NSW Southern Basin dissolved oxygen update No. 7

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 7 December.

Key information

- The arrival of cooler air temperatures last week has seen dissolved oxygen levels improve across the southern Basin. All continuous monitoring sites have dissolved oxygen readings above the 4 mg/L critical threshold for fish health.
- There were no reports of fish deaths following the drop in temperature last week after consecutive days of high air temperatures.
- The short-term rainfall outlook for NSW is for light showers, with the highest falls predicted for the north coast and adjacent ranges. Rainfall totals are not expected to result in flooding or a hypoxic blackwater event.

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 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: realtimedata.waternsw.com.au/water.stm

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

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 to 3 mg/L at the start of last week following consecutive days of high maximum air temperatures (Figure 3). The arrival of cooler air temperatures, combined with higher flows, has seen dissolved oxygen at Booligal improve to above 4 mg/L (Figure 4). Oxygen levels at sites upstream of Booligal (Willandra Weir and Hillston) are above 5 mg/L, indicating that there is oxygenated water progressing downstream. All sites in the Lachlan Valley are remaining above the 4 mg/L critical threshold for fish health.

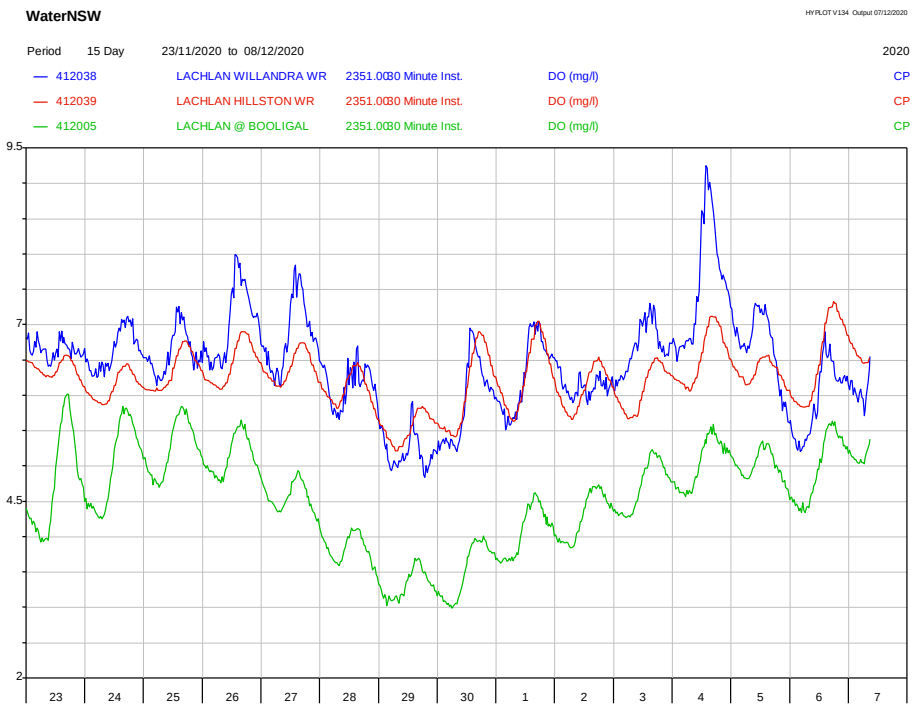

Figure 3: Continuous dissolved oxygen (mg/L) for the Lachlan River at Willandra Weir, Hillston and Booligal since 23 November

