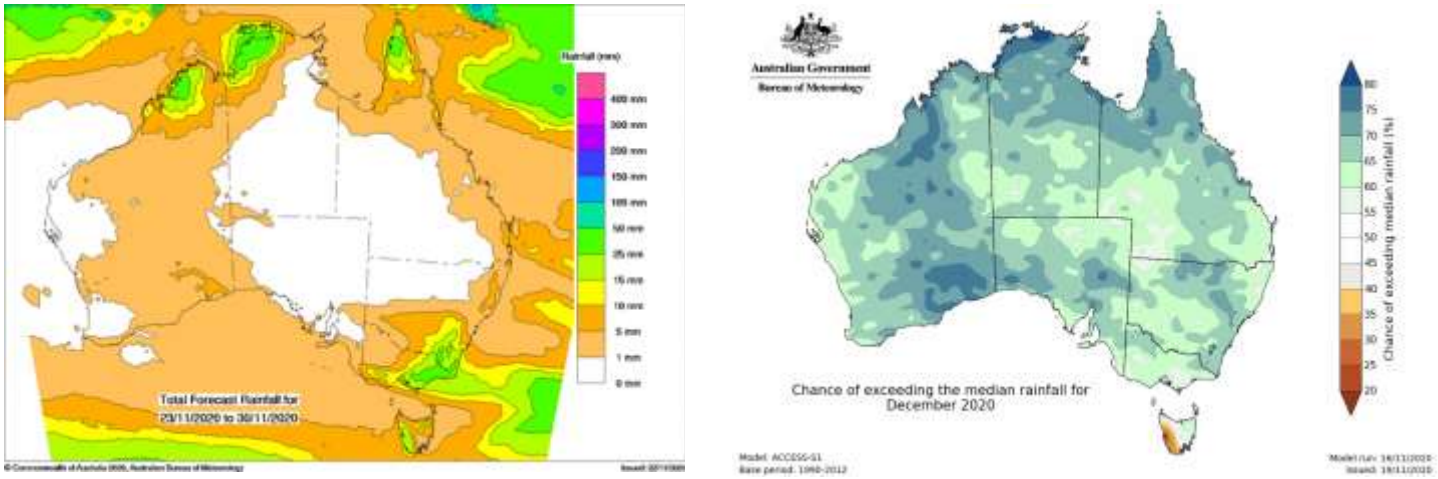

Figure 8: Eight-day rain forecast (left) and chance of exceeding median rainfall for December (right)

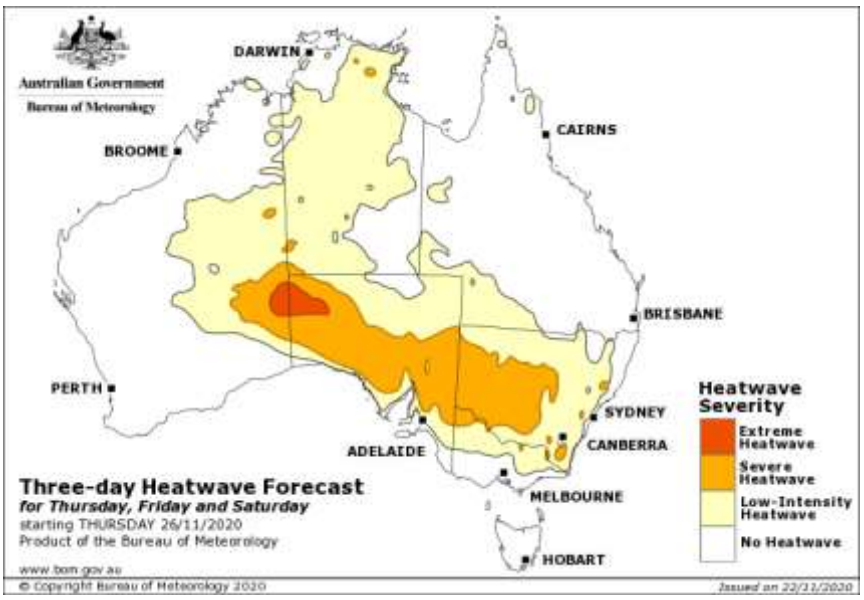

Figure 9: Heatwave Service for Australia three-day heatwave forecast

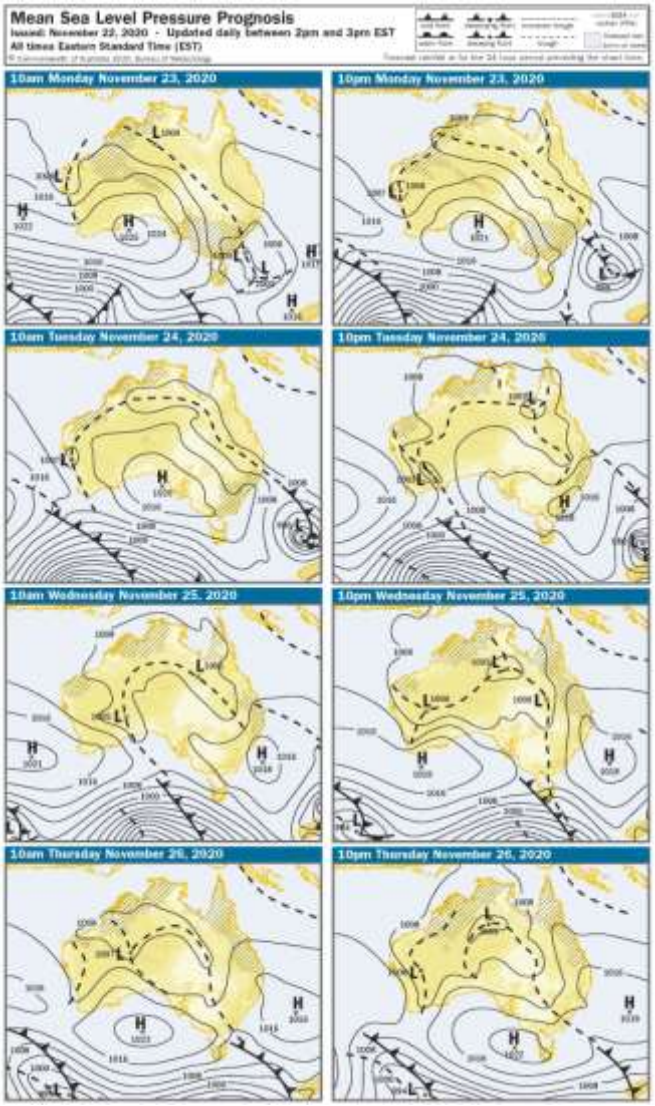

Figure 10: Bureau of Meteorology four-day forecast

Additional information

NSW and Commonwealth agencies will continue to monitor weather and river conditions over the coming summer. To notify the department of potential blackwater events email: waterqualitydata@industry.nsw.gov.au or to report a fish kill call the NSW Fisheries Hotline on 1800 043 536.

Further information on hypoxic blackwater can be found at: www.industry.nsw.gov.au/water/allocations-availability/droughts-floods/drought-update/managing-drought-recovery