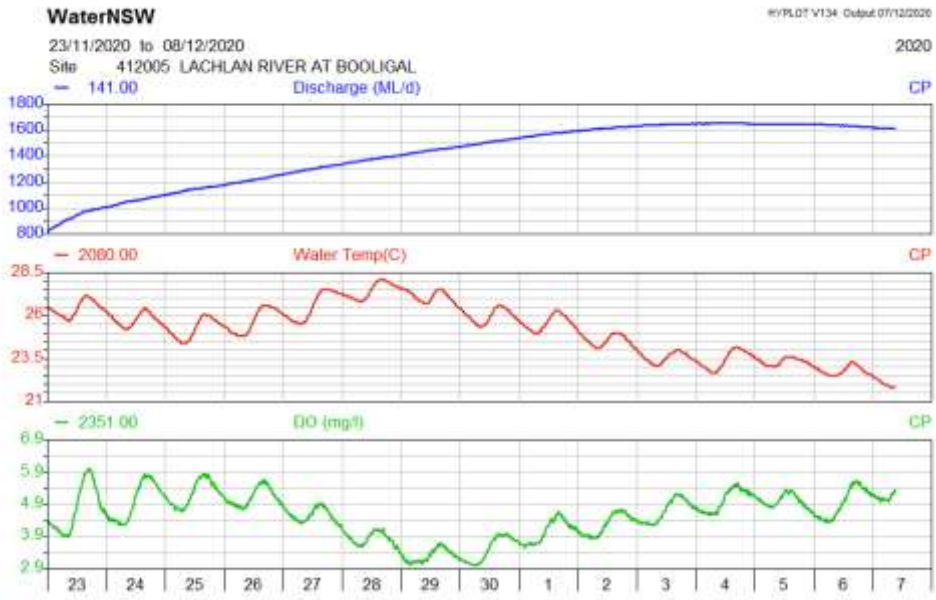

Figure 4: Discharge (ML/day), water temperature (°C) and dissolved oxygen (mg/L) in the Lachlan River at Booligal since 23 November

Dissolved oxygen levels at the monitoring sites in the Murrumbidgee River downstream of Maude, Redbank and Balranald weirs has been remaining above 5.5 mg/L (Figure 5). Oxygen levels in the Darling River at Burtundy decreased below 3 mg/L in response to the high air temperatures, but has recovered back up to above 5.5 mg/L. The pulsed release from Menindee Lakes arrived at Burtundy on 4 December.

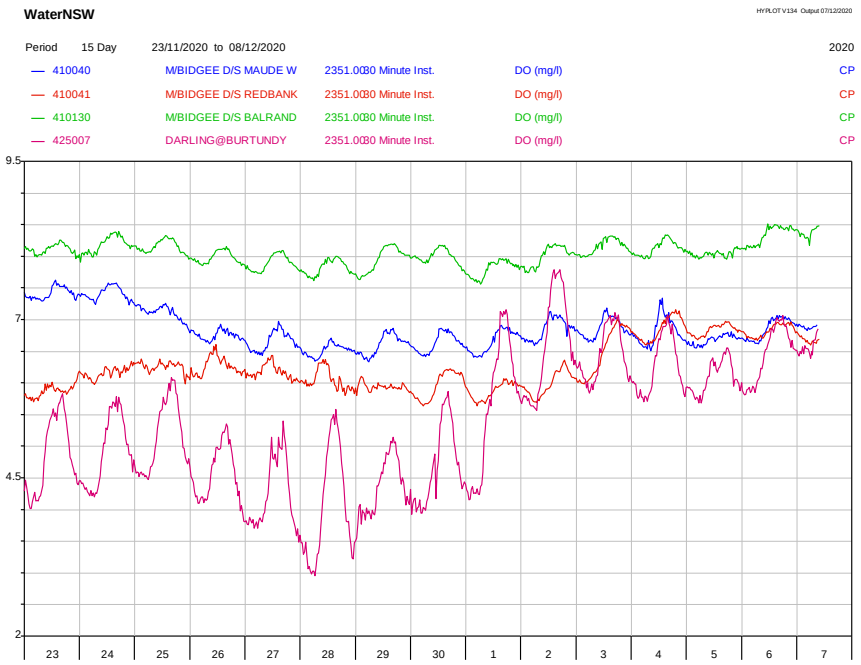

Figure 5: Continuous dissolved oxygen (mg/L) for the Murrumbidgee River downstream of Maude, Redbank and Balranald weirs and the Darling River at Burtundy since 23 November

Figure 6 illustrates the dissolved oxygen levels at monitoring locations in the Murray River and Kolety/Edward River for the past two weeks. Dissolved oxygen in the Kolety/Edward River at both Toonalook and Deniliquin improved to above 5.5 mg/L with the arrival of cooler temperatures.

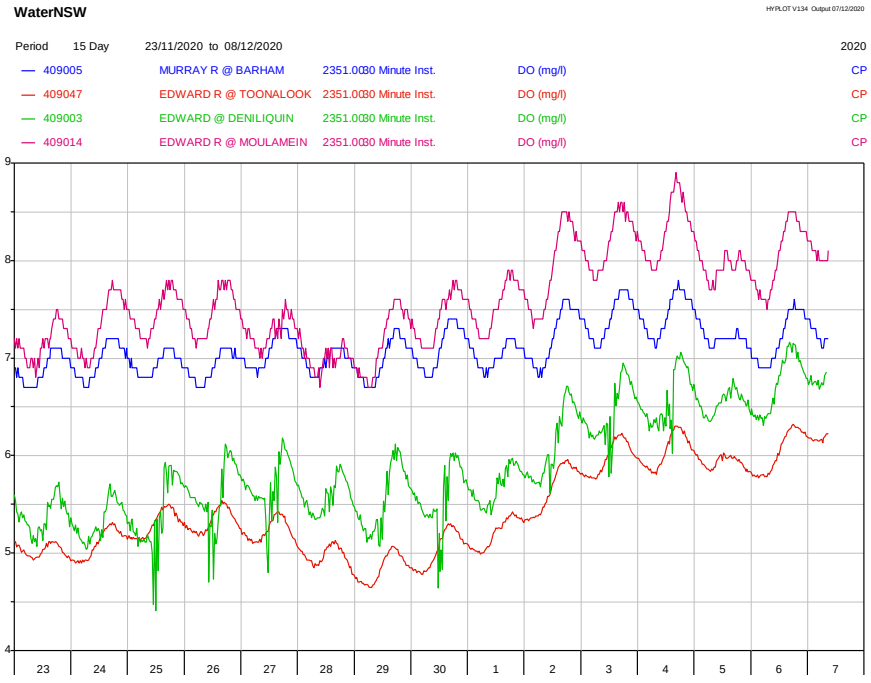

Figure 6: Continuous dissolved oxygen (mg/L) for sites in the Murray River and Kolety / Edward River since 23 November

Oxygen levels in the Wakool and Niemur rivers and Merran Creek are currently above 5.5 mg/L (Figure 7). Barber Creek at Sandy Bridge Road and Wakool River at Stoney Crossing are fluctuating in response to localised conditions. All sites in the Murray Valley are above ecological thresholds (Criticality Stage 1).

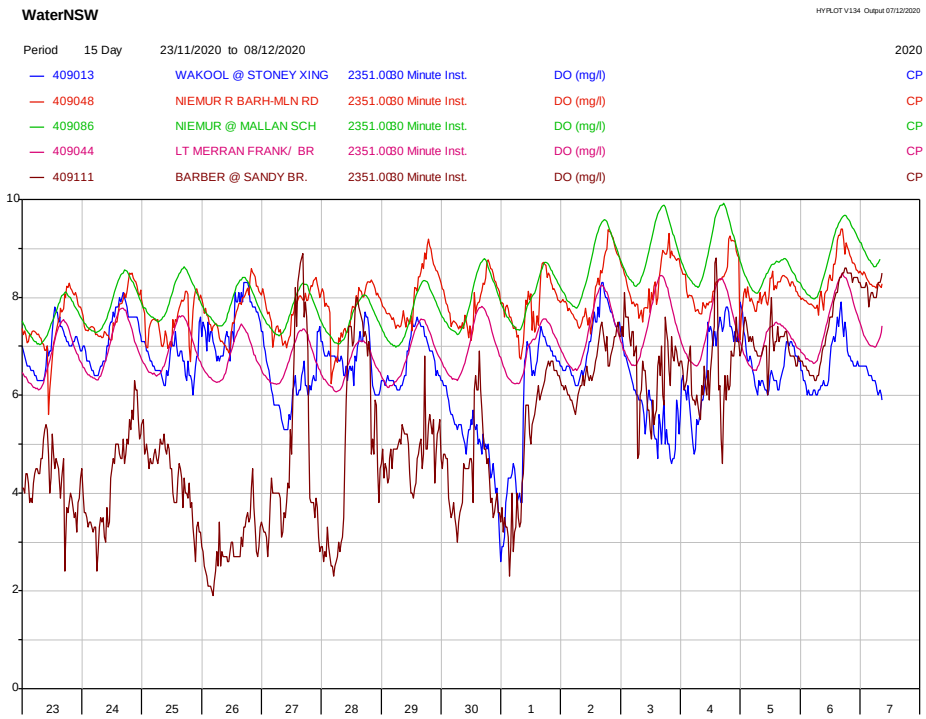

Figure 7: Continuous dissolved oxygen (mg/L) for distributary channels in the Murray catchment since 23 November

Weather forecast

The Bureau of Meteorology total rainfall forecast (Figure 8) indicates light rainfall across northern and central NSW, with higher falls predicted for the north coast and adjacent ranges later in the week. Rainfall totals are not expected to result in widespread flooding. The rainfall outlook for January indicates a slight chance of wetter than average conditions for most of NSW (Figure 8). There is a higher chance of exceeding the maximum January median air temperature in south western NSW and of exceeding the overnight minimums across most of NSW (Figure 8). La Niña is continuing, indicating above average rainfall for December 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

There are no heatwave conditions predicted for this week. Updates from the Heatwave Service for Australia and additional information is available at: www.bom.gov.au/australia/heatwave/

The four-day synoptic forecast (Figure 9) shows a trough crossing NSW could bring showers to north eastern NSW at the start of the week. A following high pressure system will bring dry, settled conditions to most of NSW for the remainder of the week. Onshore winds may bring showers to the coast. 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

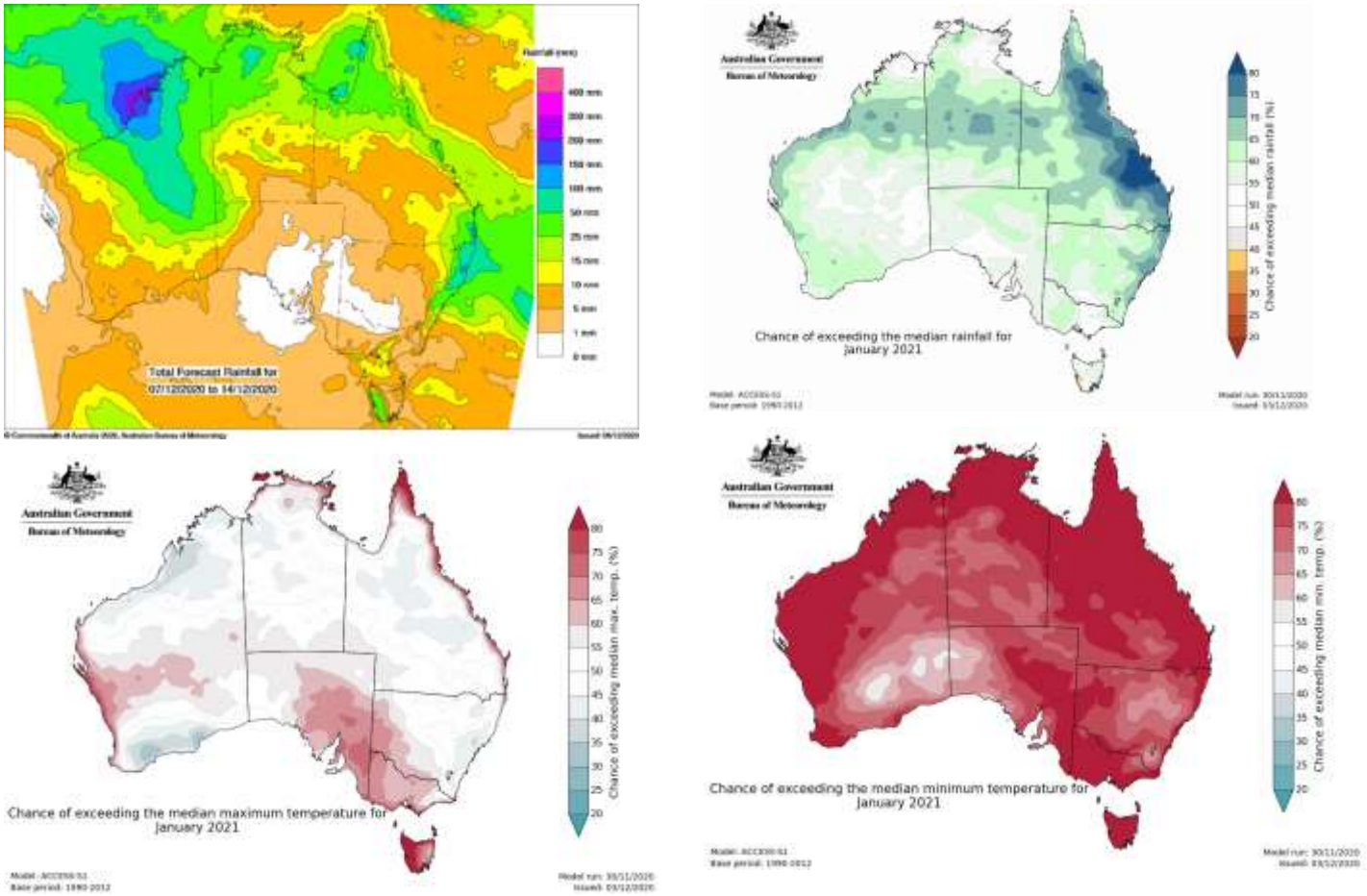

Figure 8: Eight-day rain forecast (upper left), chance of exceeding median rainfall (upper right), median maximum air temperature (lower left) and median minimum air temperature (lower right) for January

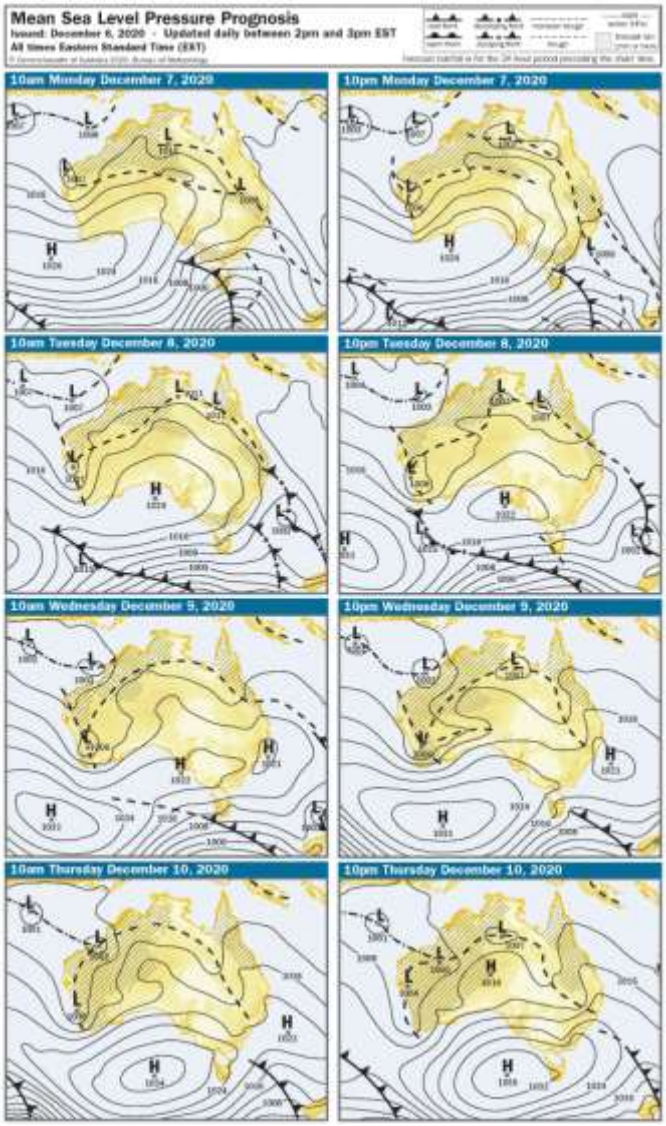

Figure 9: Bureau of Meteorology four-day forecast from Monday 7 December

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